SRM UNIVERSITY
(Under section 3 of UGC Act 1956)

B.TECH. (FULL TIME)

ELECTRONICS AND COMMUNICATION ENGINEERING

CURRICULUM & SYLLABUS

2013-14

Faculty of Engineering and Technology, SRM University
SRM Nagar, Kattankulathur – 603 203

B.Tech - Electronics and Communication Engineering
Curriculum – 2013-14
(Applicable for students admitted from the academic year 2013-14 onwards)

SEMESTER-I						
Course Code	**Category**	**Course Name**	**L**	**T**	**P**	**C**
LE1002	G	Value Education	1	0	0	1
PD1001	G	Soft Skills - I	1	0	1	1
MA1001	B	Calculus and Solid Geometry	3	2	0	4
PY1001	B	Physics	3	0	0	3
PY1002	B	Physics Laboratory	0	0	2	1
CY1001	B	Chemistry	3	0	0	3
CY1002	B	Chemistry Laboratory	0	0	2	1
CE1001	E	Basic Civil Engineering	2	0	0	2
ME1001/ ME1005	E	Basic Mechanical Engineering/ Engineering Graphics	2/1	0	0/4	2/3
EC1001	E	Basic Electronics Engineering	2	0	0	2
EC1002	E	Electronics Engineering Practices	0	0	2	1
NC1001/ NS1001/SP1001/ YG1001	G	NCC/NSS/NSO/Yoga	0	0	1	1
		Total	17/ 16	2	8/ 12	22/ 23
		Total Contact Hours	27/30			

NCC-National Cadet Corps
NSS-National Service Scheme
NSO-National Sports Organization (India)

SEMESTER-II						
Course Code	**Category**	**Course Name**	**L**	**T**	**P**	**C**
LE1001	G	English	1	0	2	2
CS1001	G	Programming using Matlab	1	0	2	2
PD1002	G	Soft Skills - II	1	0	1	1
MA1002	B	Advanced Calculus and Complex Analysis	3	2	0	4
PY1003	B	Material Science	2	0	2	3
CY1003	B	Principles of Environmental Science	2	0	0	2
BT1001	B	Biology for Engineers	2	0	0	2
EE1001	E	Basic Electrical Engineering	2	0	0	2
ME1005/ ME1001	E	Engineering Graphics / Basic Mechanical Engineering	1/2	0	4/0	3/2
EE1002	E	Electrical Engineering Practices	0	0	2	1
EC1003	P	Electric Circuits	3	0	0	3
EC1004	P	Electric Circuits Lab	0	0	2	1
		Total	18/19	2	15/ 11	26/ 25
		Total contact hours	35/32			

SEMESTER-III						
Course Code	**Category**	**Course Name**	**L**	**T**	**P**	**C**
LE1003/ LE1004/ LE1005/ LE1006/ LE1007	G	German Language Phase I / French Language Phase I/ Japanese Language Phase I / Korean Language Phase I / Chinese Language Phase I	2	0	0	2
PD1003	G	Aptitude – I	1	0	1	1
MA1003	B	Transforms and Boundary Value Problems	4	0	0	4
EC1005	P	Electromagnetic Theory and Waveguides	3	0	0	3
EC1006	P	Electron Devices	3	0	0	3
EC1007	P	Digital Systems	3	0	0	3
EC1008	P	Signals and Systems	3	1	0	4
EC1009	P	Electron Devices Lab	0	0	3	2
EC1010	P	Digital Systems Lab	0	0	3	2
		Total	19	1	7	24
		Total contact hours	27			

SEMESTER-IV						
Course Code	**Category**	**Course Name**	**L**	**T**	**P**	**C**
LE1008/ LE1009/ LE1010/ LE1011/ LE1012	G	German Language Phase II / French Language Phase II/ Japanese Language Phase II / Korean Language Phase II / Chinese Language Phase II	2	0	0	2
PD1004	G	Aptitude - II	1	0	1	1
MA1024	B	Probability and Random Process	4	0	0	4
EC1011	P	Transmission Lines and Networks	3	0	0	3
EC1012	P	Electronic Circuits	3	0	0	3
EC1013	P	Linear Integrated Circuits	3	0	0	3
EC1014	P	Electronic Circuits Lab	0	0	3	2
EC1015	P	Linear Integrated Circuits Lab	0	0	3	2
	P	Department Elective - I	3	0	0	3
		Total	19	0	7	23
		Total contact hours	26			

SEMESTER-V						
Course Code	**Category**	**Course Name**	**L**	**T**	**P**	**C**
PD1005	G	Aptitude - III	1	0	1	1
MA1015	B	Discrete Mathematics	4	0	0	4
EC1016	P	Microprocessors and Microcontrollers	3	0	0	3
EC1017	P	Digital Signal Processing	3	1	0	4
EC1018	P	Communication Theory	3	0	0	3
EC1019	P	Processor Lab	0	0	3	2
EC1020	P	Communication Engineering Lab	0	0	3	2
EC1047	P	Industrial Training – I (Training to be undergone after IV semester)	0	0	1	1
	P	Department Elective - II	3	0	0	3
	P	Open Elective - I	3	0	0	3
		Total	20	1	8	26
		Total contact hours	29			

SEMESTER-VI						
Course Code	**Category**	**Course Name**	**L**	**T**	**P**	**C**
PD1006	G	Aptitude - IV	1	0	1	1
EC1021	P	Antenna and Wave Propagation	3	0	0	3
EC1022	P	Microwave and Optical Communication	3	0	0	3
EC1023	P	Digital Communication	3	0	0	3
EC1024	P	Microwave and Optical Communication Lab	0	0	3	2
EC1025	P	Digital Communication Lab	0	0	3	2
EC1049	P	Minor Project	0	0	2	1
	P	Department Elective – III	3	0	0	3
	P	Open Elective – II	3	0	0	3
	P	Open Elective - III	3	0	0	3
		Total	19	0	9	24
		Total contact hours	28			

SEMESTER-VII						
Course Code	**Category**	**Course Name**	**L**	**T**	**P**	**C**
EC1026	P	Wireless Communication	3	0	0	3
EC1027	P	Computer Communication	3	0	0	3
EC1028	P	Elements of Information Theory and Coding	3	0	0	3
EC1029	P	VLSI Design	3	0	0	3
EC1030	P	Network Simulation Lab	0	0	3	2
EC1031	P	VLSI Design Lab	0	0	3	2
EC1048	P	Industrial Training II (Training to be undergone after VI semester)	0	0	1	1
	P	Department Elective – IV	3	0	0	3
	P	Department Elective - V	3	0	0	3
		Total	18	0	7	23
		Total contact hours	25			

SEMESTER-VIII						
Course Code	**Category**	**Course Name**	**L**	**T**	**P**	**C**
EC1050	P	Major Project / Practice School	0	0	24	12
		Total	0	0	24	12
		Total contact hours	24			

DEPARTMENTAL ELECTIVES

Course Code	**Category**	**Course Name**	**L**	**T**	**P**	**C**
EC1101	P	Electromagnetic Interference and Electromagnetic Compatibility	3	0	0	3
EC1102	P	Fundamentals of MEMS	3	0	0	3
EC1103	P	Fundamentals of Nanotechnology	3	0	0	3
EC1104	P	Electronic Measurements & Instrumentation	3	0	0	3
EC1105	P	Sensors and Transducers	3	0	0	3
EC1106	P	Biomedical Instrumentation	3	0	0	3
EC1107	P	Control Engineering	3	0	0	3
EC1108	P	Computer Architecture and Organization	3	0	0	3
EC1109	P	Embedded Systems	3	0	0	3
EC1110	P	Virtual Instrumentation using LabVIEW	3	0	0	3
EC1111	P	Digital Television	3	0	0	3
EC1112	P	Digital Image Processing	3	0	0	3
EC1113	P	Radar and Navigational Aids	3	0	0	3

Course Code	Category	Course Name	L	T	P	C
EC1114	P	Communication Switching Techniques	3	0	0	3
EC1115	P	ASIC design	3	0	0	3
EC1116	P	Embedded C and Microcontroller	3	0	0	3
EC1117	P	Cryptography and Network Security	3	0	0	3
EC1118	P	Satellite Communication and Broadcasting	3	0	0	3
EC1119	P	Mobile Computing	3	0	0	3
EC1120	P	Bluetooth Technology	3	0	0	3
EC1121	P	Communication Network Protocols	3	0	0	3
EC1122	P	Photonics and Optical Networks	3	0	0	3
EC1123	P	RF System Design for Wireless Communications	3	0	0	3
EC1124	P	Neural Network and Fuzzy Logic	3	0	0	3
EC1125	P	Digital Logic Design with PLDs and VHDL	3	0	0	3

OPEN ELECTIVES							
Course Code	Category	Course Name	L	T	P	C	Not to be offered to
EC1201	P	Electronic Circuits & Systems	3	0	0	3	EEE / ICE/ EIE / ITCE / ECSE / SWE
EC1202	P	Telecommunication Systems	3	0	0	3	ITCE / CSE / SWE
EC1203	P	Modern Wireless Communication Systems	3	0	0	3	ITCE

SUMMARY OF CREDITS									
Category	I II	III	IV	V	VI	VII	VIII	Total	%
G (Excluding open and departmental electives)	8	3	3	1	1	-	-	16	8.9
B (Excluding open and departmental electives)	23	4	4	4	-	-	-	35	19.4
E (Excluding open and departmental electives)	13	-	-	-	-	-	-	13	7.2
P (Excluding open and departmental electives)	4	17	13	15	14	17	12	92	51.8
Open Elective	--			3	6			9	5
Dep. Elective	--		3	3	3	6		15	8.3
Total	48	24	23	26	24	23	12	180	100

A.1.1 Mathematics and Basic Sciences Courses

Mathematics	
2013 Curriculum Course Code	**Name of the Course**
MA1001	Calculus and Solid Geometry
MA1002	Advanced Calculus and Complex Analysis
MA1003	Transforms and Boundary value Problems
MA1024	Probability and Random Process
MA1045	Discrete Mathematics, Linear Algebra and Statistics
Basic Sciences	
2013 Curriculum Course Code	**Name of the Course**
PY1001	Physics
PY1002	Physics Laboratory
CY1001	Chemistry
CY1002	Chemistry Laboratory
PY1003	Material Science
CY1003	Principles of Environmental Science
BT1001	Biology for Engineers

Course Number and Title

MA1001 CALCULUS AND SOLID GEOMETRY

Credits / Contact Hours

4 / 75

Instructor Name

Dr.K.Ganesan

Textbooks, References

- Kreyszig Kreyszig E, "Advanced Engineering Mathematics", John Wiley & Sons. Singapore, 10th edition, 2012
- Ganesan K, Sundarammal Kesavan, K.S.Ganapathy Subramanian & V.Srinivasan, "Engineering Mathematics", Gamma publications, Revised Edition, 2013
- Grewal B.S, Higher Engineering Mathematics, Khanna Publications, 42nd Edition, 2012.
- Veerajan T, "Engineering Mathematics I", Tata McGraw Hill Publishing Co, New Delhi, 5th edition, 2006.
- Kandasamy P etal., "Engineering Mathematics", Vol.I (4th revised edition), S.Chand &Co., New Delhi, 2000.
- Narayanan S, Manicavachagom Pillay T.K, Ramanaiah G, "Advanced Mathematics for Engineering students", Volume I (2nd edition), S.Viswanathan Printers and Publishers, 1992.
- Venkataraman M.K., "Engineering Mathematics" – First Year (2nd edition), National Publishing Co., Chennai, 2000

Purpose

To impart analytical ability in solving mathematical problems as applied to the respective branches of Engineering

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To apply advanced matrix knowledge to Engineering problems.
2. To equip themselves familiar with the functions of several variables.
3. To familiarize with the applications of differential equations.
4. To improve their ability in solving geometrical applications of differential calculus problems
5. To expose to the concept of three dimensional analytical geometry.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	K
	X				X						
Mapping of instructional objectives with student outcome	1-5				1-5						

List of Topics Covered

UNIT I - MATRICES (15 hours)

Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties of Eigen values – Cayley – Hamilton

theorem orthogonal reduction of a symmetric matrix to diagonal form – Orthogonal matrices – Reduction of quadratic form to canonical form by orthogonal transformations.

UNIT II - FUNCTIONS OF SEVERAL VARIABLES (15 hours)
Function of two variables – Partial derivatives – Total differential – Taylor's expansion – Maxima and Minima – Constrained Maxima and Minima by Lagrangian Multiplier method – Jacobians – Euler's theorem for homogeneous function.

UNIT III - ORDINARY DIFFERENTIAL EQUATIONS (15 hours)
Linear equations of second order with constant and variable coefficients – Homogeneous equation of Euler type – Equations reducible to homogeneous form – Variation of parameter – Simultaneous first order with constant co-efficient.

UNIT IV - GEOMETRICAL APPLICATIONS OF DIFFERENTIAL CALCULUS (15 hours)
Curvature – Cartesian and polar coordinates – Circle of curvature – Involutes and Evolutes – Envelopes – Properties of envelopes.

UNIT V - THREE DIMENSIONAL ANALYTICAL GEOMETRY(15 hours)
Equation of a sphere – Plane section of a sphere – Tangent Plane – Orthogonal Sphere - Equation of a cone – Right circular cone – Equation of a cylinder – Right circular cylinder.

Course Number and Title	
MA1002 ADVANCED CALCULUS AND COMPLEX ANALYSIS	
Credits / Contact Hours	
4 / 75	
Instructor Name	
Dr.K.Ganesan	
Textbooks, References	
• Kreyszig E, "Advanced Engineering Mathematics", 10th edition, John Wiley & Sons. Singapore, 2012. • Ganesan K, Sundarammal Kesavan, Ganapathy Subramanian K.S & Srinivasan V, "Engineering Mathematics", Gamma publications, Revised Edition, 2013. • Grewal B.S, "Higher Engg Maths", Khanna Publications, 42nd Edition, 2012. • Veerajan T, "Engineering Mathematics I", Tata McGraw Hill Publishing Co., New Delhi, 5th edition, 2006. • Kandasamy P etal., "Engineering Mathematics", Vol.I (4th revised edition), S.Chand &Co., New Delhi, 2000. • Narayanan S, Manicavachagom Pillay T.K, Ramanaiah G, "Advanced Mathematics", for Engineering students, Volume I (2nd edition), S.Viswanathan Printers and Publishers, 1992. • Venkataraman M.K, "Engineering Mathematics" – First Year (2nd edition), National Publishing Co., Chennai, 2000.	
Purpose	
To impart analytical ability in solving mathematical problems as applied to the respective branches of Engineering.	
Prerequisites	**Co-requisites**
Nil	Nil
Required, Elective or Selected Elective (as per Table 5.1a)	
Required	

Instructional Objectives

1. To have knowledge in multiple calculus
2. To improve their ability in Vector calculus
3. To equip themselves familiar with Laplace transform
4. To expose to the concept of Analytical function
5. To familiarize with Complex integration.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X				X						
Mapping of instructional objectives with student outcome	1-5				1-5						

List of Topics Covered

UNIT I - MULTIPLE INTEGRALS (15 hours)
Double integration in Cartesian and polar coordinates – Change of order of integration – Area as a double integral – Triple integration in Cartesian coordinates – Conversion from Cartesian to polar – Volume as a Triple Integral.

UNIT II - VECTOR CALCULUS (15 hours)
Gradient, divergence, curl – Solenoidal and irrotational fields – Vector identities (without proof) – Directional derivatives – Line, surface and volume integrals –Green's, Gauss divergence and Stoke's theorems (without proof) – Verification and applications to cubes and parallelepipeds only.

UNIT III - LAPLACE TRANSFORMS (15 hours)
Transforms of simple functions – Basic operational properties – Transforms of derivatives and integrals – Initial and final value theorems – Inverse transforms – Convolution theorem – periodic functions – Applications of Laplace transforms for solving linear ordinary differential equations up to second order with constant coefficients only.

UNIT IV - ANALYTIC FUNCTIONS (15 hours)
Definition of Analytic Function – Cauchy Riemann equations – Properties of analytic functions - Determination of harmonic conjugate – Milne-Thomson's method – Conformal mappings: 1/z, az, az+b and bilinear transformation.

UNIT V - COMPLEX INTEGRATION (15 hours)
Line integral – Cauchy's integral theorem (without proof) – Cauchy's integral formulae and its applications – Taylor's and Laurent's expansions (statements only) – Singularities – Poles and Residues – Cauchy's residue theorem – Contour integration – Unit circle and semi circular contour.

Course Number and Title

MA1003 TRANSFORMS AND BOUNDARY VALUE PROBLEMS

Credits / Contact Hours

4 / 60

Instructor Name

Dr.K.Ganesan

Textbooks, References

- Kreyszig E, "Advanced Engineering Mathematics", 10th edition, John Wiley & Sons. Singapore, 2012.
- Grewal B.S, "Higher Engg Maths", Khanna Publications, 42nd Edition, 2012.
- Kandasamy P etal. "Engineering Mathematics", Vol. II & Vol. III (4th revised edition), S.Chand & Co., New Delhi, 2000.
- Narayanan S., Manicavachagom Pillay T.K., Ramanaiah G., "Advanced Mathematics for Engineering students", Volume II & III (2nd edition), S.Viswanathan Printers and Publishers, 1992.
- Venkataraman M.K., "Engineering Mathematics" – Vol.III – A & B (13th edition), National Publishing Co., Chennai, 1998.
- Sankara Rao, "Introduction to Partial Differential Equations", 2nd Edition, PHI Learning Pvt. Ltd., 2006.
- Sivaramakrishna Das P. and Vijayakumari.C, "A text book of Engineering Mathematics-III",Viji's Academy,2010

Purpose

To impart analytical ability in solving mathematical problems as applied to the respective branches of Engineering.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To know to formulate and solve partial differential equations
2. To have thorough knowledge in Fourier series
3. To be familiar with applications of partial differential equations
4. To gain good knowledge in the application of Fourier transform
5. To learn about Z- transforms and its applications

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X				X						
Mapping of instructional objectives with student outcome	1-5				1-5						

List of Topics Covered

UNIT I - PARTIAL DIFFERENTIAL EQUATIONS (12 hours)
Formation – Solution of standard types of first order equations – Lagrange's equation – Linear homogeneous partial differential equations of second and higher order with constant coefficients - Classification of second order linear partial differential equations including the reduction to the above types – Separable Variable Method.

UNIT II - FOURIER SERIES (12 hours)
Dirichlet's conditions – General Fourier series – Half range Sine and Cosine series – Parseval's identity – Harmonic Analysis.

UNIT III - ONE DIMENSIONAL WAVE & HEAT EQUATION (12 hours)
Boundary and initial value problems - Transverse vibrations of elastic string with fixed ends – Fourier series solutions – One dimensional heat equation - Steady and transient states – problems – Excluding thermally insulated ends.

UNIT IV - FOURIER TRANSFORMS (12 hours)
Statement of Fourier integral theorem(proof omitted) – Fourier transform pairs – Fourier Sine and Cosine transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval's identity – Integral equations.

UNIT V - Z-TRANFORMS AND DIFFERENCE EQUATIONS (12 hours)

Z-transform – Elementary properties – Inverse Z-transform – Convolution theorem – Formation of Difference equations – Solution of difference equations using Z-transform.

Course Number and Title

MA1024 PROBABILITY AND RANDOM PROCESS

Credits / Contact Hours

4 / 60

Instructor Name

Dr.K.Ganesan

Textbooks, References

- Veerarajan T, "Probability, Statistics and Random Processes", Tata McGraw Hill, 3rd edition, 2008.
- Trivedi K S, "Probability and Statistics with reliability, Queueing and Computer Science Applications",Prentice Hall of India,New Delhi,2nd revised edition, 2002.
- Sivaramakrishna Das P. and Vijayakumari.C,A Textbook of Probability and Random Processes, Viji's academy,2010
- Papoulis, Probability, Random variables and stochastic processes, 4th edition, Tata McGraw Hill Company, 2002.

Purpose

To introduce the students to the idea of probability and random process, an important mathematical tool in signal processing.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To acquire knowledge about Probability and Random variables.
2. To gain knowledge on 2 - D Random variables.
3. To expose to the concepts of Random process.
4. To gain knowledge about the Correlation Functions.
5. To learn about the applications of Fourier Transforms like Spectral Density and others.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X				X						
Mapping of instructional objectives with student outcome	1-5				1-5						

List of Topics Covered

UNIT I-PROBABILITY DISTRIBUTIONS (15 hours)
Random Variables - Moments - Moment generating function - Binomial, Poisson, Geometric, Exponential and Normal distributions - Functions of Random Variables.

UNIT II-TWO DIMENSIONAL RANDOM VARIABLES (12 hours)
Two dimensional Random Variables - Marginal and conditional distributions – Transformation of Random Variables - central limit theorem - simple problems.

UNIT III-RANDOM PROCESSES (12 hours)
Classification of Random processes - Stationarity - WSS and SSS processes - Poisson Random process - Renewal Process - Markov Chain and transition probabilities.

UNIT IV-CORRELATION FUNCTIONS (9 hours)
Autocorrelation function and its properties - Cross Correlation function and its properties - Linear System with Random inputs - Ergodicity.

UNIT V-SPECTRAL DENSITY (12 hours)
Power spectral Density Function - Properties - System in the form of convolution - Unit Impulse Response of the System - Einstein - Weiner-Khinchine Relationship - Cross Power Density Spectrum - Properties.

Course Number and Title

MA1045 DISCRETE MATHEMATICS, LINEAR ALGEBRA & STATISTICS

Credits / Contact Hours

4 / 60

Instructor Name

Dr.K.Ganesan

Textbooks, References

- Alan Doerr and Kenneth Levasseur, "Applied Discrete Structures for Computer Science", Galgotia Publications (P) Ltd, 1992.
- remblay J. P. and Manohar R., Discrete Mathematical Structures with applications to Computer Science, Tata Mc Graw Hill Publishing Co., 35th edition,2008.
- K.S.Narayanan and T.K.Manicavachagam Pillai, S.Viswanathan “Modern Algebra. Vo II” (Printers & Publisher)1983.

REFERENCES:

- V. Sundaresan, K.S. Ganapathy Subramanian and K. Ganesan, Discrete Mathematics, New Revised Edition, A. R. Publications, 2001
- Kolman and Busby, Discrete Mathematical Structures for Computer Science, Prentice Hall, 3rd edition,1997.
- Kenneth H.Rosen, Discrete Mathematics and its Application, Fifth edition, Tata McGraw-Hill Publishing company PVT .Ltd., New Delhi, 2003
- Lipschutz Seymour, Marc Lars Lipson, Discrete Mathematics, Mc Graw Hill Inc., 1992
- Narsing Deo, Graph Theory with applications to Engineering and Computer science, Prentice-Hall of India pvt. Ltd., New Delhi, 1987
- Dr.S.Kandasamy & others S.Chand,”Engineering Maths (Vol III)”, Delhi, April-2005.
- C.L. Liu, Elements of Discrete Mathematics, 2nd Edition, McGraw Hill Publications, 1985.

Purpose

To impart analytical ability to describe, analyze and solving mathematical problems as applied to the respective branches of Engineering in a logical and systematic fashion.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To understand logical and mathematical reasoning and to count / or enumerate objects in a systematic way. To understand mathematical induction and recursion.
2. To understand set theory, relations, and functions and to read, understand and construct mathematical arguments
3. To understand recurrence relation, generating functions and algebraic systems and their applications in coding theory – group codes
4. To have knowledge in linear algebra
5. To have knowledge in regression and correlation.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X				X						
Mapping of instructional objectives with student outcome	1-5				1-5						

List of Topics Covered

UNIT I MATHEMATICAL LOGIC (12 hours)
Propositions and Logical operators - Truth tables and propositions generated by a set - Equivalence and Implication - Tautologies - Laws of logic - Proofs in Propositional calculus - Direct proofs - Conditional conclusions - Indirect proofs - Mathematical Induction - The existential and universal quantifiers - Predicate calculus including theory of inference.

UNIT II SET THEORY (12 hours)
Laws of Set theory - Partition of a set - The duality principle - Relations – Properties - Equivalence relation and partial order relation-poset-Graphs of relations - Hasse diagram - Matrices of relations - Closure operations on relations - Warshall's algorithm - Functions – Combinatorics - Pigeonhole Principle – Generalized Pigeon hole principle

UNIT III RECURRENCE RELATION & ALGEBRAIC SYSTEMS (12 hours)
Recurrence relations - Solving a recurrence relation – Homogeneous and Non-homogeneous Recurrence relations - Formation of Recurrence relations obtained from solutions - Generating functions - Solution of a recurrence relation using generating functions - Groups – Properties - Cyclic groups and subgroups – Properties – Cosets – Lagrange's Theorem - Normal subgroups – Group Homomorphism.

UNIT IV VECTOR SPACE AND LINEAR TRANSFORMATION (12 hours)
Vector space – Subspaces - Linear span - Linear independence and dependence-Basis-Algebra of linear transformations-Inner product space- Gramh-Schmidt Orthogonalization Process.(Theorems without proof)

UNIT V REGRESSION AND CORRELATION (12 hours)
Regression methods - Principle of least squares - Correlation - Multiple and Partial correlation - Linear and non-linear regression - Multiple linear regression

Course Number and Title

PY1001 PHYSICS

Credits / Contact Hours

3 / 45

Instructor Name

Dr.Krishna Mohan

Textbooks, References

- Thiruvadigal J. D, Ponnusamy S, Sudha D and Krishnamohan M, "Physics for Technologists", Vibrant Publication, Chennai, 2013.
- Dattu R.Joshi, "Engineering Physics", Tata McGraw- Hill,New Delih, 2010.
- Wole Soboyejo, "Mechanical Properties of Engineered Materials", Marcel Dekker Inc., 2003
- Frank Fahy, "Foundations of Engineering Acoustics", Elsevier Academic Press, 2005.
- Alberto Sona, "Lasers and their applications", Gordon and Breach Science Publishers Ltd., 1976
- David J. Griffiths, "Introduction to electrodynamics", 3rd ed., Prentice Hall, 1999.
- Leonard. I. Schiff, "Quantum Mechanics", Third Edition, Tata McGraw Hill, 2010
- Charles Kittel, "Introduction to Solid State Physics", Wiley India Pvt. Ltd, 7th ed., 2007
- Godfrey Boyle, "Renewable Energy: Power sustainable future", 2nd edition, Oxford University Press, UK, 2004

Purpose

The purpose of this course is to provide an understanding of physical concepts and underlying various engineering and technological applications. In addition, the course is expected to develop scientific temperament and analytical skill in students, to enable them logically tackle complex engineering problems in their chosen area of application.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To understand the general scientific concepts required for technology
2. To apply the Physics concepts in solving engineering problems
3. To educate scientifically the new developments in engineering and technology
4. To emphasize the significance of Green technology through Physics principles

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X		X		X						X
Mapping of instructional objectives with student outcome	1		4		2						3

List of Topics Covered

UNIT I – MECHANICAL PROPERTIES OF SOLIDS AND ACOUSTICS (9 hours)

Mechanical properties of solids: Stress-strain relationship – Hooke's law – Torsional Pendulum – Young's modulus by cantilever – Uniform and non-uniform bending — Stress-strain diagram for various engineering materials – Ductile and

brittle materials – Mechanical properties of Engineering materials (Tensile strength, Hardness, Fatigue, Impact strength, Creep) – Fracture – Types of fracture (Elementary ideas).
Acoustics: Intensity – Loudness – Absorption coefficient and its determination – Reverberation – Reverberation time – Factors affecting acoustics of buildings and their remedies – Sources and impacts of noise – Sound level meter – Strategies on controlling noise pollution – Ultrasonic waves and properties – Methods of Ultrasonic production (Magnetostriction and Piezoelectric) – Applications of Ultrasonics in Engineering and medicine.

UNIT II – ELECTROMAGNETIC WAVES, CIRCUITS AND APPLICATIONS (9 hours)
Del operator – grad, div, curl and their physical significances - displacement current –Maxwell's equations (derivation) – Wave equation for electromagnetic waves – Propagation in free space – Poynting theorem – Characteristic of Transverse electric and magnetic waves – Skin depth – Rectangular and circular waveguides – High powered vacuum-based cavity magnetrons – Applications including radars, microwave oven and lighting systems.

UNIT III – LASERS AND FIBER OPTICS (9 hours)
Lasers: Characteristics of Lasers – Einstein's coefficients and their relations – Lasing action – Working principle and components of CO_2 Laser, Nd-YAG Laser, Semiconductor diode Laser, Excimer Laser and Free electron Laser – Applications in Remote sensing, holography and optical switching – Mechanism of Laser cooling and trapping.
Fiber Optics: Principle of Optical fiber – Acceptance angle and acceptance cone – Numerical aperture – V-number – Types of optical fibers (Material, Refractive index and mode) – Photonic crystal fibers – Fiber optic communication – Fiber optic sensors.

UNIT IV – QUANTUM MECHANICS AND CRYSTAL PHYSICS (9 hours)
Quantum mechanics: Inadequacies of Classical Mechanics – Duality nature of electromagnetic radiation – De Broglie hypothesis for matter waves – Heisenberg's uncertainty principle –Schrödinger's wave equation – Particle confinement in 1D box (Infinite Square well potential). **Crystal Physics:** Crystal directions – Planes and Miller indices – Symmetry elements – Quasi crystals – Diamond and HCP crystal structure – Packing factor – Reciprocal lattice – Diffraction of X-rays by crystal planes – Laue method and powder method – Imperfections in crystals.

UNIT V – GREEN ENERGY PHYSICS (9 hours)
Introduction to Green energy – **Solar energy:** Energy conversion by photovoltaic principle – Solar cells – **Wind energy:** Basic components and principle of wind energy conversion systems – **Ocean energy:** Wave energy – Wave energy conversion devices – Tidal energy – single and double basin tidal power plants – Ocean Thermal Electric Conversion (OTEC) – **Geothermal energy:** Geothermal sources (hydrothermal, geo-pressurized hot dry rocks, magma) – **Biomass:** Biomass and bio-fuels – bio-energies from wastages – **Fuel cells**: H_2O_2 – **Futuristic Energy:** Hydrogen – Methane Hydrates – Carbon capture and storage (CCS).
* One problem sheet consisting of 10 to 15 problems is to be prepared for each unit and discussed in the class.
* Few problems based on design considerations related to appropriate branches of engineering can be incorporated in each problem sheet

Course Number and Title
PY1002 PHYSICS LABORATORY
Credits / Contact Hours
1 / 30
Instructor Name
Dr.T.Kalai vani
Textbooks, References

- Thiruvadigal J. D, Ponnusamy S, Sudha D and Krishnamohan M, "Physics for Technologists", Vibrant Publication, Chennai, 2013.
- Shukla R.K and Anchal Srivastava, "Practical Physics", 1st Edition, New Age International (P) Ltd, New Delhi, 2006.
- Souires G.L, "Practical Physics:", 4th Edition, Cambridge University, UK, 2001
- Chattopadhyay D, Rakshit P.C. and Saha B, "An Advanced Course in Practical Physics", 2nd ed., Books & Allied Ltd., Calcutta, 1990.

Purpose

The purpose of this course is to develop scientific temper in experimental techniques and to reinforce the physics concepts among the engineering students

Prerequisites	Co-requisites
Nil	PY1001

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To gain knowledge in the scientific methods and learn the process of measuring different Physical variables
2. Develop the skills in arranging and handling different measuring instruments
3. Get familiarized with experimental errors in various physical measurements and to plan / suggest on how the contributions could be made of the same order, so as to minimize the errors

Student Outcomes from Criterion 3 covered by this Course

	a	b	c	d	e	f	g	h	i	j	k
Student outcome	X	X			X						
Mapping of instructional objectives with student outcome	1	3			2						

List of Topics Covered

LIST OF EXPERIMENTS

1. Determination of Young's modulus of a given material – Uniform / Non-uniform bending methods.
2. Determination of Rigidity modulus of a given material – Torsion pendulum
3. Determination of dispersive power of a prism – Spectrometer
4. Determination of laser parameters – divergence and wavelength for a given laser source –laser grating/ Particle size determination using laser
5. Study of attenuation and propagation characteristics of optical fiber cable
6. Calibration of voltmeter / ammeter using potentiometer
7. Construction and study of IC regulation properties of a given power supply
8. Study of electrical characteristics of a solar cell
9. Mini Project – Concept based Demonstration

Course Number and Title

CY1001 CHEMISTRY

Credits / Contact Hours

3 / 45

Instructor Name

Dr. R. Jeyalakshmi

Textbooks, References

- Kamaraj P & Arthanareeswari M, "Applied Chemistry", 9th Edition, Sudhandhira Publications, 2012.
- Dara S.S, "A Text book of Engineering Chemistry", 10th Edition, S.Chand & Company Ltd., New Delhi, 2003
- Jain P.C and Monika Jain, "Engineering Chemistry", Danpat Rai publishing company (P) Ltd, New Delhi, 2010.
- Helen P Kavitha, "Engineering Chemistry – I", Scitech Publications, 2nd edition, 2008.

Purpose

To enable the students to acquire knowledge in the principles of chemistry for engineering applications

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. The quality of water and its treatment methods for domestic and industrial applications
2. The classification of polymers, different types of polymerizations, preparation, properties and applications of important polymers and FRPs.
3. The phase rule and its application to one and two component systems
4. The principle, types and mechanism of corrosion and protective coatings.
5. The classification and selection of lubricants and their applications.
6. The basic principles, instrumentation and applications of analytical techniques

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X		X						X
Mapping of instructional objectives with student outcome	1-6	1,6	3		2,5						4

List of Topics Covered

UNIT I - WATER TREATMENT (9 hours)

Water quality parameters: Physical, Chemical & Biological significance - Hardness of water - estimation of hardness (EDTA method) - Dissolved oxygen – determination (Winkler's method), Alkalinity - determination - disadvantages of using hard water in boilers: Scale, sludge formation - disadvantages - prevention - treatment: Internal conditioning - phosphate, carbon and carbonate conditioning methods - External: Zeolite, ion exchange methods - desalination - reverse osmosis and electro dialysis - domestic water treatment.

UNIT II - POLYMERS AND REINFORCED PLASTICS (9 hours)
Classification of polymers - types of polymerization reactions - mechanism of addition polymerization: free radical, ionic and Ziegler - Natta - effect of structure on the properties of polymers - strength, plastic deformation, elasticity and crystallinity - Preparation and properties of important resins: Polyethylene, PVC, PMMA, Polyester, Teflon, Bakelite and Epoxy resins - compounding of plastics - moulding methods - injection, extrusion, compression and calendaring - reinforced plastics - FRP – Carbon and Glass- applications.

UNIT III - PHASE EQUILIBRIA, LUBRICANTS AND ADHESIVES (9 hours)
Phase rule: Statement - explanation of the terms involved - one component system (water system only). Condensed phase rule - thermal analysis - two component systems: simple eutectic, Pb-Ag; compound formation, Zn-Mg.
Lubricants: Classification –solid, semi solid, liquid, emulsion- properties – selection of lubricants for different purposes, Adhesives: classification-natural, synthetic, inorganic- Adhesive action - applications.

UNIT IV - CORROSION AND ITS CONTROL (9 hours)
Corrosion: Basic concepts - mechanism of chemical, electrochemical corrosion - Pilling Bedworth rule – Types of Electrochemical corrosion - galvanic corrosion - differential aeration corrosion - pitting corrosion - stress corrosion – Measurement of corrosion (wt. loss method only) - factors influencing corrosion. Corrosion control: Cathodic protection - sacrificial anodic method - corrosion inhibitors. Protective coatings: surface preparation for metallic coatings - electro plating (copper plating) and electroless plating (Nickel plating) - chemical conversion coatings - anodizing, phosphating & chromate coating.

UNIT V - INSTRUMENTAL METHODS OF ANALYSIS (9 hours)
Basic principles, instrumentation and applications of potentiometry, UV - visible spectroscopy, infrared spectroscopy, atomic absorption spectroscopy and flame photometry.

Course Number and Title

CY1002 CHEMISTRY LABORATORY

Credits / Contact Hours

1 / 30

Instructor Name

Dr. R. Jeyalakshmi

Textbooks, References

- Kamaraj & Arthanareeswari, Sudhandhira Publications “Practical Chemistry” (work book) , 2011.
- Helen P. Kavitha “Chemistry Laboratory Manual” , Scitech Publications, 2008

Purpose

To apply the concepts of chemistry and develop analytical skills for applications in engineering.

Prerequisites	Co-requisites
Nil	CY1001

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To enable the students to understand the basic concepts involved in the analyses.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X									X
Mapping of instructional objectives with student outcome	1	1									1

List of Topics Covered

LIST OF EXPERIMENTS

1. Preparation of standard solutions
2. Estimation of total, permanent and temporary hardness by EDTA method
3. Conductometric titration - determination of strength of an acid
4. Estimation of iron by potentiometry.
5. Determination of molecular weight of polymer by viscosity average method
6. Determination of dissolved oxygen in a water sample by Winkler's method
7. Determination of Na / K in water sample by Flame photometry (Demonstration)
8. Estimation of Copper in ore
9. Estimation of nickel in steel
10. Determination of total alkalinity and acidity of a water sample.
11. Determination of rate of corrosion by weight loss method.

Course Number and Title

PY1003 MATERIALS SCIENCE

Credits / Contact Hours

3 / 60

Instructor Name

Dr.C. Prefrential Kala

Textbooks, References

- Thiruvadigal J. D, Ponnusamy S, Sudha D and Krishnamohan M, "Materials Sciences", Vibrant Publication, Chennai, 2013.
- Rajendran V, "Materials Science",Tata McGraw- Hill,New Delhi, 2011.
- Rolf E. Hummel, "Electronic Properties of Materials", 4th ed., Springer, New York, 2011.
- Dennis W. Prather, "Photonic Crystals: Theory, Applications, and Fabrication", John Wiley & Sons, Hoboken, 2009.
- James R. Janesick, "Scientific Charge-Coupled Devices", Published by SPIE - The International Society for Optical Engineering, Bellingham, Washington, 2001.
- David M. Pozar, "Microwave Engineering", 3rd ed., John Wiley & Sons, 2005.
- Silver F and Dillion C, "Biocompatibility: Interactions of Biological and Implantable Materials", VCH Publishers, New York, 1989.
- Severial Dumitriu, "Polymeric Biomaterials" Marcel Dekker Inc, CRC Press, Canada 2001.
- Cao G, "Nanostructures and Nanomaterials: Synthesis, Properties and Applications", Imperial College Press, 2004.
- Pradeep T, "A Text Book of Nanoscience and Nanotechnology", Tata McGraw Hill, New Delhi, 2012.

- Sam Zhang, “Materials Characterization Techniques”, CRC Press, 2008.

Purpose

The course introduces several advanced concepts and topics in the rapidly evolving field of material science. Students are expected to develop comprehension of the subject and to gain scientific understanding regarding the choice and manipulation of materials for desired engineering applications.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To acquire basic understanding of advanced materials, their functions and properties for technological applications
2. To emphasize the significance of materials selection in the design process
3. To understand the principal classes of bio-materials and their functionalities in modern medical science.
4. To get familiarize with the new concepts of Nano Science and Technology.
5. To educate the students in the basics of instrumentation, measurement, data acquisition, interpretation and analysis.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X		X	X						X
Mapping of instructional objectives with student outcome	1	5		4	2						3

List of Topics Covered

UNIT I – ELECTRONIC AND PHOTONIC MATERIALS (6 hours)
Electronic Materials: Fermi energy and Fermi–Dirac distribution function – Variation of Fermi level with temperature in intrinsic and extrinsic semiconductors – Hall effect – Dilute Magnetic Semiconductors (DMS) and their applications
Superconducting Materials: Normal and High temperature superconductivity – Applications.
Photonic Materials: LED – LCD – Photo conducting materials – Photo detectors – Photonic crystals and applications – Elementary ideas of Non-linear optical materials and their applications.

UNIT II – MAGNETIC AND DIELECTRIC MATERIALS (6 hours)
Magnetic Materials: Classification of magnetic materials based on spin – Hard and soft magnetic materials – Ferrites, garnets and magnetoplumbites – Magnetic bubbles and their applications – Magnetic thin films – Spintronics and devices (Giant magneto resistance, Tunnel magneto resistance and Colossal magneto resistance).
Dielectric Materials: Polarization mechanisms in dielectrics – Frequency and temperature dependence of polarization mechanism – Dielectric loss – Dielectric waveguide and dielectric resonator antenna – Piezoelectric, pyroelectric and ferroelectric materials and their applications.

UNIT III – MODERN ENGINEERING AND BIOMATERIALS (6 hours)
Modern Engineering Materials: Smart materials – Shape memory alloys – Chromic materials (Thermo, Photo and Electro) – Rheological fluids – Metallic glasses – Advanced ceramics – Composites.
Bio-materials: Classification of bio-materials (based on tissue response) – Comparison of properties of some common biomaterials – Metallic implant materials (stainless steel, cobalt-based and titanium-based alloys) – Polymeric implant materials (Polyamides, polypropylene, Acrylic resins and Hydrogels) – Tissue replacement implants – Soft and hard tissue replacements – Skin implants – Tissue engineering – Biomaterials for organ replacement (Bone substitutes) – Biosensor.

UNIT IV – INTRODUCTION TO NANOSCIENCE AND NANOTECHNOLOGY (6 hours)

Basic concepts of Nanoscience and Nanotechnology – Quantum wire – Quantum well – Quantum dot – fullerenes – Graphene – Carbon nanotubes – Material processing by chemical vapor deposition and physical vapor deposition – Principle of SEM, TEM, AFM, Scanning near-field optical microscopy (SNOM) – Scanning ion-conducting microscopy (SCIM) – Potential uses of nanomaterials in electronics, robotics, computers, sensors, sports equipment, mobile electronic devices, vehicles and transportation – Medical applications of nanomaterials.

UNIT V – MATERIALS CHARACTERIZATION (6 hours)

X-ray diffraction, Neutron diffraction and Electron diffraction– X-ray fluorescence spectroscopy – Fourier transform Infrared spectroscopy (FTIR) – Ultraviolet and visible spectroscopy (UV-Vis) – Thermogravimetric Analysis (TGA) – Differential Thermal Analysis (DTA) – Differential Scanning Calorimetry (DSC).

Course Number and Title

CY1003 PRINCIPLES OF ENVIRONMENTAL SCIENCE

Credits / Contact Hours

2 / 30

Instructor Name

Dr. H. Suhana

Textbooks, References

- Kamaraj P & Arthanareeswari M, "Environmental Science – Challenges and Changes", 4th Edition, Sudhandhira Publications, 2010.
- Sharma B.K and Kaur, "Environmental Chemistry", Goel Publishing House, Meerut, 1994.
- De.A.K, "Environmental Chemistry", New Age International, New Delhi, 1996.
- Helen P Kavitha, "Principles of Environmental Science", Sci tech Publications, 2nd Edition, 2008.

Purpose

The course provides a comprehensive knowledge in environmental science, environmental issues and the management.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To gain knowledge on the importance of environmental education and ecosystem
2. To acquire knowledge about environmental pollution- sources, effects and control measures of environmental pollution.
3. To understand the treatment of wastewater and solid waste management.
4. To acquire knowledge with respect to biodiversity, its threats and its conservation and appreciate the concept of interdependence.
5. To be aware of the national and international concern for environment for protecting the environment

Student Outcomes from Criterion 3 covered by this Course											
Student outcome	a	b	c	d	e	f	g	h	i	j	k
			X		X	X		X	X	X	
Mapping of instructional objectives with student outcome			5		2	4		1,3	3	2, 5	

List of Topics Covered

UNIT I - ENVIRONMENTAL EDUCATION AND ECOSYSTEMS (6 hours)
Environmental education: Definition and objective. Structure and function of an ecosystem – ecological succession – primary and secondary succession - ecological pyramids – pyramid of number, pyramid of energy and pyramid of biomass.

UNIT II - ENVIRONMENTAL POLLUTION (6 hours)
Environmental segments – structure and composition of atmosphere - Pollution – Air, water, soil , thermal and radiation – Effects – acid rain, ozone layer depletion and green house effect – control measures – determination of BOD, COD, TDS and trace metals.

UNIT III - WASTE MANAGEMENT (6 hours)
Waste water treatment (general) – primary, secondary and tertiary stages.
Solid waste management: sources and effects of municipal waste, bio medical waste - process of waste management.

UNIT IV - BIODIVERSITY AND ITS CONSERVATION (6 hours)
Introduction: definition - genetic, species and ecosystem diversity – bio diversity hot spots - values of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - threats to biodiversity: habitat loss, poaching of wildlife – endangered and endemic species of India, Conservation of biodiversity: in-situ and ex-situ conservations.

UNIT V - ENVIRONMENTAL PROTECTION (6 hours)
National concern for environment: Important environmental protection acts in India – water, air (prevention and control of pollution) act, wild life conservation and forest act – functions of central and state pollution control boards - international effort – key initiatives of Rio declaration, Vienna convention, Kyoto protocol and Johannesburg summit.

Course Number and Title

BT1001 BIOLOGY FOR ENGINEERS

Credits / Contact Hours

2 / 30

Instructor Name

Mr .K .Balagangadharan

Textbooks, References

- ThyagaRajan S, Selvamurugan N, Rajesh M. P, Nazeer R. A, Richard W. Thilagaraj, Barathi S, and Jaganathan M. K, "Biology for Engineers," Tata McGraw-Hill, New Delhi, 2012.
- Jeremy M. Berg, John L. Tymoczko and Lubert Stryer, "Biochemistry," W.H. Freeman and Co. Ltd., 6th Ed., 2006.
- Robert Weaver, "Molecular Biology," MCGraw-Hill, 5th Edition, 2012.
- Jon Cooper, "Biosensors A Practical Approach" Bellwether Books**, 2**004.
- Martin Alexander, "Biodegradation and Bioremediation," Academic Press, 1994.
- Kenneth Murphy, "Janeway's Immunobiology," Garland Science; 8th edition, 2011.
- Eric R. Kandel, James H. Schwartz, Thomas M. Jessell, "Principles of Neural Science, McGraw-Hill, 5th

Edition, 2012.

Purpose

The purpose of this course is to provide a basic understanding of biological mechanisms of living organisms from the perspective of engineers. In addition, the course is expected to encourage engineering students to think about solving biological problems with engineering tools.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To familiarize the students with the basic organization of organisms and subsequent building to a living being
2. To impart an understanding about the machinery of the cell functions that is ultimately responsible for various daily activities.
3. To provide knowledge about biological problems that requires engineering expertise to solve them.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X			X						X	
Mapping of instructional objectives with student outcome	1			2						3	

List of Topics Covered

UNIT I - BASIC CELL BIOLOGY (6 hours)
Introduction: Methods of Science-Living Organisms: Cells and Cell theory Cell Structure and Function, Genetic information, protein synthesis, and protein structure, Cell metabolism-Homoeostasis- Cell growth, reproduction, and differentiation.

UNIT II - BIOCHEMISTRY AND MOLECULAR ASPECTS OF LIFE (5 hours)
Biological Diversity --Chemistry of life: chemical bonds--Biochemistry and Human biology--Protein synthesis—Stem cells and Tissue engineering.

UNIT III - ENZYMES AND INDUSTRIAL APPLICATIONS (5 hours)
Enzymes: Biological catalysts, Proteases, Carbonic anhydrates, Restriction enzymes, and Nucleoside monophosphate kinases—Photosynthesis

UNIT IV - MECHANOCHEMISTRY (7 hours)
Molecular Machines/Motors—Cytoskeleton—Bioremediation—Biosensors

UNIT V - NERVOUS SYSTEM, IMMUNE SYSTEM, AND CELL SIGNALING (7 hours)
Nervous system--Immune system- General principles of cell signaling.

A.1.2 General Education Courses and others

General Education Courses	
2013 Curriculum Course Code	**Name of the Course**
LE1002	Value Education
NC1001/ NS1001/ SP1001/ YG1001	NCC/ NSS/ NSO/ YOGA
LE1001	English
LE1003/ LE1004/ LE1005/ LE1006/ LE1007	German Language Phase-I/ French Language Phase-I/ Japanese Language Phase-I/ Korean Language Phase-I/ Chinese Language Phase-I
LE1008/ LE1009/ LE1010/ LE1011/ LE1012	German Language Phase-II/ French Language Phase-II/ Japanese Language Phase-II/ Korean Language Phase-II/ Chinese Language Phase-II
CS1001	Programming in MATLAB
Others	
PD1001	Soft Skills - I
PD1002	Soft Skills - II
PD1003	Aptitude - I
PD1004	Aptitude - II
PD1005	Aptitude - III
PD1006	Aptitude-IV

Course Number and Title

LE1002 VALUE EDUCATION

Credits / Contact Hours

1 / 15

Instructor Name

Mrs.B.Monika Nair

Textbooks, References

- Department of English and Foreign Languages SRM University, "Rhythm of Life**",** SRM Publications, 2013.
- "Values **(**Collection of Essays)", Published by: Sri Ramakrishna Math, Chennai-4, 1996.

Purpose

To provide guiding principles and tools for the development of the whole person recognizing that the individual is comprised of Physical, Intellectual, Emotional and Spiritual dimensions.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To help individuals think about and reflect on different values.
2. To deepen understanding, motivation and responsibility with regard to making personal and social choices and the practical implications of expressing them in relation to themselves, others, the community and the world at large
3. To inspire individuals to choose their own personal, social, moral and spiritual values and be aware of practical methods for developing and deepening

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
						X			X		
Mapping of instructional objectives with student outcome						1-3			1-3		

List of Topics Covered

UNIT I – INTRODUCTION (3 hours)
Definition, Relevance, Types of values, changing concepts of values

UNIT II - INDIVIDUAL AND GROUP BEHAVIOUR (3 hours)
Personal values – Self – Strengths (self-confidence, self-assessment, self-reliance, self-discipline, determination, self-restraint, contentment, humility, sympathy and compassion, gratitude, forgiveness) Weaknesses (Influences -- Peer pressure, familial and societal expectations, media)

UNIT III - SOCIETIES IN PROGRESS (3 hours)
Definition of society; Units of society; Communities – ancient and modern – Agents of change – Sense of survival, security, desire for comfort and ease sense of belonging, social consciousness and responsibility

UNIT IV - ENGINEERING ETHICS (3 hours)
Definition - Societies for engineers – Code of Ethics – Ethical Issues involved in cross border research -- Ethical and Unethical practices – case studies – situational decision making

UNIT V - SPIRITUAL VALUES (3 hours)
What is religion? -- Role of religion – Misinterpretation of religion – moral policing – Consequences -- Religion as spiritual quest – Aesthetics and religion

Course Number and Title

NC1001/NS1001/SP1001/YG1001 NATIONAL CADET CORPS (NCC)/ NATIONAL SERVICE SCHEME (NSS)/ NATIONAL SPORTS ORGANIZATION (NSO) / YOGA

Credits / Contact Hours

1 / 15

Instructor Name

Mr.Harikumar

Textbooks, References

- Yogiraj Vethathiri Maharishi, "Yoga for Modern Age", Vethathiri Publishers, 1989.
- Vethathiri Maharishi T, "Simplified Physical Exercises", Vethathiri Publishers, 1987.

Purpose

To imbibe in the minds of students the concepts and benefits of NCC/NSS/NSO/YOGA and make them practice the same.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To enable the students to gain knowledge about NCC/NSS/NSO/YOGA and put the same into practice.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
				X					X		

Mapping of instructional objectives with student outcome				1					1		

List of Topics Covered

NATIONAL CADET CORPS (NCC)
Any student enrolling as a member of National Cadet Core (NCC) will have to attend sixteen parades out of twenty parades each of four periods over a span of academic year.
Attending eight parades in first semester will qualify a student to earn the credits specified in the curriculum. Grading shall be done based on punctuality, regularity in attending the parades and the extent of active involvement.

NATIONAL SERVICE SCHEME (NSS)
A student enrolling as member of NSS will have to complete 60 hours of training / social service to be eligible to earn the credits specified in the curriculum.
Grading shall be done by the faculty member handling the course based on punctuality, regularity in attending the classes and the extent of active involvement.

NATIONAL SPORTS ORGANIZATION (NSO)
Each student must select one of the following games/sports events and practice for one hour per week. An attendance of 75% is compulsory to earn the credits specified in the curriculum. Grading shall be done by the faculty member handling the course based on punctuality, regularity in attending the classes and the extent of active involvement.
List of games/sports:
Basket Ball, Football, Volley Ball, Ball Badminton, Cricket, Throw-ball, Track events
Field events or any other game with the approval of faculty member.

YOGA
Benefits of Agnai Meditation -Meditation - Agnai, Asanas, Kiriyas, Bandas, Muthras
Benefits of santhi Meditation - Meditation Santhi Physical Exercises (I & II)
Lecture & Practice - Kayakalpa Yoga Asanas, Kiriyas, Bandas, Muthras
Analysis of Thought - Meditation Santhi Physical Exercises III & IV
Benefits of Thuriyam - Meditation Thuriyam Kayakalpa Asanas, Kiriyas, Bandas, Muthras
Attitude - Meditation Thuriyam Kayakalpa Asanas, Kiriyas, Bandas, Muthras
Importance of Arutkappy & Blessings - Meditation Thuriyam Kayakalpa Asanas, Kiriyas, Bandas, Muthras
Benefits of Blessings - Meditation Santhi Kayakalpa Asanas, Kiriyas, Bandas, Muthras
Assessment
An attendance of 75% is compulsory to earn the credits specified in the curriculum. Grading shall be done by the faculty member handling the course based on punctuality, regularity in attending the classes and the extent of active involvement
.

Course Number and Title

LE1001 ENGLISH

Credits / Contact Hours

2 / 45

Instructor Name

Ms.R.Vinodha

Textbooks, References

- Department of English and Foreign Languages. “English for Engineers”, SRM University Publications, 2013.
- Dhanavel S.P, “English and Communication Skills for Students of Science and Engineering”**,** Orient Blackswan Ltd., 2009.
- Meenakshi Raman and Sangeetha Sharma**.** “Technical Communication-Principles and Practice”, Oxford

University Press, 2009.
- Day R A, Scientific English: "A Guide for Scientists and Other Professionals", 2nd ed. Hyderabad: Universities Press, 2000.

Purpose

To help students achieve proficiency in English and develop their professional communication skills to meet the demand in the field of global communication to enable them to acquire placement anywhere with ease and confidence.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To enable students improve their lexical, grammatical and communicative competence.
2. To enhance their communicative skills in real life situations.
3. To assist students understand the role of thinking in all forms of communication.
4. To equip students with oral and appropriate written communication skills.
5. To assist students with employability and job search skills.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
				X		X	X		X		
Mapping of instructional objectives with student outcome				1-5		1-5	1-5		1-5		

List of Topics Covered

UNIT I - INVENTIONS (9 hours)
1. Grammar and Vocabulary – Tense and Concord:
2. Listening and Speaking – Common errors in Pronunciation (Individual sounds); Process description (Describing the working of a machine, and the manufacturing process)
3. Writing – Interpretation of data (Flow chart, Bar chart)
4. Reading -- (Reading Comprehension -- Answering questions)

UNIT II – ECOLOGY (9 hours)
1. Grammar and Vocabulary – Error Analysis – Synonyms and Antonyms, Parallelisms
2. Listening and Speaking - Conducting Meetings
3. Writing – Notice, Agenda, Minutes , letters to the editor via email : Email etiquette
4. D Reading Comprehension – Summarizing and Note-making

UNIT III – SPACE (9 hours)
1. Grammar and Vocabulary – tense and concord; word formation
2. Listening and Speaking – Distinction between native and Indian English (Speeches by TED and Kalam) – accent, use of vocabulary and rendering;
3. Writing – Definitions and Essay writing
4. Reading Comprehension – Predicting the content

UNIT IV – CAREERS (9 hours)
1. Grammar and Vocabulary –Homonyms and Homophones
2. Listening and Speaking – – Group Discussion
3. Writing Applying for job, cover letter and resume
4. Reading, etymology (roots; idioms and phrases), Appreciation of creative writing.

UNIT V – RESEARCH (9 hours)

1. Grammar and Vocabulary – Using technical terms, Analogies
2. Listening and Speaking -- Presentation techniques (Speech by the learner)
3. Writing – Project Proposal

Reading Comprehension -- Referencing Skills for Academic Report Writing (Research Methodology – Various methods of collecting data) Writing a report based on MLA Handbook.

Course Number and Title

LE1003 GERMAN LANGUAGE PHASE I

Credits / Contact Hours

2 / 30

Instructor Name

Mrs.A.K.Bharathi

Textbooks, References

- Studio d A1. Deutsch als Fremdsprache with CD.(Kursbuch und Sprach training).
- German for Dummies
- Schulz Griesbach

Purpose

Germany offers infinite opportunities for students of engineering for higher studies, research and employment in Germany. B.Tech Students are offered German Language during their second year. Knowledge of the language will be helpful for the students to adjust themselves when they go for higher studies.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To introduce the language, phonetics and the special characters in German language
2. To introduce German culture & traditions to the students.
3. By the end of Phase – I, the students will be able to introduce themselves and initiate a conversation.
4. We endeavor to develop the ability among the students to read and understand small texts written in German
5. To enable the students to elementary conversational skills.

Student Outcomes from Criterion 3 covered by this Course

	a	b	c	d	e	f	g	h	i	j	k
Student outcome							X				
Mapping of instructional objectives with student outcome							1-5				

List of Topics Covered

UNIT I (6 hours)
Wichtige Sprachhandlungen: Phonetics – Sich begrüßen - Sich und andere vorstellen formell / informell - Zahlen von 1 bis 1 Milliarde - verstehen & sprechen
Grammatik: regelmäßige Verben im Präsens - "sein" und haben im Präsens - Personalpronomen im Nominativ

UNIT II (6 hours)
Wichtige Sprachhandlungen Telefon Nummern verstehen und sprechen
Uhrzeiten verstehen und sagen Verneinung "nicht und kein" (formell und informell)
Grammatik : Wortstellung – Aussagesatz – W-Frage und Satzfrage (Ja/Nein Frage) Nomen buchstabieren und notieren bestimmter und unbestimmter Artikel und Negativartikel im Nom. & Akkusativ

UNIT III (6 hours)
Wichtige Sprachhandlungen Tageszeiten verstehen und über Termine sprechen -Verabredungen verstehen - Aufgaben im Haushalt verstehen **Grammatik** Personalpronomen im Akkusativ und Dativ - W-Fragen "wie, wer, wohin,wo, was usw.- Genitiv bei Personennamen - Modalverben im Präsens "können, müssen, möchten"

UNIT IV (6 hours)
Wichtige Sprachhandlungen Sich austauschen, was man kann, muss – Bezeichnungen Lebensmittel – Mengenangaben verstehen – Preise verstehen und Einkaufzettel schreiben
Grammatik Wortstellung in Sätzen mit Modalverben – Konnektor "und" – "noch"- kein-------mehr – "wie viel, wie viele, wie alt, wie lange" –Possessivartikel im Nominativ.

UNIT V (6 hours)
Wichtige Sprachhandlungen Freizeitanzeigen verstehen – Hobbys und Sportarten Anzeigen für Freizeitpartner schreiben bzw. darauf antworten – Vorlieben und Abneigungen ausdrucken
Grammatik Verben mit Vokalwechsel im Präsens – Modalverben im Präsens " dürfen, wollen und mögen -"haben und sein" im Präteritum–regelmäßige Verben im
Perfekt – Konnektoren "denn, oder, aber.

Course Number and Title

LE1004 FRENCH LANGUAGE PHASE I

Credits / Contact Hours

2 / 30

Instructor Name

Mrs.A.Sharada

Textbooks, References

- Tech French
- French for Dummies.
- French made easy-Goyal publishers
- Panorama

Purpose

To enable the student learners acquire a basic knowledge of the French language and concepts of general French for everyday interactions and technical French at the beginner's level and also to get to know the culture of France.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To enable students improve their grammatical competence.
2. To enhance their listening skills.
3. To assist students in reading and speaking the language.
4. To enhance their lexical and technical competence.
5. To help the students introduce themselves and focus on their communication skills.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
							X				
Mapping of instructional objectives with student outcome							1-5				

List of Topics Covered

UNIT I (6 hours)
Grammar and Vocabulary: Usage of the French verb "se presenter", a verb of self- introduction and how to greet a person- "saluer"
Listening and Speaking – The authentic sounds of the letters of the French alphabet and the accents that play a vital role in the pronunciation of the words.
Writing – correct spellings of French scientific and technical vocabulary.
Reading -- Reading of the text and comprehension – answering questions.

UNIT II (6 hours)
Grammar and Vocabulary – Definite articles , "prepositions de lieu" subject pron ouns
Listening and Speaking – pronunciation of words like Isabelle, presentez and la liaison – vous etes, vous appelez and role play of introducing each other – group activity
Writing – particulars in filling an enrollment / registration form
Reading Comprehension – reading a text of a famous scientist and answering questions.

UNIT III (6 hours)
Grammar and Vocabulary – verb of possession "avoir' and 1st group verbs "er", possessive adjectives and pronouns of insistence- moi, lui..and numbers from 0 to 20
Listening and Speaking –nasal sounds of the words like feminine, ceinture , parfum and how to ask simple questions on one's name, age, nationality, address mail id and telephone number.
Writing –conjugations of first group verbs and paragraph writing on self –introduction and introducing a third person.
Reading Comprehension – reading a text that speaks of one's profile and answering questions

UNIT IV (6 hours)
Grammar and Vocabulary –negative sentences, numbers from 20 to 69, verb "aimer"and seasons of the year and leisure activities.
Listening and Speaking – To express one's likes and dislikes and to talk of one's pastime activities (sports activities), je fais du ping-pong and nasal sounds of words – janvier, champagne
Writing- conjugations of the irregular verbs – faire and savoir and their usage. Paragraph writing on one's leisure activity- (passé temps favori)
Reading- a text on seasons and leisure activities – answering questions.

UNIT V (6 hours)
Grammar and Vocabulary – les verbes de direction- to ask one's way and to give directions, verbes- pouvoir and vouloir and 2nd group verbs , a droite, la premiere a gauche and vocabulary relating to accommodation.
Listening and Speaking – to read and understand the metro map and hence to give one directions – dialogue between two people.
Writing –paragraph writing describing the accommodation using the different prepositions like en face de, derriere- to locate .
Reading Comprehension -- a text / a dialogue between two on location and directions- ou est la poste/ la pharmacie, la bibliotheque?.....

Course Number and Title

LE1005 JAPANESE LANGUAGE PHASE I

Credits / Contact Hours

2 / 30

Instructor Name

Ms.R.Rekhaa

Textbooks, References

- First lessons in Japanese, ALC Japan
- Japanese for dummies. Wiley publishing co. Inc., USA.
- Kana workbook, Japan foundation

Purpose

To enable students achieve a basic exposure on Japan, Japanese language and culture. To acquire basic conversational skill in the language.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To help students learn the Japanese scripts viz. hiragana and a few basic kanji.
2. To make the students acquire basic conversational skill.
3. To enable students to know about Japan and Japanese culture.
4. To create an advantageous situation for the students to have better opportunity for employability by companies who have association with Japan.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
							X				
Mapping of instructional objectives with student outcome							1 - 4				

List of Topics Covered

UNIT I (8 hours)
1. Introduction to Japanese language. Hiragana Chart 1 - vowels and consonants and related vocabulary.
2. Self introduction
3. Grammar – usage of particles wa, no, mo and ka and exercises
4. Numbers (1-100)
5. Kanji – introduction and basic kanjis – naka, ue, shita, kawa and yama
6. Greetings, seasons, days of the week and months of the year
7. Conversation – audio
8. Japan – Land and culture

UNIT II (8 hours)
1. Hiragana Chart 1 (contd.) and related vocabulary
2. Grammar – usage of kore, sore, are, kono, sono, ano, arimasu and imasu. Particles – ni (location) and ga. Donata and dare.
3. Numbers (up to 99,999)
4. Kanji – numbers (1-10, 100, 1000, 10,000 and yen)
5. Family relationships and colours.
6. Conversation – audio
7. Festivals of Japan

UNIT III (5 hours)
Hiragana Charts 2&3, double consonants, vowel elongation and related vocabulary
Lesson 3
Grammar - particles ni (time), kara, made and ne. Koko, soko, asoko and doko.
Time expressions (today, tomorrow, yesterday, day before, day after)
Kanji – person, man, woman, child, tree and book
Directions – north, south, east and west

UNIT IV (5 hours)
Grammar - directions,-kochira, sochira, achira and dochira. Associated vocabulary (mae, ushiro, ue, shita, tonari, soba, etc.)
Conversation – audio
Japanese art and culture like ikebana, origami, etc.

UNIT V (4 hours)
Kanji – hidari, migi, kuchi
Japanese sports and martial arts

Course Number and Title

LE1006 KOREAN LANGUAGE PHASE I

Credits / Contact Hours

2 / 30

Instructor Name

Ms. Soumya Brata Helbler

Textbooks, References

- Korean through English 1 (Basic Korean Grammar and Conversation).
- Bharati Korean (Intermediate Korean Grammar).
- Hand-outs.
- Various visual mediums such Movie CD, Audio CD.
- Collection of vocabularies for engineering field.

Purpose

To enable students achieve a basic exposure on Korea, Korean language and culture. To acquire basic conversational skill in the language.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To help students learn the scripts.
2. To make the students acquire basic conversational skill.
3. To enable students to know about Korean culture.
4. To create an advantageous situation for the students to have better opportunity for employability by companies who have association with Korea.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
							X				
Mapping of instructional objectives with student outcome							1 - 4				

List of Topics Covered

UNIT I (6 hours)
Lesson 1 < Introduction to Korean Language >, Lesson2 < Consonants and Vowels >, <Basic Conversation, Vocabularies and Listening >

UNIT II (10 hours)
Lesson 3 < Usage of "To be" >, Lesson 4 < Informal form of "to be" >, Lesson 5 <Informal interrogative form of "to be" >, Lesson 6 < To be, to have, to stay >, < Basic Conversation, Vocabularies and Listening >

UNIT III (10 hours)
Lesson 7 < Interrogative practice and Negation >, < Basic Conversation, Vocabularies and Listening >

UNIT IV (4 hours)
Lesson 8 < Korean Culture and Business Etiquette >, < Basic Conversation, Vocabularies and Listening

Course Number and Title

LE1007 CHINESE LANGUAGE PHASE I

Credits / Contact Hours

2 / 30

Instructor Name

Ms. Poulomi

Textbooks, References

- A New Chinese Course 1- Beijing Language and Culture University Press.
- New Practical Chinese Reader Textbook (1) – Beijing Language and Culture University Press.
- 40 Lessons For Basic Chinese Course I – Shanghai Translation Press.
- My Chinese Classroom - East China Normal University Press.

Purpose

To enable students achieve a basic exposure on China, Chinese language and culture. To acquire basic conversational skill in the language.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Instructional Objectives

1. To help students learn the Chinese scripts.
2. To make the students acquire basic conversational skill.
3. To enable students to know about China and Chinese culture.
4. To create an advantageous situation for the students to have better opportunity for employability by companies who have association with china.

Student Outcomes from Criterion 3 covered by this Course

	a	b	c	d	e	f	g	h	i	j	k
Student outcome							X				
Mapping of instructional objectives with student outcome							1- 4				

List of Topics Covered

UNIT I
Introduction of Chinese Language

UNIT II
Phonetics and Notes on pronunciation

a) 21 Initials:

b p m f d t n l g k h j q x z c s zh ch sh r

b) 37 Finals:

a	o	e	i	u	ü
ai	ou	ei	ia	ua	üe
an	ong	en	ian	uai	üan
ang		eng	iang	uan	ün
ao		er	iao	uang	
			ie	uei(ui)	
			in	uen(un)	
			ing	ueng	
			iong	uo	
			iou(iu)		

c) The combination of Initials and Finals - Pinyin

UNIT III

Introduction of Syllables and tones

a) syllable=initial+final+tone

b) There are four tones in Chinese: the high-and-level tone, the rising tone, the falling-and-rising tone, and the falling tone. And the markers of the different tones.

UNIT IV

A. Tones practice

B. the Strokes of Characters

1. Introduction of Chinese Characters
2. The eight basic strokes of characters

UNIT V

1. Learn to read and write the Characters:

八 (eight) 不 (not) 马 (horse) 米 (rice) 木 (wood).

2. **Classes are organized according to several Mini-dialogues.**

Course Number and Title

LE1008 GERMAN LANGUAGE PHASE II

Credits / Contact Hours

2 / 30

Instructor Name

Mrs.A.K.Bharathi

Textbooks, References

- Studio d A1. Deutsch als Fremdsprache with CD.(Kursbuch und Sprachtraining).
- German for Dummies
- Schulz Griesbach

Purpose

Familiarity in German language will be helpful for the students in preparing their resumes in German. Proficiency in the language will be an added asset for the students to have an edge in the present day highly competitive and global job market

Prerequisites	Co-requisites
LE1003	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To enable the students to speak and understand about most of the activities in the day to day life.
2. The students will be able to narrate their experiences in Past Tense.
3. The students will be able to understand and communicate even with German Nationals.
4. By the end of Phase – II the students will have a reasonable level of conversational skills.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
							X				
Mapping of instructional objectives with student outcome							1-4				

List of Topics Covered

UNIT I (6 hours)
Wichtige Sprachhandlungen: Zimmersuche, Möbel
Grammatik: Verben mit trennbaren Vorsilben im Präsens und Perfekt. Verben mit trennbaren Vorsilben und Modalverben imPräsens. Verben mit untrennbaren Vorsilben im Perfekt. Unregelmäßige und gemischte Verben im Perfekt.

UNIT II (6 hours)
Wichtige Sprachhandlungen: Kleidung ,Farben , Materialien.
Grammatik : formelle Imperativsätze mit "Sie" informelle Imperativsätze Vorschläge mit "wir" – "sollen/wollenwir"—Soll ich? Modalpartikeln "doch" "mal" "doch mal.

UNIT III (6 hours)
Wichtige Sprachhandlungen : Sehenswürdigkeite (Prater, Brandenburger Tör,Kolossium, Eifeltürm)
Grammatik : Ortsangaben mit Akk. und Dativ "alle","man" Indefinitepronomen "etwas", "nichts",

UNIT IV (6 hours)
Wichtige Sprachhandlungen : Wegbeschreibung/ Einladung interkulturelle Erfahrung.
Grammatik : Verwendung von Präsens für zukünftigen Zeitpunkt.

UNIT V (6 hours)
Wichtige Sprachhandlungen: Essen und Trinken im Restaurant ,
Partyvorbereitung und Feier
Grammatik: Nomen aus Adjektiven nach "etwas"und "nichts" Nomen aus dem Infinitiv von Verben, zusammegesetzte Nomen und ihre Artikel. Adjektive im Nom. und Akk. nach unbestimmten Artikel, Negativartikel und Possessivartikel.

Course Number and Title

LE1009 FRENCH LANGUAGE PHASE II

Credits / Contact Hours

2 / 30

Instructor Name

Mrs.A.Sharada

Textbooks, References

- Tech French
- French for Dummies
- French made easy: Goyal publishers
- Panorama

Purpose

To enable the students communicate effectively with any French speaker and have a competitive edge in the international market.

Prerequisites	Co-requisites
LE1004	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To enable students access information on the internet
2. To receive and send e mails
3. To assist students in gaining a certain level of proficiency to enable them to give the level 1 exam conducted by Alliance Française de Madras.
4. To enhance their lexical and technical competence.

Student Outcomes from Criterion 3 covered by this Course

	a	b	c	d	e	f	g	h	i	j	k
Student outcome							X				
Mapping of instructional objectives with student outcome							1-4				

List of Topics Covered

UNIT I (6 hours)
Grammar and Vocabulary: The second group verbs: Finir, rougir, grossir, grandir . “Les preposition de temps”: à, en, le, de 7h à 8h, jusqu’ à, vers.
Listening and Speaking – the semi- vowels: Voilà, pollutant. Writing –the days of the week. Months, technical subjects, time, “les spécialités scientifiques et l’ année universitaire, paragraph writing about time table.
Reading -- Reading of the text and comprehension – answering questions

UNIT II (6 hours)

Grammar and Vocabulary – The adjectives, the nationality, feminine & masculine noun forms “les métiers scientifiques”. Listening and Speaking – Vowels: soirée, année, près de, très.
Writing – Countries name, nationality, “les métiers scientifiques”, numbers from: 69 to infitive and some measures of unit.
Reading Comprehension – reading a text.

UNIT III (6 hours)
Grammar and Vocabulary – near future, The demonstrative adjectives, Express the aim by using the verb, Listening and Speaking –“La liaison interdite – en haut”. Writing – some scientific terms, French expressions to accept an invitation. Sentence framing. Reading Comprehension – reading a text.

UNIT IV (6 hours)
Grammar and Vocabulary –the verbs: manger, boire , the partitive articles
Listening and Speaking – “le ‘e’ caduc Writing- the food, the ingredients, fruits, vegetables, expression of quantity, paragraph writing about food habits. Reading – reading a text.

UNIT V (6 hours)
Grammar and Vocabulary – “ les prepositions de lieu”: au à la, à l’, chez, the reflexives verbs, verbs to nouns. Listening and Speaking – “le ‘e’ sans accents ne se prononce pas. C’est un “e” caduc. Ex: quatre, octobre. “ les sons (s) et (z)- salut , besoin. Writing –paragraph writing about one’s everyday life, French culture. Reading Comprehension -- reading a text or a song.....

Course Number and Title

LE 1010 JAPANESE LANGUAGE PHASE II

Credits / Contact Hours

2 / 30

Instructor Name

Ms.R.Rekhaa

Textbooks, References

- First lessons in Japanese, ALC Japan
- Japanese for dummies. Wiley publishing co. Inc., USA.
- Kana workbook, Japan foundation

Purpose

To enable students to learn a little advanced grammar in order to improve their conversational ability in Japanese.

Prerequisites	Co-requisites
LE1005	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To help students learn Katakana script (used to write foreign words)
2. To improve their conversational skill.
3. To enable students to know about Japan and Japanese culture.
4. To improve their employability by companies who are associated with Japan.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
							X				
Mapping of instructional objectives with student outcome							1 - 4				

List of Topics Covered

UNIT I (8 hours)
Introduction to Verbs; Ikimasu, okimasu, nemasu, tabemasu etc.
Grammar – usage of particles de, o, to, ga(but) and exercises
Common daily expressions and profession.
Katakana script and related vocabulary.
Religious beliefs, Japanese housing and living style.
Conversation – audio

UNIT II (8 hours)
Grammar :Verbs –Past tense, negative - ~mashita, ~masen deshita..
i-ending and na-ending adjectives - introduction
Food and transport (vocabulary)
Japanese food, transport and Japanese tea ceremony.
Kanji Seven elements of nature (Days of the week)
Conversation – audio

UNIT III (6 hours)
Grammar - ~masen ka, mashou
Adjectives (present/past – affirmative and negative)
Conversation – audio

UNIT IV (4 hours)
Grammar – ~te form
Kanji – 4 directions
Parts of the body
Japanese political system and economy
Conversation – audio

UNIT V (4 hours)
Stationery, fruits and vegetables
Counters – general, people, floor and pairs

Course Number and Title

LE1011 KOREAN LANGUAGE PHASE II

Credits / Contact Hours

2 / 30

Instructor Name

Ms. Soumya Brata Helbler

Textbooks, References

- Korean through English 2 (Basic Korean Grammar and Conversation)
- Bharati Korean (Intermediate Korean Grammar)
- Hand-outs
- Various visual media such Movie CD, Audio CD, and music
- Collection of vocabularies for engineering field.

Purpose

To enable students achieve a basic exposure on Korea, Korean language and culture. To acquire basic conversational skill in the language.

Prerequisites	Co-requisites
LE1006	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To help students learn the scripts.
2. To make the students acquire basic conversational skill.
3. To enable students to know about Korean culture.
4. To create an advantageous situation for the students to have better opportunity for employability by companies who have association with Korea.

Student Outcomes from Criterion 3 covered by this Course

	a	b	c	d	e	f	g	h	i	j	k
Student outcome							X				
Mapping of instructional objectives with student outcome							1-4				

List of Topics Covered

UNIT I (9 hours)
Lesson 1 <Review of Vowels and Consonants>, Lesson2 < Various Usages of "To be">, Lesson3 < Informal form of "to be"> <Basic Conversation, Vocabularies and Listening>

UNIT II (9 hours)
Lesson 4 < Informal interrogative form of "to be">, Lesson 5 < To be, to have, to stay>, Lesson 5 < Advanced

Interrogative practice>, Lesson 6 < Types of Negation>, <Basic Conversation, Vocabularies and Listening>

UNIT III (9 hours)
Lesson 7 < Honorific forms of noun and verb2>, Lesson8 < Formal Declarative2>, Lesson 9 < Korean Business Etiquette>, <Basic Conversation, Vocabularies and Listening>

UNIT IV (3 hours)
Lesson 10 <Field Korean as an Engineer1>, <Field Korean as an Engineer2> <Basic Conversation, Vocabularies and Listening>.

Course Number and Title

LE1012 CHINESE LANGUAGE PHASE II

Credits / Contact Hours

2 / 30

Instructor Name

Ms. Poulomi

Textbooks, References

- A New Chinese Course 1- Beijing Language and Culture University Press
- New Practical Chinese Reader Textbook (1) – Beijing Language and Culture University Press
- 40 Lessons For Basic Chinese Course I – Shanghai Translation Press
- My Chinese Classroom - East China Normal University Press

Purpose

To enable students achieve a basic exposure on China, Chinese language and culture. To acquire basic conversational skill in the language.

Prerequisites	Co-requisites
LE1007	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To help students learn the Chinese scripts.
2. To make the students acquire basic conversational skill.
3. To enable students to know about China and Chinese culture.
4. To create an advantageous situation for the students to have better opportunity for employability by companies who have association with china..

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
							X				
Mapping of instructional objectives with student							1 - 4				

outcome											

List of Topics Covered

UNIT I
A) Greetings
Questions and answers about names
Introducing oneself
Receiving a guest
Making corrections
New words: 你（you） 好（good, well） 工作（work, job）人员（personnel, staff member） 请问（May I ask…） 贵（expensive , valuable） 姓（one's family name is ）
B) Questions and answers about the number of people in a family
Expressing affirmation/negation
Questions and answers about the identity of a person same or not.
New words: 家（family, home） 有（have） 几（several）
爸爸 (father） 妈妈 (mother) 哥哥 (elderly brother）

UNIT II
A. About places
B. About numbers
C. if one knows a certain person
D. Expressing apology

E. Expressing affirmation/negation
F. Expressing thanks.
New Words:
客人（guest,visitor）这儿（here）中文（Chinese） 对（right, correct） 学生（student） 多（many, a lot）
Grammar: Sentences with a verbal predicate

UNIT III
Introducing people to each other
A. Exchanging amenities
B. Making/Negating conjectures
C. Questions and answers about nationality
Grammar: Sentences with an adjectival predicate

UNIT IV
A) About places to go
Indicating where to go and what to do
Referring to hearsay.
Saying good-bye
B) Making a request
Questions and answers about postcodes and telephone numbers
Reading dates postcodes and telephone numbers
Counting Renmibi
Grammar: Sentences with a subject-verb construction as its predicate
Sentences with a nominal predicate

UNIT V
A. Asking and answering if someone is free at a particular time
B. Making proposals
C. Questions about answers about time
D. Making an appointment
E. Telling the time
Making estimations.

Course Number and Title

CS1001 PROGRAMMING USING MATLAB

Credits / Contact Hours

2 / 45

Instructor Name

Dr. M. Sangeetha

Textbooks, References

- Bansal R.K, Goel A.K, Sharma M.K, "MATLAB and its Applications in Engineering", Pearson Education, 2012
- Amos Gilat, "MATLAB-An Introduction with Applications", Wiley India, 2009.
- Stephen J Chapman, "Programming in MATLAB for Engineers", Cengage Learning, 2011.

Purpose

This Lab Course will enable the students to understand the fundamentals and programming knowledge in MATLAB

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To learn the MATLAB environment and its programming fundamentals
2. Ability to write Programs using commands and functions
3. Able to handle polynomials, and use 2D Graphic commands.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X									X
Mapping of instructional objectives with student outcome	2,3	1-3									1

List of Topics Covered

LIST OF EXPERIMENTS

1. Practicing MATLAB environment with simple exercises to familiarize Command Window, History, Workspace, Current Directory, Figure window, Edit window, Shortcuts, Help files.
2. Data types, Constants and Variables, Character constants, operators, Assignment statements.
3. Control Structures: For loops, While, If control structures, Switch, Break, Continue statements.
4. Input-Output functions, Reading and Storing Data.
5. Vectors and Matrices, commands to operate on vectors and matrices, matrix Manipulations.
6. Arithmetic operations on Matrices, Relational operations on Matrices, Logical operations on Matrices.
7. Polynomial Evaluation, Roots of Polynomial, Arithmetic operations on Polynomials.
8. Graphics: 2D plots, Printing labels, Grid & Axes box, Text in plot, Bar and Pie chart.

Course Number and Title

PD1001 SOFT SKILLS-I

Credits / Contact Hours

1 / 30

Instructor Name

Mr.Harikumar

Textbooks, References

- INSIGHT, 2012, Career Development Centre, SRM Publications
- Convey Sean, "Seven Habits of Highly Effective Teens", New York, Fireside Publishers, 1998.
- Carnegie Dale, "How to win Friends and Influence People", New York: Simon & Schuster, 1998.
- Thomas A Harris, "I am ok, You are ok", New York-Harper and Row, 1972
- Daniel Coleman, "Emotional Intelligence", Bantam Book, 2006

Purpose

To enhance holistic development of students and improve their employability skills

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To develop inter personal skills and be an effective goal oriented team player.
2. To develop professionals with idealistic, practical and moral values
3. To develop communication and problem solving skills.
4. To re-engineer attitude and understand its influence on behavior

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
				X		X	X		X		
Mapping of instructional objectives with student outcome				1		2	3		4		

List of Topics Covered

UNIT I - SELF ANALYSIS (4 hours)
SWOT Analysis, Who am I, Attributes, Importance of Self Confidence, Self Esteem

UNIT II – ATTITUDE (4 hours)
Factors influencing Attitude, Challenges and lessons from Attitude.
Change Management
Exploring Challenges, Risking Comfort Zone, Managing Change

UNIT III – MOTIVATION (6 hours)
Factors of motivation, Self talk, Intrinsic & Extrinsic Motivators.

UNIT IV - GOAL SETTING (6 hours)
Wish List, SMART Goals, Blue print for success, Short Term, Long Term, Life Time oals.

Time Management
Value of time, Diagnosing Time Management, Weekly Planner To do list, Prioritizing work.

UNIT V – CREATIVITY (10 hours)
Out of box thinking, Lateral Thinking

Course Number and Title
PD1002 SOFT SKILLS-II
Credits / Contact Hours
1 / 30
Instructor Name
Ms.B.Revathi
Textbooks, References
• INSIGHT, 2009. Career Development Centre, SRM Publications. • Covey Sean, "Seven Habit of Highly Effective Teens", New York, Fireside Publishers, 1998. • Carnegie Dale, "How to win Friends and Influence People", New York: Simon & Schuster, 1998. • Thomas A Harris, "I am ok, You are ok", New York-Harper and Row, 1972. • Daniel Coleman, "Emotional Intelligence", Bantam Book, 2006.
Purpose
To enhance holistic development of students and improve their employability skills.
Prerequisites or Co-requisites
Nil
Required, Elective or Selected Elective (as per Table 5.1a)
Required
Instructional Objectives
1. To develop inter personal skills and be an effective goal oriented team player. 2. To develop professionals with idealistic, practical and moral values. 3. To develop communication and problem solving skills. 4. To re-engineer attitude and understand its influence on behavior..

Student Outcomes from Criterion 3 covered by this Course											
Student outcome	a	b	c	d	e	f	g	h	i	j	k
				X		X	X		X		
Mapping of instructional objectives with student outcome				1		2	3		4		

List of Topics Covered

UNIT I - INTERPERSONAL SKILLS (6 hours)
Understanding the relationship between Leadership Networking & Team work, Realizing Ones Skills in Leadership, Networking & Team Work, and Assessing Interpersonal Skills Situation description of Interpersonal Skill.
Team Work
Necessity of Team Work Personally, Socially and Educationally

UNIT II – LEADERSHIP (4 hours)
Skills for a good Leader, Assessment of Leadership Skills
Change Management
Exploring Challenges, Risking Comfort Zone, Managing Change

UNIT III - STRESS MANAGEMENT (6 hours)
Causes of Stress and its impact, how to manage & distress, Understanding the circle of control, Stress Busters.
Emotional Intelligence
What is Emotional Intelligence, emotional quotient why Emotional Intelligence matters, Emotion Scales. Managing Emotions.

UNIT IV - CONFLICT RESOLUTION (4 hours)
Conflicts in Human Relations – Reasons Case Studies, Approaches to conflict resolution.

UNIT V - DECISION MAKING (10 hours)
Importance and necessity of Decision Making, process of Decision Making, Practical way of Decision Making, Weighing Positives & Negatives.

Course Number and Title

PD1003 APTITUDE-I

Credits / Contact Hours

1 / 30

Instructor Name

Ms. B. Revathi

Textbooks, References

- Agarwal R.S – Quantitative Aptitude for Competitive Examinations, S.Chand Limited 2011
- Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Tata McGraw Hill, 3rd Edition, 2011
- Edgar Thrope, Test Of Reasoning for Competitive Examinations, Tata McGraw Hill, 4th Edition, 2012
- Other material related to quantitative aptitude

Purpose

To enhance holistic development of students and improve their employability skills.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To improve aptitude, problem solving skills and reasoning ability of the student.
2. To collectively solve problems in teams & group.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X			X							
Mapping of instructional objectives with student outcome	1			2							

List of Topics Covered

UNIT I – NUMBERS (6 hours)
Types and Properties of Numbers, LCM, GCD, Fractions and decimals, Surds

UNIT II - ARITHMETIC – I (6 hours)
Percentages, Profit & Loss, Simple Interest & Compound Interest, , Clocks & calendars

UNIT III - ALGEBRA – I (6 hours)
Logarithms, Problems on ages

UNIT IV - MODERN MATHEMATICS – I (6 hours)
Permutations, Combinations, Probability

UNIT V – REASONING (6 hours)
Logical Reasoning, Analytical Reasoning

Course Number and Title

PD1004 APTITUDE-II

Credits / Contact Hours

1 / 30

Instructor Name

Ms. S. Mythreyi Koppur

Textbooks, References

- Personality Development -Verbal Work Book, Career Development Centre, SRM Publications
- Green Sharon Weiner M.A & Wolf Ira K.Barron's New GRE, 19th Edition. Barron's Educational Series, Inc, 2011.

- Lewis Norman, Word Power Made Easy, Published by W.R.Goyal Pub, 2011.
- Thorpe Edgar and Thorpe Showich, Objective English. Pearson Education 2012.
- Murphy Raymond, Intermediate English Grammar, (Second Edition), Cambridge University Press, 2012.

Purpose

To enhance holistic development of students and improve their employability skills.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To improve verbal aptitude, vocabulary enhancement and reasoning ability of the student..

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
							X				
Mapping of instructional objectives with student outcome							1				

List of Topics Covered

UNIT I (6 hours)
Critical Reasoning – Essay Writing

UNIT II (6 hours)
Synonyms – Antonyms - Odd Word - Idioms & Phrases

UNIT III (6 hours)
Word Analogy - Sentence Completion

UNIT IV (6 hours)
Spotting Errors - Error Correction - Sentence Correction

UNIT V (6 hours)
Sentence Anagram - Paragraph Anagram - Reading Comprehension

Course Number and Title

PD1005 APTITUDE-III

Credits / Contact Hours

1/30

Instructor Name

Ms. B. Revathi

Textbooks, References

To enhance holistic development of students and improve their employability skills.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. Understand the importance of effective communication in the workplace.
2. Enhance presentation skills – Technical or general in nature.
3. Improve employability scope through Mock GD, Interview

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
							X		X	X	
Mapping of instructional objectives with student outcome							1-3		1,2	2,3	

List of Topics Covered

UNIT I (6 hours)
Video Profile

UNIT II (6 hours)
Tech Talk / Area of Interest / Extempore / Company Profile

UNIT III (6 hours)
Curriculum Vitae

UNIT IV (6 hours)
Mock Interview

UNIT V (6 hours)
Group Discussion / Case Study

Course Number and Title

PD1006 APTITUDE-IV

Credits / Contact Hours

1/30

Instructor Name

Ms. G. Shobhana

Textbooks, References

- Agarwal.R.S – Quantitative Aptitude for Competitive Examinations, S Chand Limited 2011
- Abhijit Guha, Quantitative Aptitude for Competitive Examinations, Tata Mcgraw Hill, 3rd Edition
- Edgar Thrope, Test Of Reasoning For Competitive Examinations, Tata Mcgraw Hill, 4th Edition
- Other material related to quantitative aptitude

Purpose

To enhance holistic development of students and improve their employability skills.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To improve aptitude, problem solving skills and reasoning ability of the student.
2. To collectively solve problems in teams & group.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X			X							
Mapping of instructional objectives with student outcome	1			2							

List of Topics Covered

UNIT I - ARITHMETIC – II (6 hours)
Ratios & Proportions, Averages, Mixtures & Solutions

UNIT II - ARITHMETIC – III (6 hours)
Time, Speed & Distance, Time & Work

UNIT III - ALGEBRA – II (6 hours)
Quadratic Equations, Linear equations & inequalities

UNIT IV– GEOMETRY (6 hours)
2D Geometry, Trigonometry, Menstruation

UNIT V – MODERN MATHEMATICS – II (6 hours)
Sets & Functions, Sequences & Series, Data Interpretation, Data Sufficiency

A.1.3 Engineering Topics - I

General Engineering Courses and others

2013 Curriculum Course Code	Name of the Course
CE1001	Basic Civil Engineering
ME1001	Basic Mechanical Engineering
ME1005	Engineering Graphics
EC1001	Basic Electronics Engineering
EC1002	Electronics Engineering Practice
EE1001	Basic Electrical Engineering
CY1003	Electrical Engineering Practice

Course Number and Title

CE1001 BASIC CIVIL ENGINEERING

Credits / Contact Hours

2 / 30

Instructor Name

Mrs.A.Vijaya

Textbooks, References

- Raju K.V.B, Ravichandran P.T, "Basics of Civil Engineering", Ayyappa Publications, Chennai, 2012.
- Rangwala S.C, "Engineering Materials", Charotar Publishing House, Anand, 2012.
- Ramesh Babu, "Civil Engineering", VRB Publishers, Chennai, 2000.
- National Building Code of India, Part V, "Building Material"s, 2005
- Surendra Singh, "Building Material"s, Vikas Publishing Company, New Delhi, 1996.

Purpose

To get exposed to the glimpses of Civil Engineering topics that is essential for an Engineer.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To know about different materials and their properties
2. To know about engineering aspects related to buildings
3. To know about importance of surveying and the transportation systems
4. To get exposed to the rudiments of engineering related to dams, water supply, and sewage disposal.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X				X						X
Mapping of instructional objectives with student outcome	1 - 4				1-4						2-4

List of Topics Covered

UNIT I - BUILDING MATERIALS (6 hours)

Introduction – Civil Engineering – Materials: Bricks – composition – classifications – properties –uses. Stone – classification of rocks – quarrying – dressing –properties –uses. Timber - properties –uses –ply wood. Cement – grades – types – properties –uses. Steel – types – mild steel – medium steel – hard steel – properties – uses – market forms.

Concrete – grade designation – properties – uses.

UNIT II - MATERIAL PROPERTIES (6 hours)
Stress – strain – types – Hook's law – three moduli of elasticity – poisons ratio – relationship – factor of safety. Centroid - center of gravity – problems in symmetrical sections only (I, T and channel sections). Moment of inertia, parallel, perpendicular axis theorems and radius of gyration (definitions only).

UNIT III - BUILDING COMPONENTS (6 hours)
Building – selection of site – classification – components. Foundations –functions – classifications – bearing capacity. Flooring – requirements – selection – types – cement concrete marble – terrazzo floorings. Roof – types and requirements.

UNIT IV - SURVEYING AND TRANSPORTATION (6 hours)
Surveying – objectives – classification – principles of survey. Transportation – classification – cross section and components of road – classification of roads. Railway – cross section and components of permanent way –functions. Water way – docks and harbor – classifications – components. Bridge – components of bridge.

UNIT V - WATER SUPPLY AND SEWAGE DISPOSAL (6 hours)
Dams – purpose – selection of site – types –gravity dam (cross section only). Water supply – objective – quantity of water – sources – standards of drinking water – distribution system. Sewage – classification – technical terms – septic tank – components and functions.

.

Course Number and Title

ME1001 BASIC MECHANICAL ENGINEERING

Credits / Contact Hours

2 / 30

Instructor Name

Mr.A.Rajasekaran

Textbooks, References

- Kumar T, Leenus Jesu Martin and Murali G, "Basic Mechanical Engineering", Suma Publications, Chennai, 2007.
- Prabhu T. J, Jai Ganesh V and Jebaraj S, "Basic Mechanical Engineering", Scitech Publications, Chennai, 2000.
- Hajra Choudhary S.K. and Hajra Choudhary A. K, "Elements of Workshop Technology", Vols. I & II, Indian Book Distributing Company Calcutta, 2007.
- Nag P.K, "Power Plant Engineering", Tata McGraw-Hill, New Delhi, 2008.
- Rattan S.S, "Theory of Machines", Tata McGraw-Hill, New Delhi, 2010.

Purpose

To familiarize the students with the basics of Mechanical Engineering.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To familiarize with the basic machine elements
2. To familiarize with the Sources of Energy and Power Generation
3. To familiarize with the various manufacturing processes

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X				X						
Mapping of instructional objectives with student outcome	1- 3				1- 3						

List of Topics Covered

UNIT I - MACHINE ELEMENTS– I (5 hours)
Springs: Helical and leaf springs – Springs in series and parallel. **Cams:** Types of cams and followers – Cam profile.

UNIT II - MACHINE ELEMENTS– II (5 hours)
Power Transmission: Gears (terminology, spur, helical and bevel gears, gear trains). Belt drives (types). Chain drives. Simple Problems.

UNIT III – ENERGY (10 hours)
Sources: Renewable and non-renewable (various types, characteristics, advantages/disadvantages). **Power Generation:** External and internal combustion engines – Hydro, thermal and nuclear power plants (layouts, element/component description, advantages, disadvantages, applications). Simple Problems.

UNIT IV - MANUFACTURING PROCESSES – I (5 hours)
Sheet Metal Work: Introduction – Equipments – Tools and accessories – Various processes (applications, advantages / disadvantages). **Welding:** Types – Equipments – Tools and accessories – Techniques employed -applications, advantages / disadvantages – Gas cutting – Brazing and soldering.

UNIT V - MANUFACTURING PROCESSES– II (5 hours)
Lathe Practice: Types - Description of main components – Cutting tools – Work holding devices – Basic operations. Simple Problems. **Drilling Practice:** Introduction – Types – Description – Tools. Simple Problems.

Course Number and Title

ME1005 ENGINEERING GRAPHICS

Credits / Contact Hours

3 / 75

Instructor Name

Mr.A.Rajasekaran

Textbooks, References

- Venugopal K and Prabhu Raja V, “Engineering Graphics”, Eighth Edition (Revised), New Age International Publishers, Chennai, 2007.

- Natarajan, K.V, "A Text Book of Engineering Graphics", 21st Edition, Dhanalakshmi Publishers, Chennai, 2012.
- Jeyapoovan T, "Engineering Drawing and Graphics using AutoCAD", Vikas Publishing House Pvt. Ltd., New Delhi, 2010.
- Bethune J.D, "Engineering Graphics with AutoCAD 2013", PHI Learning Private Limited, Delhi, 2013.
- Bhatt N.D, "Elementary Engineering Drawing (First Angle Projection)", Charotar Publishing Co., Anand, 1999.
- Narayanan K. L. and Kannaiah P, "Engineering Graphics", Scitech Publications, Chennai, 1999.
- Shah M. B. and Rana B. C, "Engineering Drawing", Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2005.

Purpose

1. To draw and interpret various projections of 1D, 2D and 3D objects.
2. To prepare and interpret the drawings of buildings.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To familiarize with the construction of geometrical figures
2. To familiarize with the projection of 1D, 2D and 3D elements
3. To familiarize with the sectioning of solids and development of surfaces
4. To familiarize with the Preparation and interpretation of building drawing

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X				X				
Mapping of instructional objectives with student outcome		1-4	1-4				1-4				

List of Topics Covered

UNIT I - FUNDAMENTALS OF ENGINEERING GRAPHICS (2 hours)
Lettering – Two dimensional geometrical constructions – Conics – Representation of three-dimensional objects – Principles of projections – Standard codes – Projection of points.

UNIT II - PROJECTION OF LINES AND SOLIDS (4 hours)
Projection of straight lines – Projection of planes - Projection of solids – Auxiliary projections.

UNIT III - SECTIONS AND DEVELOPMENTS (3 hours)
Sections of solids and development of surfaces.

UNIT IV - PICTORIAL PROJECTIONS (4 hours)
Conversion of Projections: Orthographic projection – Isometric projection of regular solids and combination of solids.

UNIT V - BUILDING DRAWING (2 hours)
Plan, Elevation and section of single storied residential (or) office building with flat RCC roof and brick masonry walls having not more than 3 rooms (planning / designing is not expected in this course) with electrical wiring diagram.

Course Number and Title

EC1001 BASIC ELECTRONICS ENGINEERING

Credits / Contact Hours

2 / 30

Instructor Name

Ms. A. Ramya

Textbooks, References

1. Thyagarajan T, SendurChelvi K.P, Rangaswamy T.R, "Engineering Basics: Electrical, Electronics and Computer Engineering", New Age International, Third Edition, 2007.
2. Somanathan Nair B, Deepa S.R, "Basic Electronics", I.K. International Pvt. Ltd., 2009.
3. Thomas L. Floyd, "Electronic Devices", Pearson Education, 9th Edition, 2011.
4. Rajput R.K, "Basic Electrical and Electronics Engineering", Laxmi Publications, First Edition, 2007.

Purpose

This course provides comprehensive idea about working principle, operation and characteristics of electronic devices, transducers, Digital Electronics and Communication Systems.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

At the end of the course students will be able to gain knowledge about the

1. Fundamentals of electronic components, devices, transducers
2. Principles of digital electronics
3. Principles of various communication systems

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X				X						
Mapping of instructional objectives with student outcome	1, 3				2,3						

List of Topics Covered

UNIT I - ELECTRONIC COMPONENTS (4 hours)
Passive components – resistors, capacitors & inductors (properties, common types, I-V relationship and uses).

UNIT II - SEMICONDUCTOR DEVICES (7 hours)
Semiconductor Devices - Overview of Semiconductors - basic principle, operation and characteristics of PN diode, Zener diode, BJT, JFET, optoelectronic devices (LDR, photodiode, phototransistor, solar cell, optocouplers)

UNIT III – TRANSDUCERS (5 hours)
Transducers - Instrumentation – general aspects, classification of transducers, basic requirements of transducers, passive transducers - strain gauge, thermistor, Hall-Effect transducer, LVDT, and active transducers – piezoelectric and thermocouple.

UNIT IV - DIGITAL ELECTRONICS (7 hours)
Number systems – binary codes - logic gates - Boolean algebra, laws & theorems - simplification of Boolean expression - implementation of Boolean expressions using logic gates - standard forms of Boolean expression.

UNIT V - COMMUNICATION SYSTEMS (7 hours)
Block diagram of a basic communication system – frequency spectrum - need for modulation - methods of modulation - principles of AM, FM, pulse analog and pulse digital modulation – AM / FM transmitters & receivers (block diagram description only)

Course Number and Title

EC1002 ELECTRONICS ENGINEERING PRACTICES

Credits / Contact Hours

1 / 30

Instructor Name

Dr. P. Eswaran

Textbooks, References

- ORCAD User manual.
- Raghbir Singh Khandpur, "Printed Circuit Boards: Design, Fabrication, and Assembly", Tata McGraw-Hill Education, 2005
- Department Laboratory Manual

Purpose

To equip the students with the knowledge of PCB design and fabrication processes.

Prerequisites	Co-requisites
Nil	EC1001

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To familiarize the electronic components and basic electronic instruments.
2. To make familiar with PCB design and various processes involved.
3. To provide in-depth core knowledge in the and fabrication of Printed Circuit Boards.
4. To provide the knowledge in assembling and testing of the PCB based electronic circuits.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X								X
Mapping of instructional objectives with student outcome	1	2,3	2,3								1-4

List of Topics Covered

Expt.1: INTRODUCTION TO BASICS OF ELECTRONIC COMPONENTS AND INSTRUMENTS (4 hours)
Study of electronic components- active & passive, Electronic Instruments: CRO, Function generator, Power Supply, Multi-meter, IC tester. Solder practice.

Expt. 2: SCHEMATIC CAPTURE (6 hours)
Introduction to ORCAD schematic capture tool, Simulation of simple electronic circuit, Schematic to layout transfer, Layout Printing

Expt. 3: PCB DESIGN PROCESS (6 hours)
Conception Level Introduction: Specifying Parts, Packages and Pin Names, Libraries and Checking foot prints of the components, Partlist, Netlist, Making Netlist Files, Placing Parts, Routing Traces, Modifying Traces, Mounting Holes, Adding Text, PCB Layout, DRC, Pattern Transfer

Expt. 4: PCB FABRICATION PROCESS (6 hours)
Etching, cleaning, drying and drilling

Expt. 5: ASSEMBLING AND TESTING (8 hours)
Identifying the components and its location on the PCB, soldering of active and passive components, Testing the assembled circuit for correct functionality

Course Number and Title

EE1001 BASIC ELECTRICAL ENGINEERING

Credits / Contact Hours

2 / 30

Instructor Name

Mrs. V. K. Daliya

Textbooks, References

- Dash S.S, Subramani C, Vijayakumar K, "BasicElectrical Engineering", First edition,Vijay Nicole Imprints Pvt.Ltd, 2013.
- Smarajt Ghosh, "Fundamentals of Electrical & Electronics Engineering", Second edition, PHI Learning, 2007.
- Metha V.K, Rohit Metha, "Basic Electrical Engineering", Fifth edition, S.Chand & Co, 2012.
- Kothari D. P and Nagrath IJ, "Basic Electrical Engineering", Second edition, Tata McGraw - Hill, 2009.
- Bhattacharya S. K, "Basic Electrical and Electronics Engineering", First edition, Pearson Education, 2011.

Purpose

This course provides comprehensive idea about circuit analysis, working principles of machines and common measuring instruments.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. Understand the basic concepts of magnetic circuits, AC & DC circuits.
2. Explain the working principle, construction, applications of DC & AC machines and measuring instruments.
3. Gain knowledge about the fundamentals of wiring and earthing.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X				X						
Mapping of instructional objectives with student outcome	1-3				1						

List of Topics Covered

UNIT I – FUNDAMENTALS OF DC CIRCUITS (6 hours)
Introduction to DC and AC circuits, Active and passive two terminal elements, Ohms law, Voltage-Current relations for resistor, inductor, capacitor , Kirchhoff's laws, Mesh analysis, Nodal analysis, Ideal sources –equivalent resistor, current division, voltage division

UNIT II – MAGNETIC CIRCUIT (6 hours)
Introduction to magnetic circuits-Simple magnetic circuits-Faraday's laws, induced emfs and inductances

UNIT III – AC CIRCUITS (6 hours)
Sinusoids, Generation of AC, Average and RMS values, Form and peak factors, concept of phasor representation, J operator. Analysis of R-L, R-C, R-L-C circuits. Introduction to three phase systems - types of connections, relationship between line and phase values.

UNIT IV – ELECTRICAL MACHINES & MEASURING INSTRUMENTS(6 hours)
Working principle, construction and applications of DC machines and AC machines (1 - phase transformers, single phase induction motors: split phase, capacitor start and capacitor start & run motors). Basic principles and classification of instruments -Moving coil and moving iron instruments.

UNIT V – ELECTRICAL SAFETY, WIRING & INTRODUCTION TO POWER SYSTEM (6 hours)
Safety measures in electrical system- types of wiring- wiring accessories- staircase, fluorescent lamps & corridor wiring- Basic principles of earthing-Types of earthing- Simple layout of generation, transmission & distribution of power..

Course Number and Title

EE1002 ELECTICAL ENGINEERING PRACTICE

Credits / Contact Hours

1 / 30

Instructor Name

Dr.C.S.Boopathy

Textbooks, References

- Subhransu Sekhar Dash & K.Vijayakumar, "Electrical Engineering Practice Lab Manual". Vijay Nicole Imprints Private Ltd., First Edition, 2013.
- Jeyachandran K, Natarajan S & Balasubramanian S, "A Primer on engineering practices laboratory", Anuradha Publications, 2007.
- Jeyapoovan T, Saravanapandian M & Pranitha S, "Engineering practices lab manual", Vikas Publishing House Pvt., Ltd., 2006.

Purpose

To provide exposure to the students with hands on experience on various Electrical Engineering practices.

Prerequisites	Co-requisites
Nil	EE1001

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

At the end of the course students will be able.

1. To learn the residential wiring and various types of wiring.
2. To measure the various electrical quantities.
3. To gain knowledge about the fundamentals of various electrical gadgets and their working and trouble shooting of them.
4. To design a prototype of a transformer.
5. To know the necessity and types of earthing and measurement of earth resistance.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X								
Mapping of instructional objectives with student outcome	1-5	2,5	4								

List of Topics Covered

LIST OF EXPERIMENTS

1. Residential wiring (using Energy meter, fuses, switches, indicator, lamps, etc)
2. Types of wiring (fluorescent lamp wiring, staircase wiring, godown wiring, etc)
3. Measurement of electrical quantities (like voltage, current, power, power factor in RLC circuits)
4. Measurement of energy (using single phase and three phase energy meter)
5. Study of Earthing and Measurement of Earth resistance.
6. Study of trouble shooting of electrical equipments (fan, iron box, mixer-grinder, etc)
7. Study of various electrical gadgets (Induction motor, transformer, CFL, LED, PV cell, etc)
8. Assembly of choke or small transformer.

A.1.4 Engineering Topics - II

Professional Core Courses

2013 Curriculum Course Code	Name of the Course
EC1003	Electric Circuits
EC1004	Electric Circuits Lab
EC1005	Electromagnetic Theory And Waveguides
EC1006	Electron Devices
EC1007	Digital Systems
EC1008	Signals And Systems
EC1009	Electron Devices Lab
EC1010	Digital Systems Lab
EC1011	Transmission Lines And Networks
EC1012	Electronic Circuits
EC1013	Linear Integrated Circuits
EC1014	Electronic Circuits Lab
EC1015	Linear Integrated Circuits Lab
EC1016A	Microprocessors And Microcontrollers
EC1017	Digital Signal Processing
EC1018	Communication Theory
EC1019A	Processor Lab
EC1020	Communication Engineering Lab
EC1047	Industrial Training – I
EC1021	Antenna And Wave Propagation
EC1022	Microwave And Optical Communication
EC1023	Digital Communication
EC1024	Microwave And Optical Communication Lab
EC1025	Digital Communication Lab
EC1049	Minor Project
EC1026	Wireless Communication
EC1027	Computer Communication
EC1028	Elements of Information Theory and Coding
EC1029	VLSI Design
EC1030	Network Simulation Lab
EC1031	VLSI Design Lab
EC1048	Industrial Training II
EC1050	Major Project / Practice School

Course Number and Title

EC1003 ELECTRIC CIRCUITS

Credits / Contact Hours

3 / 45

Instructor Name

Dr.K.Kalimuthu

Textbooks, References

- Sudhakar A & Shyammohan S Palli, "Circuits & Network Analysis & Synthesis", 4th Edition, Tata McGraw Hill, 2010.
- Soni M.L & Gupta J.C, "Course in Electrical Circuits Analysis", Dhanpat Rai & Sons, New Delhi, 1999.
- Muhammed H Rashid, "SPICE for Circuits and Electronics using PSPICE", PHI, 2nd Edition, 2011.
- William H.Hyte, Jr, J.E.Kemmerly & Steven M.Durban, "Engineering Circuit Analysis", 7th Edition, McGraw Hill, 2010.
- Joseph Edminster, "Electric Circuits", Schaum's Outline Series", McGrawHill, 5th Edition, 2011.

Purpose

To expose basic circuit concepts, circuit modeling and methods of circuit analysis in time domain and frequency domain for solving simple and multi dimensional circuits including coupled circuits and tuned circuits.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To understand the concept of circuit elements lumped circuits, waveforms, circuit laws and network reduction
2. To solve the electrical network using mesh and nodal analysis by applying network theorems
3. To understand the concept of resonance in Series and parallel circuits and to know the basic concepts of coupled circuits.
4. To analyze the transient response of series and parallel A.C. circuits and to solve problems in time domain using Laplace Transform
5. To analyze the tuned circuits and to analyze DC, AC and Transient response of the circuit using PSICE.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X		X						X
Mapping of instructional objectives with	1-5	5	5		1-4						5

student outcome											

List of Topics Covered

UNIT I - BASIC CIRCUIT CONCEPTS & LAWS (9 hours)
Classification of Circuit Elements – Node, Loop, Path & Branch – Incidence Matrix – Network topology - Analysis of Incidence Matrix- Tie Set & Cut Set – Kirchoff's Laws – Series and Parallel – Voltage and Current division rule.
Introduction to AC Analysis – Complex Impedance – Analysis: Mesh – Supermesh – Nodal – Supernodal.

UNIT II - NETWORK THEOREMS: (Both DC & AC Circuit Analysis (9 hours)
Source Transformation Theorem - Super Position Principle - Thevenin's & Norton's Theorem - Reciprocity Theorem - Compensation Theorem - Millman's Theorem - Maximum Power Transfer theorem - Star - Delta Theorem.

UNIT III - RESONANCE & COUPLED CIRCUITS (9 hours)
Resonance: Introduction – series resonance – parallel resonance – Definition: Q Factor- Half power frequency resonant frequency – Bandwidth.
Coupled Circuits: Mutual inductance – Co-efficient of Coupling – Dot Convention – Energy Consideration – Analysis of Coupled Circuits.

UNIT IV - TRANSIENT ANALYSIS (9 hours)
Basics - Source free and Forced Response of RL, RC and RLC Series Circuits – Forced Response of RL, RC & RLC Series circuits with Sinusoidal Excitation - Time Constant & Natural frequency of Oscillation - Laplace Transform Application to the Solution of RL, RC & RLC Transient Circuits.

UNIT V - TUNED CIRCUITS & PSPICE (9 hours)
Tuned Circuits – Single Tuned Circuits – Double Tuned Circuits – Analysis
PSPICE (Elementary treatment only) – DC Analysis and Control Statements - AC Analysis and Control Statements – Transient analysis.

Course Number and Title

EC1004 ELECTRIC CIRCUITS LAB

Credits / Contact Hours

1 / 30

Instructor Name

Mrs.A. Anilet Bala

Textbooks, References

- LAB MANUAL, Department of ECE, SRM University.
- David A Bell, "Laboratory Manual for Electric Circuits", 6th Edition, PHI.
- Muhammed H Rashid, "SPICE for Circuits and Electronics using PSPICE", 2nd Edition, PHI, 1995.
- Maheswari.L.K and Anand.M.M.S, "Laboratory Manual for Introductory Electronic Experiments", New Age, 2010.

Purpose

To inculcate strong practical skills on the fundamental theorems and transient circuit analysis.

Prerequisites	Co-requisites

Nil	EC1003

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. Provide hands-on experience to the students so that they are able to put theoretical concepts to practice.
2. Use computer simulation tools such as PSPICE, or Multisim to carry out design experiments as it is a key analysis tool of engineering design.
3. Give a specific design problem to the students, which after completion they will verify using the simulation software or hardwired implementation.
4. Understand the concept of circuit laws
5. Solve the electrical network using mesh and nodal analysis by applying network theorems
6. Understand the concept of resonance in series and parallel circuits
7. Analyze the transient response of series and parallel A.C. circuits and to solve problems in time domain using Laplace Transform.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
			X	X		X					X
Mapping of instructional objectives with student outcome			1, 3, 4, 5, 6, 7	1-3		2, 3					1-7

List of Topics Covered

LIST OF EXPERIMENTS

1. Verification of Kirchoff's voltage and Current Laws
2. Verification of Superposition Theorem
3. Verification of Thevenin's Theorem & Norton's Theorem
4. Verification of Maximum Power Transfer Theorem
5. Verification of Tellegen's and Reciprocity Theorem
6. Time domain response of RL Transient Circuit.
7. Time domain response of RC Transient Circuit.
8. Series RLC Resonance Circuits (Frequency response& Resonant frequency)
9. Parallel RLC Resonance Circuits (Frequency response & Resonant frequency)
10. Simulation experiments using PSPICE or MultiSim

EC1005 ELECTROMAGNETIC THEORY AND WAVEGUIDES

Credits / Contact Hours

3 / 45

Instructor Name

Mrs. M. Neelaveni Ammal

Textbooks, References

- William H.Hayt,Jr and John A.Buck., "Engineering Electromagnetics", Tata McGraw-Hill Publishing Ltd, 8th Edition, 2012.
- Raju.G.S.N, "Electromagnetic Field Theory and Transmission Lines", Pearson Education, First Indian print,

2005
- Edward Jordan and Balmain. KG, "Electromagnetic Waves and Radiating Systems", Pearson education, 2nd Edition, 2001.
- Matthew N. Sadiku. O, "Elements of Electromagnetics", Oxford University Press, 3rd Edition, First Indian Edition, 2006.
- John D. Kraus, "Electromagnetics", McGraw Hill book Company, New York, Fourth Edition, 1991.

Purpose

To enable the students understand the universal theoretical concepts in three dimensional real world and find solution to problems related to electromagnetic wave propagation.

Prerequisites	Co-Requisites
MA1001 & MA1002	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To impart knowledge on the basic concepts of electric and magnetic fields.
2. To educate scientifically about Maxwell's equations and Poynting theorem
3. To interpret the Wave propagation in between parallel plates.
4. To emphasize the significance of different types of waveguides.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X				X						
Mapping of instructional objectives with student outcome	1-4				1-4						

List of Topics Covered

UNIT I - STATIC ELECTRIC FIELDS (11 hours)
Introduction to co-ordinate system – Rectangular Cylindrical and Spherical – The experimental law of Coulomb. Electric Field Intensity – field of line charge, sheet charge, continuous volume charge distribution – Streamline and sketches of fields - Electric flux density – Gauss Law – Applications of Gauss Law - Some symmetrical charge distributions – Differential volume element – Concept of divergence. Definition of Electric potential, work, Energy potential difference – Potential field of different types of charges – Potential gradient – The dipole and field due to a dipole. Energy density in the electric field.

UNIT II - STEADY MAGNETIC FIELDS (9 hours)
Biot Savart Law – Applications of Biot Savart Law - Ampere's circuital law - Applications circuital law – Curl – Stoke's Theorem - Magnetic flux and magnetic flux density – The scalar and vector magnetic potentials – Derivation of the steady magnetic field laws.

UNIT III - TIME VARYING FIELDS AND MAXWELLS EQUATIONS (7 hours)
Faraday's law – Displacement current –Maxwell's equations in point form and integral form for steady fields and time varying fields – Retarded potentials - Comparison of field and circuit theory - Poynting vector and Poynting Theorem.

UNIT IV - GUIDED WAVES (9 hours)
Waves between parallel planes: Transverse electric waves-Transverse magnetic waves-Characteristic of TE and TM waves-TEM waves. Velocity of propagation-Attenuation in parallel plane guides-Wave impedance

UNIT V - WAVEGUIDE THEORY (9 hours)

Rectangular wave guides: TE waves and TM waves in Rectangular waveguides – Dominant mode – cutoff frequency in wave guides – Impossibility of TEM waves in waveguides.
Circular waveguides: Wave impedance and characteristic impedance – Power flow in wave guides – Attenuation factor and Q of wave guides – Transmission line analogy for waveguides

Course Number and Title

EC1006 ELECTRON DEVICES

Credits / Contact Hours

3 / 45

Instructor Name

Mrs. E. Chitra

Textbooks, References

- Robert L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuit Theory", Pearson Education, 9th Edition, 2009.
- Somanathan Nair B, "Electronic Devices and Applications", PHI, 2006.
- Jacob Millman, Christos C Halkias, Satyabrata Jit, "Electron Devices and Circuits", Tata McGraw Hill, 2010.
- David A Bell, "Fundamentals of Electronic Devices and Circuits", Oxford Press, 2009.
- Theraja.B.L, Sedha.R.S, "Principles of Electronic Devices and Circuits", Chand. S, 2004.

Purpose

The purpose of this course is to provide a basis for understanding the characteristics, operation and limitations of semiconductor and optoelectronic devices. This course brings together the semiconductor device physics, optoelectronic device principles and complete description of power supply circuit.

Prerequisites	Co-requisites
EC1001	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To understand the physical construction, working and operational characteristics of Semiconductor devices.
2. To understand the operation of power supply circuits built using filters, rectifiers and voltage regulators.
3. To discuss the manufacturing process of monolithic ICs & the fabrication of components on monolithic IC.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X								
Mapping of instructional objectives with student outcome	1,2,3	1,2	1,2								

List of Topics Covered

UNIT I - SEMICONDUCTOR DIODES AND SPECIAL PURPOSE DIODES (12 hours)
Overview on Physics and Properties of Semiconductors: Intrinsic semiconductor – extrinsic semiconductor – Fermi level in an intrinsic semiconductor – conductivity of a metal, intrinsic semiconductor and extrinsic semiconductor – drift – diffusion – recombination – carrier life time.
Semiconductor diodes : Formation of PN junction – working principle – VI characteristics – PN diode currents – diode current equation – diode resistance – transition and diffusion capacitance – diode models – voltage breakdown in diodes.
Special purpose diodes : Zener diode – Point-contact diode – Backward diode – Varactor diode – Step-recovery diode – Schottky diode, PNPN diode – RF diode.

UNIT II - BIPOLAR TRANSISTORS (6 hours)
Bipolar Transistors: Construction – working – transistor currents – transistor configurations and input-output characteristics – Early effect (base-width modulation) – Ebers Moll model – transistor as an amplifier – Transistor as a switch.

UNIT III - FIELD-EFFECT TRANSISTORS (6 hours)
Field-Effect Transistors : construction, working and VI characteristics of JFET – comparison of BJT and JFET – MOSFET – enhancement MOSFET, depletion MOSFET, their working principle and VI characteristics, comparison of MOSFET with JFET, comparison of D MOSFET with E MOSFET, CMOS, MESFET, CCD.

UNIT IV - DC POWER SUPPLIES (12 hours)
Rectifiers and Filters : Block schematic of a typical DC power supply, single phase HWR, FWR, full-wave bridge rectifier, power supply filters (ripple factor and efficiency analysis), bleeder resistor, voltage dividers.

Voltage regulators: voltage regulation, Zener diode shunt regulator, transistor series regulator, transistor shunt regulator, switching regulators, design of complete DC power supply circuit.

UNITV - INTEGRATED CIRCUIT FABRICATION (9 hours)
Integrated circuit – advantages and drawback of ICs – scale of integration – classification of ICs – definition of linear IC and digital IC with examples – manufacturing process of monolithic ICs – fabrication of components (diode, capacitor, bipolar transistor, resistor and field – effect transistor) on monolithic IC – comparison of MOS ICs and bipolar ICs.

Course Number and Title

EC1007 DIGITAL SYSTEMS

Credits / Contact Hours

3 / 45

Instructor Name

Mrs. P. Radhika

Textbooks, References

- Morris Mano M, Michael D. Ciletti, “Digital Design”, Pearson Education, 4th Edition, 2007.
- Charles H Roth (Jr), Larry L. Kinney, “Fundamentals of Logic Design”, Cengage Learning India Edition, 5th Edition, 2010.
- Floyd and Jain, “Digital Fundamentals”, Pearson Education, 8th Edition, 2007.
- Ronald J. Tocci, “Digital Systems: Principles and Applications”, Pearson Education, 10th Edition, 2009.
- Donald P Leach, Albert Paul Malvino, Goutam Saha, “Digital Principles and Applications”, Tata McGraw Hill, 6th Edition, 2008.

Purpose

The purpose of this course is to develop a strong foundation in analysis and design of digital electronics.

Prerequisites	Co-requisites
EC1001	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

At the end of the course students should be able to

1. Understand concepts of combinational and sequential circuits.
2. Analyze the synchronous and asynchronous logic circuits.
3. Understand concepts of memory, programmable logic and digital integrated circuits.
4. Design Combinational and sequential systems.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X								
Mapping of instructional objectives with student outcome	1,2,4	1- 4	1- 4								

List of Topics Covered

UNIT I-BASIC CONCEPTS, BOOLEAN ALGEBRA, THEOREMS AND FUNCTIONS (10 hours)
Number Systems: Decimal number system, binary number system, octal number system , hexadecimal number system, BCD number system, Excess-3 code, Gray code, Alpha numeric code, error detecting and error correcting codes.
Arithmetic: Arithmetic number representation, Binary arithmetic, Hexadecimal arithmetic, BCD arithmetic.
Boolean Algebra and Theorems: Logic gates and logic operations, Boolean theorems and postulates, SOP's & POS's, Minterms and Maxterms.
Minimization of Boolean Functions: Algebraic simplification, Karnaugh map simplification, Quine-Mc Cluskey or Tabulation method.

UNIT II-LOGIC GATES (9 hours)
Logic Families: Metal Oxide Semiconductor logic families- switching properties of NMOS and PMOS transistors, static NMOS, dynamic NMOS, Static CMOS and dynamic CMOS logic families, CMOS Transmission gate circuits, Bipolar logic families- switching properties of NPN and PNP transistors, TTL, Schottkey TTL, Comparison of MOS logic circuits(CMOS) with that of a TTL digital circuit, Tristate gates.

Electrical characteristics: Meanings of speed, propagation delay, operating frequency, and power dissipated per gate, supply voltage levels, operational voltage levels of various logic families.

UNIT III-COMBINATIONAL SYSTEMS (9 hours)
Binary arithmetic units (Adder, Subtractor, n-bit parallel adder & Subtractor, look ahead carry generator), decoder, encoder, multiplexer, Demultiplexer, code converters, Magnitude comparators, parity generators.
Implementation of combinational logic by standard IC's.

UNIT IV-SEQUENTIAL SYSTEMS (10 hours)
Flip-flop and Latch: SR latch, JK flip-flop, T flip-flop, D flip-flop and latch, Master-slave RS flip-flop, Master-slave JK flip-flop, asynchronous inputs.
Registers & Counters: Shift registers (SISO, SIPO, PISO, PIPO), universal shift register. Counters-Asynchronous/Ripple counters, Synchronous counters, Modulus-n Counter, Ring counter, Johnson counter, Up-Down

counter, asynchronous clear, preset and load in a counter, synchronous clear, preset and load in a counter, typical IC's for counters.
Synchronous (Clocked) sequential circuits: Moore and Mealey state machine circuits, Analysis & design of synchronous sequential circuits – State machine design with SM charts.

UNIT V-MEMORY AND PROGRAMMABLE LOGIC (7 hours)
RAM, memory decoding, ROM, PROMs, PAL & PLA, Sequential Programmable Devices (discuss three major devices without going into their detailed construction).

Course Number and Title

EC1008 SIGNALS AND SYSTEMS

Credits / Contact Hours

4 / 60

Instructor Name

Mr.U.Hari

Textbooks, References

- Alan V Oppenheim, Ronald W. Schafer "Signals & Systems", Pearson Education, 1997.
- Simon Haykin and Barry Van Veen, "Signals and Systems", John Wiley & Sons Inc, 2nd Edition, 2007.
- John G. Proakis and Manolakis, "Digital Signal Processing, Principles, Algorithms and Applications", Pearson Education, 4th Edition, 2007.
- Lathi B.P, "Linear Systems & Signals", Oxford Press, Second Edition, 2009.
- Rodger E Ziemer, William H. Tranter, D. Ronald Fannin, "Signals and Systems – continuous and Discrete", Pearson Education, 4th Edition, 2009.
- Douglas K Linder, "Introduction to Signals and Systems", Mc-Graw Hill, 1st Edition, 1999.

Purpose

The purpose of this course is to introduce students to the fundamentals of signals and systems which are basic to Digital Signal Processing. The main objective of this subject is to help the students to mathematically analyze different types of signals and their associated systems

Prerequisites	Co-requisites
MA1002	MA1003

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

At the end of this course, the students will be able to understand the
1. Various classifications of both Continuous time and Discrete time Signals and Systems.
2. Spectral analysis of Periodic and Aperiodic Signals using Fourier series.
3. Analysis and characterization of the CT system through Laplace transform and Fourier transform
4. Analysis and characterization of the DT system through classical method.
5. Analysis and characterization of the DT system through Z transform.

Student Outcomes from Criterion 3 covered by this Course											
Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X								
Mapping of instructional objectives with student outcome	1-5	1-5	3,5								

List of Topics Covered

UNIT I-CLASSIFICATION OF SIGNALS AND SYSTEMS (9 hours)
Classification of Signals: Continuous time signals - Discrete time signals – Periodic and Aperiodic signals – Even and odd signals – Energy and power signals –Deterministic and random signals –Complex exponential and Sinusoidal signals .Unit step, Unit ramp, Unit impulse – Representation of signals in terms of unit impulse .
Classification of Systems: Continuous time systems- Discrete time systems - Linear system – Time Invariant system – causal system – BIBO system – Systems with and without memory – LTI system.

UNIT II-ANALYSIS OF CONTINUOUS TIME SIGNALS (9 hours)
Fourier series: Representation of Continuous time Periodic signals –Trigonometric and exponential-Symmetry conditions- Properties of Continuous time Fourier series – Parseval's relation for power signals –Frequency spectrum.
Fourier transform: Representation of Continuous time signals- Properties of Continuous time Fourier transform – Parseval's relation for energy signals –Frequency spectrum –Analysis of LTI system using Fourier methods.

UNIT III-LTI CONTINUOUS TIME SYSTEM (9 hours)
System modeling: Solution of Differential equation with initial conditions-Zero state response and Zero input response– impulse response – Frequency response – Convolution – Analysis and characterization of LTI system using Laplace transform.

UNIT IV-ANALYSIS OF DISCRETE TIME SIGNALS AND SYSTEMS (9 hours)
Representation of sequences – Discrete Time Fourier Transform (DTFT) - Discrete Fourier Transform (DFT) and its properties – Solution of linear constant coefficient difference equations with initial conditions-Zero state response and Zero input response–- impulse response – Convolution sum -Frequency response.

UNIT V-LTI DT SYSTEM CHARACTERIZATION AND REALIZATION(9 hours)
Unilateral and Bilateral Z transforms and its properties - Inverse Z transform: Power series expansion and Partial fraction methods - Analysis and characterization of DT system using Z transform-Realization of structures for DT systems -Direct form-I- Direct form II--Parallel-Cascade forms

Tutorial - (15 hours)

Course Number and Title

EC1009 ELECTRON DEVICES LAB

Credits / Contact Hours

2 / 45

Instructor Name

Mrs.A.Maria Jossy

Textbooks, References

- "LAB MANUAL", Department of ECE, SRM University

- Paul B Zbar and Alber P Malvino, Michael A Miller, "Basic Electronics: A Text Lab Manual", 7th edition, Tata McGraw Hill, 2009.
- David A Bell, "Laboratory Manual for Electronic Devices and Circuits", 4th edition, PHI, 2001.
- Muhammed H Rashid, "SPICE for circuits and electronics using PSPICE", 2nd edition, PHI, 1995.
- Mithal. G.K, "Practicals in Basic Electronics", G K Publishers Private Limited, 1997.
- Maheswari. L.K and Anand.M.M.S, "Laboratory Manual for Introductory Electronic Experiments", New Age, 2010.
- Poornachandra Rao.S and Sasikala.B, "Handbook of Experiments in Electronics and Communication Engineering", Vikas publishers, 2003

Purpose

To reinforce learning in the accompanying EC1004 course through hands-on experience by examining the electrical characteristics of various semiconductor devices, such as diodes, BJTs and FETs. To provide the student with the capability to use simulation tools for performing various analysis of semiconductor devices.

Prerequisites	Co-requisites
EC1004	EC1006

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To study experimentally the characteristics of diodes, BJT's and FET's.
2. To verify practically the response of various special purpose electron devices.
3. To construct and simulate various semiconductor devices using tools such as PSPICE/multisim..

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X	X		X					X
Mapping of instructional objectives with student outcome		1-3	1-3	1-3		1-3					3

List of Topics Covered

LIST OF RECOMMENDED EXPERIMENTS

1. Characteristics of PN junction and Zener diode.
2. Input, Output and Transfer characteristics of CE and CC Amplifier.
3. Characteristics of LDR, Photo-diode and Photo transistor.
4. Transfer characteristics of JFET.
5. Transfer characteristics of MOSFET (with depletion and enhancement mode)
6. Characteristics of LED with three different wavelengths.
7. Half wave rectifier.
8. Full wave rectifier with 2 diodes.
9. Full wave rectifier with 4 diodes (Bridge rectifier).
10. Series voltage Regulator.
11. Shunt voltage Regulator.
12. Characteristics of Thermistor.
13. Simulation experiments using PSPICE or Multisim.

Course Number and Title

EC1010 DIGITAL SYSTEM LAB

Credits / Contact Hours

2 / 45

Instructor Name

Mrs. A .Anilet Bala

Textbooks, References

- "LAB MANUAL", Department of ECE, SRM University.
- Maheswari.L.K and Anand.M.M.S, "Laboratory Manual for Introductory Electronic Experiments", New Age, 2010.
- Poornachandra Rao.S and Sasikala.B, "Handbook of Experiments in Electronics and Communication Engineering", Vikas publishers, 2003.
- Website: http://ozark.hendrix.edu/~burch/logisim/

Purpose

To reinforce learning in the accompanying EC0205 course through hands-on experience with digital electronic circuit analysis, design, construction, and testing. To provide the student with the capability to use simulation tools in digital electronic circuit analysis and design.

Prerequisites	Co-requisites
Nil	EC1007

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To develop necessary skill in designing, analyzing and constructing digital electronic circuits.
2. To design and simulate digital logic circuits using tools such as Logisim or PSPICE or Multisim.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X	X		X					X
Mapping of instructional objectives with student outcome		1,2	1,2	1,2		1					2

List of Topics Covered

LIST OF EXPERIMENTS **(45 hours)**

1. Study of Gates & Flip-flops.
2. Half Adder and Full Adder.
3. Magnitude Comparator (2-Bit).
4. Encoders and Decoders.
5. Multiplexer and Demultiplexer.
6. Code Converters.
7. Implementation of combinational logic functions using standard ICs
8. Synchronous Counters.
9. Ripple Counter.

10. Mod – N Counter.
11. Shift Registers and Shift Register Counters.
12. Implementation of sequential logic functions using standard ICs.
13. Simulation Experiments using Logisim/PSPICE/multisim..

Course Number and Title

EC1011 TRANSMISSION LINES AND NETWORKS

Credits / Contact Hours

3 / 45

Instructor Name

Mrs. A. Maria Jossy

Textbooks, References

- John D.Ryder, "Networks, Lines and Fields", PHI, 2009.
- Sudhakar. A, Shyammohan S Palli, "Circuits and Networks – Analysis and Synthesis", Tata McGraw Hill, 4th Edition, 2010
- Umesh Sinha, "Transmission Lines and Network", Satya Prakashan Publishing Company, New Delhi, 2012

Purpose

To lay a strong foundation on the theory of transmission line and networks by highlighting their applications.

Prerequisites	Co-requisites
EC1005	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To become familiar with propagation of signals through lines.
2. Calculation of various line parameters by conventional and graphical methods..
3. Need for impedance matching and different impedance matching techniques.
4. Design of different types of filters, equalizer and attenuators

Student Outcomes from Criterion 3 covered by this Course

	a	b	c	d	e	f	g	h	i	j	k
Student outcome	X		X		X						
Mapping of instructional objectives with student outcome	1- 4		3,4		1-4						

List of Topics Covered

UNIT I-TRANSMISSION LINE THEORY (9 hours)
General theory of Transmission lines - the transmission line – general solution – The infinite line – Wavelength, velocity of propagation – Waveform distortion – the distortion less line - Loading and different methods of loading – Line not terminated in Z0 – Reflection coefficient – calculation of current , voltage, power delivered and efficiency of transmission – Input and transfer impedance - Open and short circuited lines – reflection factor and reflection loss.

UNIT II-HIGH FREQUENCY TRANSMISSION LINES (8 hours)
Transmission line equations at radio frequencies – Line of Zero dissipation – Voltage and current on the dissipation less line, Standing Waves, Nodes , Standing Wave Ratio – Input impedance of the dissipation less line - Open and short circuited lines – Power and impedance measurement on lines – Reflection losses – Measurement of VSWR and wavelength.

UNIT III-IMPEDANCE MATCHING IN HIGH FREQUENCY LINES (9 hours)
Impedance matching: Quarter wave transformer – Impedance matching by stubs – Single stub and double stub matching – Smith chart – Solutions of problems using Smith chart – Single and double stub matching using Smith chart.

UNIT IV-PASSIVE FILTERS (9 hours)
Characteristic impedance of symmetrical networks – filter fundamentals. Design of filters: Constant K, Low Pass, High Pass, Band Pass, Band Elimination, m-derived sections and composite.

UNIT V-ATTENUATORS AND EQUALIZERS (10 hours)
Attenuators: T, π, Lattice Attenuators, Bridged – T attenuator, L-Type Attenuator. Equalizers: inverse network, series, full series, shunt, full shunt, constant resistance T, constant resistanceπ, constant resistance lattice and bridged T network.

Course Number and Title

EC1012 ELECTRONIC CIRCUITS

Credits / Contact Hours

3 / 45

Instructor Name

Mrs.G.Kalaimagal

Textbooks, References

- Robert L. Boylestad and Louis Nashelsky, *"Electronic Devices and Circuit Theory"*, Pearson Education, 9th Edition, 2009.
- David A Bell, *"Fundamentals of Electronic Devices and Circuits"*, Oxford University Press, 2009.
- David A. Bell, *"Solid State Pulse Circuits"*, Oxford University Press, 2007.
- Jacob Millman, Christos C Halkias, Satyabrata Jit, *"Electron Devices and Circuits"*, Tata McGraw Hill, 2010.
- Thomas L. Floyd, *"Electronic Devices"*, 9th edition, Pearson Education, 2011.
- Albert P. Malvino, David J. Bates, *"Electronic Principles"*, 7th edition, Tata McGraw Hill, 2007.

Purpose

The purpose of this course is to introduce to the students the basics of biasing transistor circuits, feedback amplifiers, large signal amplifiers, tuned amplifiers, oscillators, wave shaping circuits, and to design and analyze various electronic circuits and systems.

Prerequisites	Co-requisites
EC1006	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

At the end of this course, the students will learn

1. Operating point calculations, working and design of basic amplifiers, power amplifiers and tuned amplifiers
2. Working of different types of feedback amplifiers & oscillators.
3. Frequency response and design of tuned amplifiers.
4. Basic working & design of wave shaping circuits.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X		X						
Mapping of instructional objectives with student outcome	1- 4	1-4	2-4		1- 4						

List of Topics Covered

UNIT I-BIASING CIRCUITS AND SMALL SIGNAL MODELS (9 hours)

Biasing circuits: DC load line and bias point – BJT biasing circuits – FET biasing circuits.

Small-signal models: AC load line, BJT models and parameters – hybrid equivalent model – hybrid ∏ model, FET small-signal model and parameters.

UNIT II-SMALL-SIGNAL AMPLIFIERS - ANALYSIS AND FREQUENCY RESPONSE (9 hours)

BJT amplifiers : CE, CB and CC amplifiers – multistage amplifiers - differential amplifier – designing BJT amplifier networks.(analysis using hybrid –π model) FET amplifiers : CS, CG and CD amplifiers –designing FET amplifier networks

Frequency response: low frequency response of BJT and FET amplifiers – Miller effect capacitance – high frequency response of BJT and FET amplifiers.

UNIT III-FEEDBACK AND OSCILLATOR CIRCUITS (9 hours)

Feedback circuits: concept of feedback – effects of negative feedback – feedback connection types – practical feedback circuits – phase and frequency considerations – designing feedback amplifier circuits.

Oscillator circuits: oscillator principles – LC oscillators – RC oscillators – crystal oscillators – designing oscillator circuits.

UNIT IV-POWER AMPLIFIERS AND TUNED AMPLIFIERS (9 hours)

Power amplifiers : definitions and amplifier types – Q point placement – maximum dissipation hyperbola – Class A amplifier – Class B and Class AB push-pull amplifiers – Class C amplifiers – Amplifier distortions – heat sink – designing power amplifier circuits.

Tuned amplifiers: need for tuned circuits – single tuned – double tuned – synchronously tuned amplifiers – impedance matching to improve gain – design of basic tuned amplifier – video amplifier circuits (CA3040).

UNITV-SOLID STATE SWITCHING CIRCUITS (9 hours)

Types of waveforms – transistor switching times – Multivibrators – Astable Multivibrator – Monostable multivibrator – bistable multivibrator – Schmitt trigger – design of multivibrators and Schmitt trigger.

Course Number and Title

EC1013 LINEAR INTEGRATED CIRCUITS

Credits / Contact Hours

3 / 45

Instructor Name

Mr.A.V.M.Manikandan

Textbooks, References

- Roy Choudhury and Shail Jain, "Linear Integrated Circuits", 2nd Edition, New Age International Publishers, 2003.
- Salivahanan.S. and Kanchana. V.S, Bhaaskaran, "Linear Integrated Circuits", 6th Edition, Tata McGraw-Hill, 2011.
- Ramakant A.Gayakwad, "Op-Amps and Linear Integrated Circuits", 4th Edition, Prentice Hall, 2000.
- Robert F. Coughlin, Frederick F. Driscoll, "Operational-Amplifiers and Linear Integrated Circuits", 6th Edition, Prentice Hall, 2001.
- Sergio Franco, "Design with operational amplifier and analog integrated circuits", McGraw Hill, 1997.

Purpose

To enable the students to understand the fundamentals of integrated circuits and designing electronic circuits using it.

Prerequisites	Co-requisites
EC1006	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To design simple circuits like amplifiers using op-amps.
2. To design waveform generating circuits.
3. To design simple filter circuits for particular application.
4. To gain knowledge in designing a stable voltage regulators.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X		X						
Mapping of instructional objectives with student outcome	1-3	1-3	1-3		2,4						

List of Topics Covered

UNIT I-OPERATIONAL AMPLIFIER CHARACTERISTICS (9 hours)

Op-amp symbol, terminals, packages and specifications - Block diagram Representation of op-amp- Ideal op-amp & practical op-amp - Open loop & closed loop configurations – DC & AC performance characteristics of op-amp – Frequency compensation - Noise – Differential amplifiers – General Description, Manufacturer's Specification, Electrical Characteristics and internal schematic of 741 op-amps.

UNIT II-OP–AMP APPLICATIONS (9 hours)

Basic op-amp circuits: Inverting & Non-inverting voltage amplifiers - Voltage follower - Summing, scaling & averaging amplifiers - AC amplifiers.
Linear Applications: Instrumentation Amplifiers-V-to-I and I-to-V converters-Differentiators and Integrators.
Non-linear Applications: Precision Rectifiers – Wave Shaping Circuits (Clipper and Clampers) – Log and Antilog Amplifiers – Analog voltage multiplier circuit and its applications – Operational Trans-Conductance Amplifier (OTA) - Comparators and its applications – Sample and Hold circuit.

UNIT III-WAVEFORM GENERATORS AND PLL (9 hours)
Waveform Generators: Sine-wave Generators – Square / Triangle / Saw-tooth Wave generators.
IC 555 Timer: Monostable operation and its applications – Astable operation and its applications.
PLL: Operation of the Basic PLL-Closed loop analysis of PLL-Voltage Controlled Oscillator-PLL applications.

UNIT IV-ACTIVE FILTERS & VOLTAGE REGULATOR (9 hours)
Filters: Comparison between Passive and Active Networks-Active Network Design – Filter Approximations-Design of LPF, HPF, BPF and Band Reject Filters – State Variable Filters – All Pass Filters – Switched Capacitor Filters.
Voltage Regulators: Basics of Voltage Regulator – Linear Voltage Regulators using Op-amp – IC Regulators (78xx, 79xx, LM 317, LM 337, 723)-Switching Regulators.

UNIT V-DATA CONVERSION DEVICES (9 hours)
Digital to Analog Conversion: DAC Specifications – DAC circuits – Weighted Resistor DAC-R-2R Ladder DAC-Inverted R-2R Ladder DAC-Monolithic DAC
Analog to Digital conversion: ADC specifications-ADC circuits-Ramp Type ADC-Successive Approximation ADC-Dual Slope ADC-Flash Type ADC- Monolithic ADC.

Course Number and Title

EC1014 ELECTRONIC CIRCUITS LAB

Credits / Contact Hours

2 / 45

Instructor Name

Ms. A. Ramya

Textbooks, References

- "LAB MANUAL", Department of ECE, SRM University
- Paul B Zbar and Albert P Malvino, Michael A Miller, "Basic Electronics: A Text Lab Manual", 7th edition, Tata McGraw Hill, 2009.
- David A Bell, "Laboratory Manual for Electronic Devices and Circuits", 4th edition, PHI, 2001.
- David A Bell, "Laboratory Manual for Operational Amplifiers & Linear ICs", 2nd edition, PHI
- Muhammed H Rashid, "SPICE for circuits and electronics using PSPICE", 2nd edition, PHI, 1995.
- Maheswari.L.K and Anand.M.M.S, "Laboratory Manual for Introductory Electronic Experiments", New Age, 2010.

Purpose

The purpose of the lab is to train the students to design and analyze the operation of discrete amplifier and oscillator circuits and understand their functionality. This Laboratory can also support many experiments and new ideas which are evolved in the mind of students.

Prerequisites	Co-requisites
Nil	EC1012

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To provide hands-on experience to the students so that they are able to put theoretical concepts to practice
2. To use computer simulation tools such as PSPICE, or Multisim to carry out design experiments as it is a key analysis tool of engineering design
3. To give a specific design problem to the students, which after completion they will verify using the simulation software or hardwired implementation

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X	X		X					X
Mapping of instructional objectives with student outcome		1-3	1-3	1-3		1-3					2,3

List of Topics Covered

LIST OF EXPERIMENTS

1. Biasing networks for BJT & FET.
2. Transient analysis and frequency response of single-stage BJT & FET amplifiers.
3. Transient analysis and frequency response of multi-stage BJT & FET amplifiers.
4. Frequency response of BJT & FET feedback amplifiers.
5. Transistor Oscillators.
6. Frequency response of Single Tuned Amplifier.
7. Transistor Multi vibrators & Schmitt Trigger.
8. Simulation experiments using PSPICE or Multisim.

Course Number and Title

EC1015 LINEAR INTEGRATED CIRCUITS LAB

Credits / Contact Hours

2 / 45

Instructor Name

Mrs.K.Vadivukarasi

Textbooks, References

- LAB MANUAL, Department of ECE, SRM University
- David A Bell, “Laboratory Manual for Operational Amplifiers & Linear ICs”, 2nd edition, PHI.
- Muhammed H Rashid, “SPICE for circuits and electronics using PSPICE”, 2nd edition, PHI, 1995.
- Maheswari.L.K and Anand.M.M.S, “Laboratory Manual for Introductory Electronic Experiments”, New Age, 2010.

Purpose

The purpose of the lab is to train the students to design and analyze the operation of operational amplifier and oscillator circuits and understand their functionality. This Laboratory can also support many experiments and new ideas which are evolved in the mind of students.

Prerequisites	Co-requisites
Nil	EC1013

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To provide hands-on experience to the students so that they are able to put theoretical concepts to practice.
2. To use computer simulation tools such as PSPICE, or Multisim to carry out design experiments as it is a key analysis tool of engineering design.
3. To give a specific design problem to the students, which after completion they will verify using the simulation software or hardwired implementation.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X		X						
Mapping of instructional objectives with student outcome	1-5	1-5	1-5		1-5						

List of Topics Covered

LIST OF EXPERIMENTS

1. Basic op-amp circuits such as inverting & non-inverting amplifiers, adders and subtractors.
2. Linear applications of op-amp such as Integrator and Differentiator.
3. Non-linear application of op-amp such as precision rectifiers and comparators.
4. Op-amp oscillators such as Wein Bridge and RC Phase Shift oscillator.
5. 555 Timer – Astable and Monostable operation.
6. Active Filters such as LPF, HPF, BPF and Notch filter.
7. Digital to Analog converter and Analog to Digital converter (any one method).
8. Simulation experiments using PSPICE or Multisim.

Course Number and Title

EC1016A MICROPROCESSORS AND MICROCONTROLLERS

Credits / Contact Hours

3/45

Instructor Name

Mr. A.V. M. Manikandan

Textbooks, References

- Muhammad Ali Mazidi and Janice Gillispie Mazidi, "*The 8051 - Microcontroller and Embedded systems*", 7th Edition, Pearson Education, 2004.

- Doughlas.V.Hall, "*Microprocessor and Interfacing : Programming and Hardware*", Revised 2nd edition, McGraw Hill, 1992.
- Andrew N. Sloss, Dominic Symes, Chris Wright and John Rayfield, "*ARM System Developer's Guide, Designing and Optimizing System Software*", Elsevier, 2004.
- David Seal, "*ARM Architecture Reference Manual*", Pearson Education, 2007.
- Michael J. Pont, "*Embedded C*", Addison Wesley, 2002.
- Ray.K and Bhurchandi.K.M, "*Advanced Microprocessors and Peripherals – Architectures, Programming and Interfacing*", Tata McGraw Hill, 2002 Reprint.
- Kenneth.J.Ayala, "*8051 Microcontroller Architecture, Programming and Applications*", 3rd edition, Thomson, 2007.
- nuvoTon Cortex M0 (Nu-LB-NUC100/140) Driver and Processor Reference Manual; www.nuvoton.com

Purpose

The purpose of this course is to teach students the fundamentals of microprocessor and microcontroller systems. The student will be able to incorporate these concepts into their electronic designs for other courses where control can be achieved via a
Microprocessor/microcontroller implementation.

Prerequisites	Co-requisites
EC1012 & EC1007	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

Through the use of assembly language, by the end of the course students will become thoroughly familiar with the elements of microprocessor software and hardware. They will be able to:

1. Understand fundamental operating concepts behind microprocessors and microcontrollers.
2. Appreciate the advantages in using RISC microprocessors / microcontrollers in engineering applications.
3. Design microprocessor based solutions to problems.
4. Understand Low-Level and Embedded C Programming.
5. Apply this knowledge to more advanced structures.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X	X		X			X	X	X
Mapping of instructional objectives with student outcome	1,3,4	1,3,4	1- 4	1-4		4,5			5	5	5

List of Topics Covered

UNIT I-MICROPROCESSOR- 8086 (9 hours)
Register Organization -Architecture-Signals-Memory Organization-Bus Operation- I/O Addressing-Minimum Mode-Maximum Mode-Timing Diagram-Interrupts - Service Routines – I/O and Memory Interfacing concepts.

UNIT II-RISC ARCHITECTURE AND PROGRAMMING (12 hours)
Addressing Modes-Instruction format-Instruction set-Assembly language programs in 8086. RISC architecture –The ARM Cortex M0 (nuvoTon- Nu-LB-LUC140)architecture - ARM organization and implementation – Introduction to ARM Programming Register –Nested Vector Interrupt Configuration and Instruction Set - The thumb instruction set - Basic ARM ALP (32-bit arithmetic operations, sorting technique, sum of series).

UNIT III-INTERFACING DEVICES (7 hours)
Programmable Peripheral Interface (8255) - Programmable Interval Timer (8254)- Programmable Interrupt Controller (8259A) - Programmable DMA Controller (8257) - Programmable Communication Interface (8251A) – Programmable Keyboard and Display Controller (8279).

UNIT IV-MICROCONTROLLER-8051 (7 hours)
Register Set-Architecture of 8051 microcontroller- I/O and memory addressing- Interrupts-Instruction set- Addressing modes.

UNIT V- INTERFACING OF 8051 USING EMBEDDED C PROGRAMMING (10 hours)
Timer-Serial Communication-Interrupts Programming-Interfacing to External Memory- Introduction to Embedded C Programming -Basic techniques for reading & writing from I/O port pins. Interfacing 8051 to ADC, LCD, Keyboard and stepper motor using Embedded C.

Course Number and Title

EC1017 DIGITAL SIGNAL PROCESSING

Credits / Contact Hours

4/60

Instructor Name

Mrs. Ferents Koni Jiavana

Textbooks, References

- John G. Proakis and Dimitris C. Manolakis, "Digital Signal Processing Principles, Algorithms and Applications", Pearson Education, Fourth edition, 2007.
- Venkataramani.B, Bhaskar.M, "Digital Signal Processors, Architecture, Programming and Application", Tata McGraw Hill, New Delhi, 2003.
- Sanjit Mitra, "Digital Signal Processing – A Computer based approach", Tata McGraw Hill, New Delhi, 2011.
- Hayes.M.H, "Digital Signal Processing", Tata McGraw Hill, New Delhi, Edition, 2009.

Purpose

The purpose of this course is to introduce the concepts of Digital signal processing and DSP Processor. The mathematical analysis of FIR and IIR filter design and simulation using MATLAB are dealt with in detail

Prerequisites	Co-requisites
EC1008 & MA1003	Nil

Required, Elective or Selected Elective (as per Table 5.2)

Required

Instructional Objectives

At the end of this course, the students will be able to understand the
1. Structures of Discrete time signals and systems.
2. Fast Fourier Transform Implementations, Frequency response and design of FIR and IIR filters.

3. Finite word length effect.
4. DSP Processor- TMS320C5X.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X		X						X
Mapping of instructional objectives with student outcome	1	2,4	2		1,2						2

List of Topics Covered

UNIT I-REVIEW OF DISCRETE TIME SIGNALS AND SYSTEMS (9 hours)
Overview of signals and systems – DFT–FFT using DIT and DIF algorithms – Inverse DFT-FFT using DIT and DIF algorithms – Applications – Circular convolution – MATLAB programs for DFT and FFT.

UNIT II-DESIGN AND IMPLEMENTATION OF IIR FILTERS (9 hours)
Design of analog filters using Butterworth and Chebyshev approximations – IIR digital filter design from analog filter using impulse invariance technique and bilinear transformations – MATLAB programs for IIR filters.

UNIT III-DESIGN AND IMPLEMENTATION OF FIR FILTERS (9 hours)
Linear phase response – Design techniques for FIR filters – Fourier series method and frequency sampling method – Design of Linear phase FIR filters using windows: Rectangular, Hanning and Hamming windows – Matlab programs for FIR filters.

UNIT IV-FINITE WORD LENGTH EFFECTS IN DIGITAL FILTERS (9 hours)
Fixed point arithmetic – effect of quantization of the input data due to Finite word length. Product round off – need for scaling – Zero input limit cycle oscillations - Limit cycle oscillations due to overflow of adders – Table look up implementation to avoid multiplications.

UNIT V-PROCESSOR FUNDAMENTALS (9 hours)
Features of DSP processors – DSP processor packaging (Embodiments) – Fixed point Vs floating point DSP processor data paths – Memory architecture of a DSP processor (Von Neumann – Harvard) – Addressing modes – pipelining – TMS320 family of DSPs (architecture of C5x).

Course Number and Title

EC1018 COMMUNICATION THEORY

Credits / Contact Hours

3/45

Instructor Name

Mrs. R. Dayana

Textbooks, References

- John G. Proakis & Masoud Salehi, “Communication System Engineering”, 2nd Edition, 2002.
- Singh.R.P. & Sapre. S.D, “Communication Systems: Analog & Digital”, 3rd Edition, Tata McGraw-Hill, 2012.
- Sanjay Sharma, “Communication Systems, Analog & Digital”, S.K. Kataria & Sons, 5th Edition, 2009.
- Dennis Reddy & John Coolen, “Electronic Communications”, 4th Edition, Prentice Hall, 2008.

Purpose

The course considers analog communication systems and techniques. In this course we will introduce some of the basic mathematical concepts that will allow us to think in the two "domains" of communications, the time domain and the frequency domain. We will cover the basic types of analog modulation (AM, FM, and PM) from both a mathematical description and from a block-diagram system approach.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

The scope of this course is to provide the complete analysis of Analog communications. This knowledge helps them to acquire better application of these principles in Digital communications. The overall objective is to introduce the student to the basics of communication theory. This course emphasizes:

1. Analog modulation and demodulation techniques.
2. Acquiring mathematical understanding of Analog Communication Systems.
3. Understanding the trade-offs (in terms of bandwidth, power, and complexity requirements)
4. Performance evaluation of communication systems in the presence of noise.
5. Design of practical communication system at the block diagram level under certain constraints and requirements..

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X			X						
Mapping of instructional objectives with student outcome	1,2,5	1,2,5			1- 4						

List of Topics Covered

UNIT I-AMPLITUDE MODULATION SYSTEMS (10 hours)
Need for modulation, Amplitude Modulation System, Single Tone & Multiple Tone Amplitude Modulation, Power Relation, Generation of Amplitude Modulation – Linear Modulation – Collector Modulation method Non-linear Modulation – Square law Modulator, Product Modulator, Switching Modulator - Demodulation of Amplitude Modulation – Envelope Detector, Coherent Detector, VSB, Performance comparison of various Amplitude Modulation System.

UNIT II-ANGLE MODULATION SYSTEMS (10 hours)
Frequency Modulation, Types of Frequency Modulation, Generation of NBFM, WBFM, Transmission BW of FM Signal, Phase Modulation. Relationship between PM & FM, Comparison, Generation of FM Direct Method, Indirect method, Demodulation of FM - FM Discriminators.

UNIT III-RADIO RECEIVERS (6 hours)
Introduction – Functions & Classification of Radio Receivers, Tuned Radio Frequency (TRF) Receiver, Superheterodyne Receiver – Basic Elements, Receiver Characteristics, Frequency Mixers, AGC Characteristics.

UNIT IV-NOISE THEORY (9 hours)
Noise, Types of noise, White Noise, Addition of Noise due to several sources in series and parallel, Generalized Nyquist Theorem for Thermal Noise, Calculation of Thermal Noise for a Single Noise Source, RC Circuits & Multiple Noise sources. Equivalent Noise Bandwidth, Signal to Noise Ratio, Noise-Figure, Noise Temperature, Calculation of Noise Figure, Noise Figure Determination for Cascaded Stages of Amplifiers.

UNIT V-PERFORMANCE OF COMMUNICATION SYSTEM (10 hours)
Receiver Model, Noise in DSB-SC Receivers, Noise in SSB-SC Receivers, Noise in AM receiver (Using Envelope

Detection), Noise in FM Receivers, FM Threshold Effect, Threshold Improvement through Pre-Emphasis and De-Emphasis, Noise in PM system – Comparison of Noise performance in PM and FM, Link budget analysis for radio channels.

Course Number and Title

EC1019A PROCESSOR LAB

Credits / Contact Hours

2/45

Instructor Name

Dr. A. Ruhan Bevi

Textbooks, References

1. EC1019A Processor Lab MANUAL, Department of ECE, SRM University
2. Ray.A.K and Bhurchandi.K.M, "Advanced Microprocessors and Peripherals", Tata McGraw-Hill, 2006.
3. Muhammad Ali Mazidi and Janice Gillispie Mazidi, Rolin D. McKinlay, "The 8051 – Microcontroller and
4. Embedded Systems: Using Assembly and C", 2nd Edition, Pearson Education, 2011.
5. nuvoton (NUC100/140 series Board Schematics manual, nuvoTon (NUC100/140) series Educational sample codes), www.nuvoton.com

Purpose

This laboratory will provide the students a perfect introduction to the world of Microprocessors and to provide hands-on experience essential to the real understanding of microprocessors architecture and it's interfacing to the peripheral devices. The experiments are designed to provide the students with the design principles of microprocessor systems and real time programming. The course accomplishes this by using microprocessor kits, simulators and software development systems.

Prerequisites	Co-requisites
Nil	EC1016A

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To demonstrate programming proficiency using the various addressing modes and data transfer instructions of the target microprocessor.
2. To apply knowledge of the microprocessor's internal registers and operations by use of a PC based microprocessor simulator.
3. To interface the processor to external devices.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k

			X	X	X	X				X	
Mapping of instructional objectives with student outcome			1-3	1-3	3	1-3				3	

List of Topics Covered

LIST OF EXPERIMENTS

PART-A: GENERAL PURPOSE PROGRAMMING EXERCISES

Minimum six experiments to be conducted.

1. Introduction of Microprocessor and Microcontroller Kit.
2. Addition, Subtraction, Multiplication and Division.
3. Finding the maximum value in an array.
4. Sorting of data.
5. Finding number of positive / negative elements in a block of data.
6. BCD-to-Hex conversion and Hex-to-BCD conversion.
7. Binary-to-ASCII and ASCII-to-Binary conversion.
8. Square Root of a given data.
9. LCM and GCD.

PART-B: INTERFACING WITH APPLICATION BOARDS (8051, ARM Cortex M0 {Nu-LB-NUC140})

Minimum six experiments to be conducted

1. 8255 PPI.
2. Transfer data serially between two kits (Study of 8253/8251).
3. 8279 Keyboard & display using 8051 controller.
4. Seven segment display using nuvoTon (NUC140) board.
5. LCD Display using 8051/ Nu-LB-NUC140 controller.
6. Traffic light using nuvoTon (NUC140) board.
7. 8259 programmable interrupt controller.
8. 8257/8237 DMA controller.
9. 8 bit ADC and 8 bit DAC. using nuvoTon (NUC140) board
10. Stepper motor control using 8051 controller.
11. DC motor speed measurement and control module.
12. Real Time Clock using nuvoTon (NUC140) board.
13. Logic Controller.

Course Number and Title

EC1020 COMMUNICATION ENGINEERING LAB

Credits / Contact Hours

2/45

Instructor Name

Mrs. S. Kolangiammal

Textbooks, References

- John O. Attia, “PSPICE and MATLAB for Electronics: An integrated approach”, CRC press, 2002.
- LAB MANUAL, Department of ECE, SRM University.

Purpose

The experiments in this laboratory enable the students to gather basic knowledge on communication systems. Different experiments are performed which forms the fundamental blocks of any communication system used now-a-days. Experiments are performed using electronic instrument, such as oscilloscopes, signal generators, spectrum analyzers, and network analyzers. Certain experiments are simulated using MATLAB and P-SPICE simulation software.

Prerequisites	Co-requisites
Nil	EC1018

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To practice the basic theories of analog communication system.
2. To provide hands-on experience to the students, so that they are able to apply theoretical concepts in practice.
3. To use computer simulation tools such as P-SPICE, or MATLAB to carry out design experiments as it is a key analysis tool of engineering design.
4. To give a specific design problem to the students, which after completion they will verify using the simulation software or hardware implementation.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X	X	X	X			X	X	X
Mapping of instructional objectives with student outcome		1-4	1- 4	1- 4	1-4	3,4			3,4	4	3,4

List of Topics Covered

LIST OF EXPERIMENTS

1. AM modulator and Demodulator.
2. DSB-SC modulator and Demodulator.
3. SSB modulator and Demodulator.
4. FM modulator and Demodulator.
5. PAM modulator and Demodulator.
6. TDM Multiplexer and Demultiplexer.
7. FDM Multiplexer and Demultiplexer.
8. Pre emphasis and De-emphasis in FM.
9. Simulation experiments using P-SPICE and MATLAB.

a) AM modulator with AWGN noise in MATLAB.
b) Pre-emphasis and De-emphasis in FM using P-SPICE.

Course Number and Title

EC1047 INDUSTRIAL TRAINING I (Training to be undergone after IV semester)

Credits / Contact Hours

1

Instructor Name

Mrs. Ferents Koni Jiavana

Textbooks, References

Purpose

To provide hands-on experience at site / planning or design office where Electronics and Communication engineering projects are carried out

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. Students have to undergo two – week practical training in Electronics and Communication Engineering related project site or design / planning office so that they become aware of the practical application of theoretical concepts studied in the class rooms.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
				X	X	X	X	X	X	X	X
Mapping of instructional objectives with student outcome	1										

List of Topics Covered

Students have to undergo two-week practical training in Electronics and Communication Engineering related project site or design / planning office of their choice but with the approval of the department. At the end of the training student will submit a report as per the prescribed format to the department.

Course Number and Title

EC1021 ANTENNA AND WAVE PROPAGATION

Credits / Contact Hours

3/45

Instructor Name

Mr. S. Manikandaswamy.

Textbooks, References

- John D Kraus, Ronald J Marhefka, Ahmad S Khan, "Antenna and Wave Propagation", Tata McGraw Hill, 4th Edition, 2010.
- Yadava.R.L, "Antennas and Wave Propagation", PHI, 2011.
- Constantine Balanis.A, "Antenna Theory: Analysis and Design", Third Edition, John Wiley and Sons, 2012.
- Raju.G.S.N, "Antennas and wave propagation", 1st Edition Pearson Education, 2012.
- Robert S. Elliott, "Antenna Theory and Design", John Wiley and Sons, Revised Edition, 2007.

Purpose

The purpose of this course is to enable the students to understand the basics of antennas and various types of antenna arrays and its radiation patterns. The main objective of this subject is to help students to identify the different latest antennas available for specific communication.

Prerequisites	Co-requisites
EC1005 & EC1011	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To study various antennas, arrays and radiation patterns of antennas.
2. To learn the basic working of antennas.
3. To understand various techniques involved in various antenna parameter measurements.
4. To understand the propagation of radio waves in the atmosphere.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X		X						
Mapping of instructional objectives with student outcome	1- 3	1,2,4	2,4		1-3						

List of Topics Covered

UNIT I-ANTENNA FUNDAMENTALS AND RADIATION (9 hours)

Definition and function of antennas – Antenna theorems-Antenna parameters – Radiation Mechanism – Antenna field zones – Radiation from a small current element – Power radiated by a small current element and its radiation resistance – Hertzian dipole – Half wave dipole – Monopole – Current distributions.

UNIT II-ANTENNA ARRAYS AND SYNTHESIS (9 hours)
Linear arrays – Analysis of linear arrays – Phased arrays – Binomial arrays – Pattern multiplication – Method of excitation of antennas – Impedance matching techniques.
Synthesis methods: Schelkunoff polynomial – Fourier transform – Wooden Lawson method.

UNIT III-SPECIAL PURPOSE ANTENNAS (9 hours)
Travelling wave – Loop – small loop – Dipole and Folded dipole antennas – Horn antenna – Reflector antenna – Yagi – Uda antenna – Log periodic antenna – Helical and Micro strip antennas. Introduction to CAD tools used for antenna modeling.

UNIT IV-ANTENNA MEASUREMENTS (9 hours)
Drawbacks in measurements of antenna parameters – Methods to overcome drawbacks in measurements –Measurement ranges – Impedance – Gain – Radiation pattern – Beam width – Radiation resistance – Antenna efficiency-Directivity-Polarization and Phase Measurements.

UNITV-RADIO WAVE PROPAGATION (9 hours)
Basics of propagation-Ground wave propagation – Space wave propagation-Considerations in space wave propagation – Super refraction – Ionospheric wave propagation – Structure of ionosphere – Mechanism of ionospheric propagation – Effect of earth's Magnetic field on Radio wave propagation – Virtual height – MUF – Skip distance – OWF – Ionosphere abnormalities.

Course Number and Title

EC1022 MICROWAVE AND OPTICAL COMMUNICATIONS

Credits / Contact Hours

3/45

Instructor Name

Dr. J. Manjula.

Textbooks, References

- Samuel Y. Liao, "Microwave Devices and Circuits", 3rd edition, Pearson education, 2011 reprint.
- Keiser G, "Optical Fiber Communication Systems", 4th edition, Tata McGraw Hill. Edition, 2010.
- Collin.R.E, "Foundations for Microwave Engineering", 2nd edition, Tata McGraw Hill, 2006.
- Djafar.K. Mynbaev Lowell and Scheiner, "Fiber Optic Communication Technology", Pearson Education Asia, 9th impression, 2011.
- John Powers, "An Introduction to Fiber optic Systems", 2nd edition, Tata-McGraw Hill, 2010.

Purpose

To expose basics of Microwave and Optical devices and components. To introduce the students to a few microwave measurements. To expose various optical fiber modes configurations and various signal degradation factors associated with optical fiber and to the design simple optical communication system.

Prerequisites	Co-requisites
EC1005 & EC1006	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To understand all basic Microwave and Optical devices and components.
2. To learn few microwave measurements and analyze parameters.
3. To understand the principles of fiber-optic communications and the different kind of losses, signal distortion in optical wave guides and other signal degradation factors.
4. To design the optical communication system..

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X								
Mapping of instructional objectives with student outcome	1,3	1,2,4	1,3,4								

List of Topics Covered

UNIT I-MICROWAVE AMPLIFIERS AND OSCILLATORS (9 hours)
Introduction to microwave transmission – Application and limitation – Klystron amplifier – Reflex Klystron Oscillator – TWT amplifiers – Magnetron Oscillator – Gunn oscillator.

II-MICROWAVE COMPONENTS (9 hours)
Directional coupler – E plane Tee, H- plane Tee – Magic Tee – Circulators – Isolators – Attenuators – Phase Shifters – Avalanche breakdown devices, PIN diode and TUNNEL diode.
Power, VSWR, Impedance Measurement.

UNIT III-INTRODUCTION TO OPTICAL FIBERS AND TRANSMISSION CHARACTERISTICS (9 hours)
The propagation of light in optical waveguides – Classification of optical fibers – Numerical aperture, Step index and Graded index fiber – Modes in cylindrical fiber – Linearly polarized modes, Attenuation: Absorption, Scattering, Bending losses. Modal dispersion and chromatic dispersion – Single mode fiber - waveguide dispersion– MFD – PMD.

UNIT IV-OPTICAL TRANSMITTERS AND RECEIVERS (9 hours)
Optical Sources: - Light source materials – LED homo and hetero structures – surface and edge emitters – Quantum efficiency – Injection Laser Diode – Modes and threshold condition – Structures and Radiation Pattern.
Optical detectors: – Physical principles – PIN and APD diodes – Photo detector noise

UNIT V-OPTICAL COMMUNICATION SYSTEMS AND DESIGN (9 hours)
Transmitter module: Signal formats – Electronic driving circuit – Modulation circuit – external modulators.
Amplifier: EDFA, Semiconductor Optical Amplifier.
Receiver Module: Optical front end – Quantizer – Decision circuit.
Optical Link Design: Point- to- point links – System considerations – Link Power budget – Rise time budget.

Course Number and Title

EC1023 DIGITAL COMMUNICATION

Credits / Contact Hours

3/45

Instructor Name

Dr.J.Selvakumar

Textbooks, References

- Bernard Sklar, "Digital Communication, Fundamentals and Application", Pearson Education Asia, 2nd Edition, 2001.
- Simon Haykin, "Communication Systems", John Wiley & Sons, 4th Edition, 2000.
- Taub & Schilling, "Principle of Communication Systems", 2nd Edition, 2003.
- John G. Proakis, "Digital Communication", McGraw Hill Inc, 5th Edition, 2008.
- Singh, R.P. & Sapre, S.D, "Communication Systems: Analog & Digital", Tata McGraw-Hill, 5th reprint, 2000.

Purpose

To provide a comprehensive coverage of digital communication systems. The key feature of digital communication systems is that it deals with discrete messages and to add organization and structure to this field

Prerequisites	Co-requisites
EC1018	MA1024

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

To learn and understand

1. The process of sampling, quantization and coding that are fundamental to the digital transmission of analog signals and digital modulation systems.
2. Baseband and Passband transmission systems.
3. M-ary signaling and spread spectrum Techniques..

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X		X						
Mapping of instructional objectives with student outcome		1-3	1-3		1-3						

List of Topics Covered

UNIT I-SAMPLING AND QUANTIZATION (9 hours)
Sampling Process – Aliasing – Instantaneous sampling – Natural Sampling –Flat Sampling – Quantization of signals – sampling and quantizing effects –channel effects – SNR for quantization pulses – data formatting techniques –Time division multiplexing.

UNIT II-DIGITAL MODULATION SYSTEMS (9 hours)
PCM Systems – Noise Considerations in PCM system – Overall Signal-to-noise ratio for PCM system – Threshold effect – Channel Capacity – Virtues, Limitations & Modification of PCM system – PCM Signal Multiplexing – Differential PCM – Delta Modulation – Noise Considerations in Delta Modulation – SNR Calculations – Comparison of PCM, DPCM & DM.

UNIT III-BASE BAND PULSE TRANSMISSION (9 hours)
Maximum likelihood receiver structure – Matched filter receiver – Probability error of the Matched filter – Intersymbol interference – Nyquist criterion for distortion less baseband transmission – Correlative coding – Eye pattern.

UNIT IV-PASS BAND DATA TRANSMISSION (9 hours)
Pass Band Transmission Model – Generation, Detection, Signal Space Diagram, Probability of Error for BFSK, BPSK, QPSK, DPSK, and Schemes – Comparison.

UNITV-M-ARY SIGNALING AND INTRODUCTION TO SPREAD SPECTRUM TECHNIQUES (9 hours)
M-ary signaling, vectoral view of MPSK and MFSK signaling, symbol error performance of M-ary systems –Introduction – Discrete Sequence Spread Spectrum technique – Use of Spread Spectrum with CDMA-Ranging Using Discrete Sequence Spread Spectrum – Frequency Hopping Spread Spectrum – Generation & Characteristics of PN Sequence.

Course Number and Title

EC1024 MICROWAVE AND OPTICAL COMMUNICATION LAB

Credits / Contact Hours

45/2

Instructor Name

Dr. J. Manjula

Textbooks, References

- LAB MANUAL, Department of ECE, SRM University

Purpose

Microwave communication deals with the study of operation and characteristics of microwave sources and microwave components. It also deals with the measurement of load impedance VSWR, antenna gain and radiation pattern. Optical communication deals with the study of the characteristics of the optical fiber, sources and detectors and setting up of analog and digital fiber links using LED and LASER sources.

Prerequisites	Co-requisites
EC1009	EC0122

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To familiarize the students with microwave and optical communication techniques/technologies
2. To understand the fundamentals of microwave circuit design using ORCAD PSPICE tool, and become familiar with basic microwave measurements.
3. To analyze optical signals and devices in optical communication systems, and learn how to measure and interpret optical signals.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X	X		X					X
Mapping of instructional objectives with student outcome		1-3	1-3	1-3		1-3					3

List of Topics Covered

LIST OF EXPERIMENTS

MICROWAVE EXPERIMENTS

1. Mode Characteristics of Reflex Klystron.
2. Study of power distribution in Directional coupler, E & H plane and Magic tee.
3. Wavelength and Frequency measurement.
4. Impedance measurement by slotted line method.
5. Gain and Radiation pattern of Horn antenna.
6. Study of Micro strip components.

OPTICAL COMMUNICATION EXPERIMENTS

1. D. C. Characteristics of LED and Laser diode.
2. D. C. Characteristics of PIN and APD photo diode.
3. Measurement of Numerical aperture, Propagation and Bending Loss in fiber.
4. Fiber Optic Analog and Digital Link.

PSPICE SIMULATION

1. Operating characteristics of Microwave semiconductor devices (bipolar transistors, GaAs FETs, varactor diodes, PIN diodes).
2. Microwave transistor amplifier and oscillator design.
3. Operating characteristics of optical devices (LED and photodiode).

Course Number and Title

EC1025 DIGITAL COMMUNICATION LAB

Credits / Contact Hours

2/45

Instructor Name

Dr.J.Selvakumar

Textbooks, References

- LAB MANUAL, Department of ECE, SRM University.

Purpose

This lab helps the students to understand the basic principles of digital communication systems by practical module systems. The experiments are designed in such a way that the theoretical concepts introduced in lectures are re-discussed and implemented practically.

Prerequisites	Co-requisites
EC1020	EC1023

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To demonstrate digital communication concepts using hands-on experience and using simulation environments such as PSPICE / Multisim, or MATLAB/Simulink, or LABVIEW.
2. To use commercial, modular systems which have some distinct advantages over bread boarding to examine more complex communication topics and to deliver a hands-on laboratory experience.
3. To use LABVIEW in conjunction with data acquisition cards and interconnected instruments, and to present communication concepts using real-world signals so that the students can investigate and manipulate.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X	X		X					X
Mapping of instructional objectives with student outcome		1-3	1-3	1-3		1-3					3

List of Topics Covered

LIST OF EXPERIMENTS

1. FSK Modulation and Demodulation.
2. PSK Modulation and Demodulation.
3. QPSK Modulation and Demodulation.
4. DPSK Modulation and Demodulation.
5. PAM Modulation and Demodulation.
6. PWM Modulation and Demodulation.
7. PPM Modulation and Demodulation.
8. Pulse Code Modulation and Demodulation.
9. Delta Modulation and Demodulation.
10. Differential Pulse Code Modulation and Demodulation.
11. Data formatting.
12. BER comparison of different modulation schemes in AWGN channel in MATLAB Simulink.
13. Performance analysis of different channels with error correcting codes.

Course Number and Title

EC1049 MINOR PROJECT

Credits / Contact Hours

1/30

Instructor Name

Mrs.N.Saraswathi

Textbooks, References

Purpose

To carry out a design project in one of the specializations of Electronics and communication engineering with substantial multidisciplinary component

Prerequisites	Co-requisites

Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

To guide the students in such a way so that they carry out a work on a topic as a forerunner to the full fledged project work to be taken subsequently in VIII semester. The project work shall consist of substantial multidisciplinary component.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X	X	X	X	X	X	X	X	X
Mapping of instructional objectives with student outcome	1										

List of Topics Covered

The students will carry out a project in one of the following Electronics and communication **engineering areas but with** substantial multidisciplinary component involving Electrical Engineering, Computer Science Engineering, Information Technology, Mechanical Engineering, Bio-Medical Engineering.

Communication
Signal Processing
Electronics
VLSI
Embedded

Student groups will be formed (6 in a group) and a faculty member will be allocated to guide them. There will be three reviews. First review will not carry any marks but the project topic will be finalized in it. Of remaining 2 reviews one will be carried out in the mid-semester and the last one by the end of semester.

Course Number and Title

EC1026 WIRELESS COMMUNICATION

Credits / Contact Hours

3/45

Instructor Name

Dr.K.Kalimuthu

Textbooks, References

- Rappaport T.S, *"Wireless Communications: Principles and Practice"*, Pearson education, 2nd edition, 2009.
- William Stallings, *"Wireless Communication & Networking"*, Pearson Education Asia, 2009.
- Feher K. *"Wireless Digital Communications"*, Prentice Hall 1995.
- Schiller, *"Mobile Communication"*, Pearson Education Asia Ltd., 2008.

- Andrea Goldsmith, *"Wireless Communications"*, Cambridge University Press, Aug 2005.
- Lee W.C.Y., *"Mobile Communications Engineering: Theory & Applications"*, McGraw Hill, New York 2nd Edition, 1998.

Purpose

To introduce the students to the concepts of wireless systems, mobile systems.

Prerequisites	Co-requisites
MA1024	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

To understand and gain complete knowledge about.

1. Basic wireless, cellular concepts.
2. Radio wave propagation and Mobile Channel models.
3. Various performance analysis of mobile communication system
4. Standards 1G, 2G Basic system available.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X				X			X	X	X	
Mapping of instructional objectives with student outcome	1-3				1-3			1-4	1-4	1-3	

List of Topics Covered

UNIT I-INTRODUCTION TO WIRELESS COMMUNICATION (9 hours)
Evolution of Mobile Radio Communication – Examples of Wireless Communication System – Cellular concept – Frequency Reuse – Channel assignment – Hand off – Interference & System capacity – Trunking and Erlang – capacity calculation – Improving coverage and capacity.

UNIT II-MOBILE RADIO WAVE PROPAGATION (LARGE SCALE FADING) (9 hours)
Radio wave Propagation – Transmit and receive Signal Models – Free Space path loss – Ray Tracing – Empirical Path loss models – Simplified path loss model – Shadow fading – Combine path loss and Shadowing – Outage Probability under path loss & shadowing – Cell coverage area.

UNIT III-MOBILE RADIO WAVE PROPAGATION (SMALL SCALE FADING & MULTIPATH) (9 hours)
Small Scale Multipath Propagation – Impulse response model of a Multipath Channel – Small Scale Multipath Measurements – Parameters of Mobile Multipath Channels – Types of fading (fading effects due to Multipath Time Delay Spread & Doppler spread) – Rayleigh and Ricean Distribution.

UNIT IV-CAPACITY, DIVERSITY AND EQUALIZATION IN WIRELESS SYSTEM (9 hours)
Capacity in AWGN – Capacity of Flat Fading Channels – Channel and System Model – Channel Distribution Information known – CSI at Receiver Diversity Technique – Selection combining – EGC – MRC – Feedback – Time – Frequency – Rake Receiver – Interleaving.

Equalization – Linear Equalization – Non linear (DFE & MLSE) – Algorithm of Adaptive Equalization – Zero Frequency algorithm – LMS algorithm – Recursive Least Square algorithm.

UNIT V-WIRELESS SYSTEMS AND STANDARDS (9 hours)
AMPS & ETACS System overview – Call handling – GSM System – Services and features – Architecture – Radio

Subsystem – GSM Call – Frame Structure – Signal Processing – CDMA Digital Cellular Standard (IS-95) – Frequency & Channel Specification – Forward CDMA channel – Reverse CDMA channel. Introduction to OFDM system – Cyclic prefix – Matrix representation case study: IEEE 802.11a wireless LAN.

Course Number and Title

EC1027 COMPUTER COMMUNICATION

Credits / Contact Hours

3/45

Instructor Name

Ms.T.Ramya.

Textbooks, References

- Behrouz A.Fehrouzan, *"Data communication & Networking"*, Mc-Graw Hill, 4th Edition, 2007.
- Andrew S.Tanenbaum, *"Computer Networks"*, Pearson Education India, 3rd Edition, 2010.
- William Stallings, *"Data & Computer Communication"*, Pearson Education India, 8th Edition, 2007.
- Rarnier Handel, N.Huber, Schroder, *"ATM Networks Concepts, Protocols Applications''*, Addison Welsey, 3rd Edition, 2009.

Purpose

It is very much required for an ECE graduate to know use of computers in communication as well as in network formation. The syllabus focuses on mode of data transfer, layer and protocols related to networks.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. Understand about the functions and services of all 7 layers of OSI model.
2. Get an idea of various network standards.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
								X	X	X	
Mapping of instructional objectives with student outcome								1,2	1,2	1, 2	

List of Topics Covered

UNIT I-DATA COMMUNICATION & NETWORKING BASICS (9 hours)

Data transfer modes Telephone system – Protocols & standards – Multiplexing – Circuit switching – Message & packet switching – Introduction to LAN, MAN & WAN – IEEE standards for LAN – Network topologies.

UNIT II-OSI LOWER LAYERS (9 hours)
Network models – OSI layer architecture – Issues in data traffic over network – Physical layer standards – Data link control & protocol – ARQ schemes – HDLC protocol.

UNIT III-NETWORK LAYER (9 hours)
Need for Internetworking – Addressing – Routing Issues – Internet protocol (IPV4/V6) – Congestion & flow control mechanism – TCP/IP model.

UNIT IV-OSI HIGHER LAYERS (9 hours)
Transport layer – TCP & UDP – Session layer issues – Presentation layer – Application layer.

UNIT V-APPLICATION & INTRODUCTION TO ISDN (9 hours)
Application layer: Email – FTP – HTTP – Compression Techniques. Introduction to ISDN – Broadband ISDN Features – ATM Concept.

Course Number and Title

EC1028 ELEMENTS OF INFORMATION THEORY AND CODING

Credits / Contact Hours

3/45

Instructor Name

Mrs. J.Subhashini

Textbooks, References

- Hamming, Richard W, *"Coding and Information Theory"*, Prentice Hall Inc., NJ, 1986.
- Proakis J. G., *"Digital Communications"*, McGraw Hill Inc., 4th Edition, NY, 2001.

Purpose

To learn the basic principles of encoding, error detection, and error correction, decoding, mutual information, and channel capacity, which will be extremely useful in understanding the working of a digital communication system.

Prerequisites	Co-requisites
MA1024	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To analyze the process of coding for analog and discrete sources and the mathematical model for information sources.
2. To solve problems on error detection and error correction for various types of codes.
3. To understand the principles of Huffman codes and to solve problems therein.
4. To study the properties of Entropy and the principles of Shannon-Fano coding.
5. To learn the concepts of mutual information, channel capacity, and Shannon's Main Theorem.

.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X				X						
Mapping of instructional objectives with student outcome	2,5				1,2,4,5						

List of Topics Covered

UNIT I-SOURCE CODING (9 hours)
Model of signaling system - Mathematical models for information sources – Encoding a source alphabet – ASCII code – Radix r code – Miscellaneous codes - A Logarithmic measure of information – Coding for Discrete sources – Coding for analog sources (Optimum quantization) – Coding techniques for analog sources.

UNIT II-ERROR DETECTING AND ERROR CORRECTING CODES (10 hours)
Simple parity checks – CRC codes – Hamming weight – Hamming distance – Minimum distance decoding – Single / Double parity checks – Hamming codes – Linear block codes – Cyclic codes – Syndrome calculation – Block encoders and Decoders.

UNIT III-VARIABLE-LENGTH CODES – HUFFMAN CODES (10 hours)
Unique decoding **–** Instantaneous codes and its construction – The Kraft's inequality – Shortened block codes – The McMillan's Inequality – Huffman codes and its special cases – Extensions of a code – Huffman codes Radix r – Noise in Huffman coding probabilities – Use of Huffman codes – Hamming Huffman coding

UNIT IV-ENTROPY AND SHANNON'S FIRST THEOREM (5 hours)
Entropy and its Mathematical properties – Entropy and coding – Shannon-Fano coding – Entropy of a Markov process – The Adjoint system – Robustness of Entropy.

UNIT V-MUTUAL INFORMATION, CHANNEL CAPACITY & SHANNON'S MAIN THEOREM (11 hours)

Information channel – Capacity of a Binary symmetric channel – System entropies – Mutual information – Definition of channel capacity – Uniform channel – Conditional mutual information – Random encoding - Average random code – Fano bound – Converse of Shannon's theorem.

Course Number and Title

EC1029 VLSI DESIGN

Credits / Contact Hours

3/45

Instructor Name

Dr.J.Selvakumar

Textbooks, References

- Douglas A. Pucknell, *"Basic VLSI Systems and Circuits"*, Prentice Hall of India, 3rd Edition, reprint 2008.
- John P. Uyemura, *"Introduction to VLSI Circuits and Systems"*, John Wiley & Sons, Reprint 2009.
- Samir Palnitkar, *"Verilog HDL – Guide to Digital Design and Synthesis"*, Pearson Education, 3rd Edition,

2003.
- Smith.M.J.S, *"Application Specific Integrated Circuits",* Addison -Wesley Longman Inc., 1997.
- Weste & Eshraghian, *"Principles of CMOS VLSI Design",* Addison Wesley, 2nd Edition, 2008.
- John P Uyemura, *"Chip Design for Submicron VLSI: CMOS layout and simulation"*, Thomson India Edition, 2010.

Purpose

To introduce the technology, design concepts, electrical properties and modeling of Very Large Scale Integrated Circuits

Prerequisites	Co-requisites
EC1006 & EC1007	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To learn the basic MOS Technology.
2. To learn the MOS Process Technology and its second order effect.
3. To learn the concepts of modeling a digital system using Hardware Description Language.
4. To learn the basic concept of VLSI implementation strategies based on CMOS and FPGA..

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
			X		X						X
Mapping of instructional objectives with student outcome			1,3		3,4						2,3

List of Topics Covered

UNIT I-MOS TECHNOLOGY (9 hours)
Chip Design Hierarchy – IC Layers – Photolithography and Pattern Transfers – Basic MOS Transistors – CMOS Fabrication: n-well – p-well – twin tub – Latch up and prevention (SOI) – Submicron CMOS Process – Masks and Layout – CMOS Design Rules: Lambda based layout – Types of rules – SCMOS Design Rule set II.

UNIT II-MOS CIRCUIT DESIGN PROCESS (9 hours)
Introduction of MOSFET: Symbols, Enhancement mode-Depletion mode transistor operation – Threshold voltage derivation – body effect – Drain current Vs voltage derivation – channel length modulation. NMOS and CMOS inverter – Determination of pull up to pull down ratio –Stick diagrams – VLSI Circuit Design Flow.

UNIT III-CMOS LOGIC GATES & OTHER COMPLEX GATES (9 hours)
Gate delays – Logical Effort - CMOS Static Logic – Transmission Gate Logic – Tri-State Logic – Pass Transistor Logic – Dynamic CMOS Logic – Domino CMOS Logic, NORA CMOS Logic, Differential Cascade Voltage Switch (DCVS) Logic, True Single Phase Clock (TSPC) Dynamic Logic.

UNIT IV-VERILOG HDL (9 hours)
Hierarchical modeling concepts – Basic concepts: Lexical conventions – Data types – Modules and ports. Gate level modeling – Dataflow modeling – Behavioral modeling – Design examples of Combinational and Sequential circuits – Switch level modeling – Functions – UDP concepts.

UNIT V-VLSI IMPLEMENTATION STRATEGIES (9 hours)
Introduction – Design of Adders: carry look ahead-carry select-carry save. Design of multipliers: Array – Braun array – Baugh-Wooley Array. Introduction to FPGA – Full custom and Semi custom design, Standard cell design and cell libraries, FPGA building block architectures.

Course Number and Title

EC1030 NETWORK SIMULATION LAB

Credits / Contact Hours

2/45

Instructor Name

Dr .V. Nithya

Textbooks, References

1. LAB MANUAL, Department of ECE, SRM University.

Purpose

Network Simulation is a cost-effective method to design, analyze and evaluate network protocols and is an important tool in networking research. To know and understand communication networks using NETSIM Software and LAN Trainer kit.

Prerequisites	Co-requisites
Nil	` EC1027

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To understand the basics of network simulation.
2. To introduce simulations and use simulation tools in networking.
3. To design and analyze different networks, and protocols.
4. To simulate and evaluate networks using network simulator (ns-2).
5. To study the communication network's characteristics and to analyze various MAC and routing layer Protocols.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
			X	X		X		X		X	X
Mapping of instructional objectives with student outcome			1-4	1-4		1-4		3-5		3-5	4,5

List of Topics Covered

LIST OF EXPERIMENTS (45 hours)

1. Ethernet LAN protocol. To create Scenario and study the performance of CSMA/CD protocol through simulation.
2. Token bus and Token Ring protocols. To create scenario and study the performance of token bus and token ring protocols through simulation.
3. Wireless LAN protocols. To create scenario and study the performance of network with CSMA/CA protocol and compare with CSMA/CD protocols.
4. Implementation and study of stop and wait protocol.
5. Implementation and study of Go back N and selective repeat protocols.
6. Implementation of distance vector routing algorithm.
7. Implementation of Link state routing algorithm.
8. Implementation of data encryption and decryption.
9. Transfer of files from PC to PC using windows/ UNIX socket processing.

Course Number and Title

EC1031 VLSI DESIGN LAB

Credits / Contact Hours

2/45

Instructor Name

Dr.J.Selvakumar

Textbooks, References

- LAB MANUAL, Department of ECE, SRM University.
- Michael D. Ciletti, "Advanced Digital Design with the Verilog HDL", Prentice Hall Higher Education, 2010, Edition 2.
- Bhaskar J, "A VHDL Primier", Prentice Hall, 3rd Edition, 1999.
- Douglas L.Perry**,** "VHDL:Prigramming by Example", McGraw-Hill, 2002.
- Charles H.Roth, Lizy Kurian John, "Digital systems design using VHDL", Thomson, 2008.

Purpose

The laboratory consists of hands-on assignments which accompany the lectures of EC1029. The goal is to illustrate concepts discussed in the class and to give the students the opportunity to build and test real systems. The lab exercises will make use of the Xilinx Foundation™ System which is a powerful state-of-the-art CAD tool for designing and implementing digital systems on Field Programmable devices (FGPAs or CPLDs).

Prerequisites	Co-requisites
EC1010	EC1029

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

To gain expertise in design and development and simulation of digital circuits with Verilog HDL

1. To apply concepts and methods of digital system design techniques as discussed in the class (EC1029) through hands-on experiments.

2. Learn to design combinational and sequential digital systems starting from a word description that performs a set of specified tasks and functions.
3. To analyze the results of logic and timing simulations and to use these simulation results to debug digital systems.
4. Develop skills, techniques and learn state-of-the-art engineering tools (such as HDL, Xilinx / Altera tools) to design, implement and test digital systems on FPGAs / CPLDs.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X	X		X					X
Mapping of instructional objectives with student outcome		1-4	1-4	1-4		1,4					3

List of Topics Covered

LIST OF EXPERIMENTS (45 hours)

1. Combinational logic circuit design.
2. Sequential logic circuit design.
3. Design of VLSI multipliers.
4. Multiply-Accumulate circuits.
5. Digital Filters.
6. State Machines.
7. Design of microprocessor parts.

Course Number and Title

EC1048 INDUSTRIAL TRAINING II (Training to be undergone after VI semester)

Credits / Contact Hours

1

Instructor Name

Mr.K.Ramesh

Textbooks, References

N/A

Purpose

To provide hands-on experience at site / planning or design office where Electronics and Communication engineering projects are carried out

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

Students have to undergo three – week practical training in Electronics and Communication Engineering related project site or design / planning office so that they become aware of the practical application of theoretical concepts studied in the class rooms. .

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
				X	X	X	X	X	X	X	X
Mapping of instructional objectives with student outcome	1										

List of Topics Covered

Students have to undergo two-week practical training in Electronics and Communication Engineering related project site or design / planning office of their choice but with the approval of the department. At the end of the training student will submit a report as per the prescribed format to the department.

Course Number and Title

EC1050 MAJOR PROJECT / PRACTICE SCHOOL

Credits / Contact Hours

12/360

Instructor Name

Dr.K.Kalimuthu

Textbooks, References

Purpose

To simulate real life situations related to Electronics and Communication Engineering and impart adequate training so that confidence to face and tackle any problem in the field is developed in the college itself.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

To guide the students such a way that the they carry out a comprehensive work on the chosen topic which will stand them in good stead as they face real life situations. The project work so chosen by the student shall culminate in gaining of major design experience in the related area of specialization.

Student Outcomes from Criterion 3 covered by this Course											
Student outcome	**a**	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
	X	X	X	X	X	X	X	X	X	X	X
Mapping of instructional objectives with student outcome	1										

List of Topics Covered

MAJOR PROJECT

Each project will cover all the aspects (to the extent possible) like investigation, designing, coding detailing ,implementation of a Electronics and Communication circuits / systems in which the aspects like performance analysis, application of relevant standards etc., will find a place. Alternately, a few research problems also may be identified for investigation and the use of laboratory facilities to the fullest extent may be taken as a project work. The project shall be driven by realistic constraints like that related to economic, environmental, social, political, ethical, health & safety, manufacturability and sustainability. The outcomes to be attained by students by doing the project work shall be spelt out clearly. A project report is to be submitted on the topic which will be evaluated during the final review. Assessment procedure will be as spelt out in the regulations.

PRACTICE SCHOOL

Alternately, a student is encouraged to take an industrial project with Electronics and Communication companies or firms chosen by the institute. In such cases the student will stay with the firm and carry out the project. The project will be guided by the faculty member and the concerned officer in the industry. All the requirements spelt out under 'MAJOR PROJECT' above, shall be incorporated under this work also. However reviews will be conducted in the institute which the student shall attend.

A.1.5 Engineering Topic - III

Department Elective Courses

2013 Curriculum Course Code	Name of the Course
EC1101	Electromagnetic Interference and Electromagnetic Compatibility
EC1102	Fundamentals of MEMS
EC1103	Fundamentals ofNanotechnology
EC1104	Electronic Measurements & Instrumentation
EC1105	Sensors and Transducers
EC1106	Biomedical Instrumentation
EC1107	Control Engineering
EC1108	Computer Architecture and Organization
EC1109	Embedded Systems
EC1110	Virtual Instrumentation Using LABVIEW
EC1111	Digital Television
EC1112	Digital Image Processing
EC1113	Radar and Navigational Aids
EC1114	Communication Switching Techniques
EC1115	ASIC Design
EC1116	Embedded C and Micro Controller
EC1117	Cryptography and Network Security
EC1118	Satellite Communication and Broadcasting
EC1119	Mobile Computing
EC1120	Bluetooth Technology
EC1121	Communication Network Protocols
EC1122	Photonics and Optical Networks
EC1123	RF System Design for Wireless Communications
EC1124	Neural Network and Fuzzy Logic
EC1125	Digital Logic Design With PLDs And VHDL

Course Number and Title

EC1101 ELECTROMAGNETIC INTERFERENCE AND ELECTROMAGNETIC COMPATIBILITY

Credits / Contact Hours

3/ 45

Instructor Name

Dr.P.Eswaran

Textbooks, References

- Prasad Kodali, "Engineering Electromagnetic Compatibility–Principles, Measurements, and Technologies", IEEE press, 2001.
- Henry W. Ott, "Noise Reduction Techniques in Electronic Systems", John Wiley & Sons, 2nd Edition, 1988.
- Bernharo Q'Keiser, "Principles of Electromagnetic Compatibility", Artech house, 3rd Edition, 1986.

Purpose

The purpose of this course is to expose the students to the basics and fundamentals of Electromagnetic Interference and Compatibility and application in System Design.

Prerequisites	Co-requisites
EC1005	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Selective Elective

Instructional Objectives

1. To study EMI Fundamentals and EMI sources.
2. To learn EMI Measuring Instruments and their usage.
3. To study EMI standards and controlling methods..

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
					X			X			
Mapping of instructional objectives with student outcome					1,2,3			1,2			

List of Topics Covered

UNIT I-EMI ENVIRONMENT (9 hours)

Concepts of EMI and EMC and Definitions, Sources of EMI – Celestial Electromagnetic noise- Lightning Discharge- Electrostatic Discharge- Electromagnetic Pulse-Electromagnetic emissions-Noise from relays and Switches-Nonlinearities in Circuits.

UNIT II-EMI COUPLING PRINCIPLES (9 hours)
Capacitive coupling - Inductive coupling- Common Impedance Ground Coupling- Ground Loop coupling-Transients in power supply lines- Radiation coupling-Conduction coupling-Common – mode and Differential-mode interferences-Conducted EM noise on power supply lines.

UNIT III-EMI MEASUREMENTS (9 hours)
Open Area test site measurements-Measurement precautions – Anechoic Chamber – TEM - Reverberating TEM-GTEM cell – Comparisons.

UNIT IV-EMI CONTROL TECHNIQUES (9 hours)
EMC Technology- Grounding-Shielding-Electrical Bonding-Power line filter-CM filter – DM filter- EMI suppression Cables- EMC Connectors -Isolation transformer.

UNIT V-EMI / EMC STANDARDS (9 hours)
Introducti1on- Standards for EMI/EMC- MIL-STD-461/462-IEEE/ANSI standard-CISPR/IEC standard- FCC regulations-British standards-VDE standards-Euro norms-Performance standards-some comparisons.

Course Number and Title

EC1102 FUNDAMENTALS OF MEMS

Credits / Contact Hours

3 / 45

Instructor Name

Dr.P.Eswaran

Textbooks, References

- Chang Liu, "Foundations of MEMS", Pearson Indian Print, 1st Edition, 2012.
- Gaberiel M. Rebiz, "RF MEMS Theory,Design and Technology", John Wiley & Sons, 2003.
- Charles P. Poole and Frank J. Owens, "Introduction to Nanotechnology", John Wiley & Sons, 2003.
- Julian W.Gardner and Vijay K Varadhan, "Microsensors, MEMS and Smart Devices", John Wiley & sons, 2001.

Purpose

This course is offered to students to gain basic knowledge on MEMS (Micro Electro Mechanical System) and various fabrication techniques. This enables them to design, analyze, fabricate and test the MEMS based components.

Prerequisites	Co-requisites
PY1001, CY1001, PY1003, ME1001 & EC1001	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. To introduce MEMS and micro fabrication.
2. To study the essential electrical and mechanical concepts of MEMS.
3. To study various sensing and actuating technique.
4. To know about the polymer and optical MEMS.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X		X						X	
Mapping of instructional objectives with student outcome	1-4	2,3		1- 4						1	

List of Topics Covered

UNIT I-INTRODUCTION TO MEMS AND MICRO FABRICATION (9 hours)
History of MEMS Development, Characteristics of MEMS-Miniaturization - Micro electronics integration - Mass fabrication with precision. Sensors and Actuators- Energy domain. Sensors, actuators. Micro fabrication - microelectronics fabrication process- Silicon based MEMS processes- New material and fabrication processing- Points of consideration for processing. Anisotropic wet etching, Isotropic wet etching, Dry etching of silicon, Deep reactive ion etching (DRIE), and Surface micromachining process- structural and sacrificial material.

UNIT II-ELECTRICAL AND MECHANICAL CONCEPTS OF MEMS (9 hours)
Conductivity of semiconductors, crystal plane and orientation, stress and strain - definition - Relationship between tensile stress and strain- mechanical properties of Silicon and thin films, Flexural beam bending analysis under single loading condition- Types of beam- longitudinal strain under pure bending -deflection of beam- Spring constant, torsional deflection, intrinsic stress, resonance and quality factor.

UNIT III-ELECTROSTATIC AND THERMAL PRINCIPLE SENSING AND ACTUATION (9 hours)
Electrostatic sensing and actuation-Parallel plate capacitor - Application-Inertial, pressure and tactile sensor parallel plate actuator- comb drive. Thermal sensing and Actuations-Thermal sensors-Actuators- Applications Inertial, flow and infrared sensors.

UNIT IV-PIEZORESISTIVE, PIEZOELECTRIC AND MAGNETIC PRINCIPLE SENSORS AND ACTUATOR (9 hours)
Piezoresistive sensors- Piezoresistive sensor material- stress in flexural cantilever and membrane- Application-Inertial, pressure, flow and tactile sensor. Piezoelectric sensing and actuation- piezoelectric material properties-quartz-PZT-PVDF -ZnO- Application-Inertial, Acoustic, tactile, flow-surface elastic waves
Magnetic actuation- Micro magnetic actuation principle- Deposition of magnetic materials-Design and fabrication of magnetic coil.

UNIT V-POLYMER AND OPTICAL MEMS (9 hours)
Polymers in MEMS- polymide-SU-8 Liquid Crystal Polymer (LCP)- PDMS – PMMA – Parylene - Flurocorbon, Application-Acceleration, pressure, flow and tactile sensors. Optical MEMS-passive MEMS optical components-lenses-mirrors-Actuation for active optical MEMS.

Course Number and Title

EC1103 FUNDAMENTALS OF NANOTECHNOLOGY

Credits / Contact Hours

3 / 45

Instructor Name

Mr.A.V.M.Manikandan

Textbooks, References

- Rainer Waser (Ed.), "Nano electronics and information technology", Wiley- VCH. 3rd Edition, 2012.
- Thomas Heinzel, "A Microscopic Electronics in Solid State Nanostructure", Wiley- VCH, 2008.
- Mick Wilson, Kamali Kannangara, Geoff Smith, Michelle Simmons, Burkhard Raguse, "Nanotechnology – (Basic Science and Emerging Technologies)", Overseas Press, 2002**.**
- Mark Ratner, Daniel Ratner, "Nanotechnology: A Gentle introduction to the Next Big idea", Pearson education, 2003.

Purpose

To introduce to the students, the various opportunities in the emerging field of Nano electronics and Nano technologies

Prerequisites	Co-requisites
PY1003, EC1006	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. The objective of this course is to make students familiar with the important concepts applicable to small electronic devices, their fabrication, characterization and application.

.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X									
Mapping of instructional objectives with student outcome	1	1									

List of Topics Covered

UNIT I-LIMITATIONS OF CMOS (9 hours)
Fundamentals of MOSFET devices - Scaling of CMOS – Limitations – Alternative concepts in materials – **Structures of MOS devices:** SOI MOSFET, FINFETS, Dual Gate MOSFET, Ferro electric FETs.

UNIT II-MICRO AND NANO FABRICATION (9 hours)
Optical Lithography – Electron beam Lithography – Atomic Lithography – Molecular beam epitaxy - Nano lithography.

UNIT III-CHARACTERIZATION EQUIPMENTS (9 hours)
Principles of Electron Microscopes – Scanning Electron Microscope – Transmission Electron Microscope - Atomic Force Microscope – Scanning Tunneling Microscope.

UNIT IV-NANO DEVICES – I (9 hours)
Resonant tunneling diodes – Single electron devices – Josephson junction – Single Flux Quantum logic – Molecular electronics.

UNIT V-NANO DEVICES – II (9 hours)
Quantum computing: principles – Qbits – Carbon nanotubes (CNT): Characteristics, CNTFET, Application of CNT - Spintronics: Principle, Spin valves, Magnetic Tunnel Junctions, Spin FETs, MRAM.

Course Number and Title

EC1104 ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

Credits / Contact Hours

3 / 45

Instructor Name

Mrs.R.Manohari

Textbooks, References

- Albert.D. Helfrick and William. D. Cooper, "*Modern Electronic Instrumentation and Measurement Techniques*", PHI Learning Private Limited, 2010
- Kalsi.S, "*Electronic Instrumentation*", Tata McGraw Hill Publishing Company Ltd., 3rd edition, 2010.
- Sawhney.A.K, "*A Course in Electrical and Electronic Measurements and Instrumentation*", Dhanapat Rai & Sons, 2012.
- Earnest.O Doeblin, "*Measurement Systems Application and Design*", McGraw Hill International editions, 4th edition, 1990.
- A.J.Bouwens, "*Digital Instrumentation*", McGraw Hill, 1986.

Purpose

The Purpose of this course is to introduce students to the various types of measurements made in electronics and the instruments used for measuring them. The main objective of this subject is to help students identify the different latest measurement techniques available for specific engineering applications.

Prerequisites	Co-requisites
Nil	EC1013

Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. Understand the various measurement techniques available.
2. Understand the basic working of instruments used for measurement.
3. Understand the errors in measurements and their rectification. .

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
			X		X						
Mapping of instructional objectives with student outcome			1-3		1,2						

List of Topics Covered

UNIT I-MEASUREMENTS AND ERRORS (9 hours)

Accuracy-Precision-Significant Figures-Types of Errors-Statistical Analysis-Limiting Errors-Bridge Measurements (AC and DC bridges) - Analysis of Linear Systems-Static and Dynamic characteristics-Time Domain Response-I Order response for Step Input-Ramp Input-Impulse Input- Bourdon Tube-Pressure Gauges - Measurement of Flow

(Magnetic).

UNIT II-ELECROMECHANICAL & DIGITAL INDICATING INSTRUMENTS (9 hours)
PMMC Mechanism-DC Ammeters and Voltmeters-Series and Shunt Type Ohmmeter-Alternating Current Indicating Instruments (Moving Iron instruments, electrodynamometer instrument)- Digital Voltmeters-Vector Voltmeter-Guarding Techniques-Automation in Voltmeter.

UNIT III–SIGNAL GENERATION AND ANALYSIS (9 hours)
Sine Wave Generator-Sweep Frequency Generator-Pulse and Square wave Generator-Function Generator-Analyzer-Wave Analyzer-Distortion Analyzer-Harmonic Distortion Analyzer-Spectrum Analyzer - Logic Analyzer.

UNIT IV–OSCILLOSCOPES AND RECORDERS (9 hours)
Simple CRO - Dual Beam-Dual Trace-Sampling Oscilloscope-Analog and Digital Storage Oscilloscope-Recorders-Analog and Digital Recorders

UNIT V–ADVANCED MEASUREMENT AND COMPUTER CONTROLLED TEST SYSTEMS (9 hours)
Scanning Probe Microscope-Atomic Force Microscope-Magnetic Force Microscope-Scanning Tunneling Microscope-Testing an Audio Amplifier-Testing a Radio Receiver-Instruments used in Computer Controlled Instrumentation-Case Studies in Instrumentation-Electronic Weighing System-Digital Transducer.

Course Number and Title

EC1105 SENSORS AND TRANSDUCERS

Credits / Contact Hours

3 / 45

Instructor Name

Mrs.K.Vadivukarasi

Textbooks, References

- Patranabis D, “Sensor and Actuators”, Prentice Hall of India (Pvt) Ltd., 2006.
- Ian Sinclair, “Sensor and Transducers”, Elsevier India Pvt Ltd, 3rd Edtion, 2011.
- Sawhney.A.K, Puneeth sawhney, “A Course in Electrical and Electronic Measurements and Instrumentation”, Dhanpat Rai Publications, 2012.
- Ernest O. Doeblin, “Measurement System, Application and Design”, Tata McGraw Hill Publishing Company Ltd., 5th Edition, 2008.

Purpose

To impart knowledge on various types of sensors and transducers for Automation in science, Engineering and medicine.

Prerequisites	Co-requisites
PY1003 & EC1001	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. To study basic concepts of various sensors and transducers.
2. To develop knowledge in selection of suitable sensor based on requirement and application.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X		X							
Mapping of instructional objectives with student outcome	1,2	1,2		1,2							

List of Topics Covered

UNIT I-NTRODUCTION (9 hours)
Definition, classification, static and dynamic parameters, Characterization – Electrical, mechanical, thermal, optical, biological and chemical, Classification of errors – Error analysis, Static and dynamic characteristics of transducers, Performance measures of sensors.

UNIT II-MECHANICAL AND ELECTROMECHANICAL SENSORS (9 hours)
Resistive Potentiometer, strain gauge, Inductive sensors and transducer, capacitive sensors, ultrasonic sensors.

UNIT III-THERMAL AND RADIATION SENSOR (9 hours)
Thermal Sensors: Gas thermometric sensors, acoustic temperature sensors, magnetic thermometer, resistance change - type thermometric sensors, thermo emf sensors, junction semiconductor types, Thermal radiation sensors, spectroscopic thermometry
Radiation Sensors: Photo detectors, photovoltaic and photo junction cells, photo sensitive cell, photo FETs and other devices.

UNIT IV-MAGNETIC AND ELECTROANALYTICAL SENSOR (9 hours)
Magnetic Sensors: Force and displacement measurement, magneto resistive sensors, Hall Effect sensor, Inductance and eddy current sensors, Angular/rotary movement transducer, Electromagnetic flow meter, squid sensor.
Electro analytical Sensors: Electro chemical cell, cell potential, sensor electrodes, electro ceramics in gas media, chemFET.

UNIT V-SENSORS AND THEIR APPLICATIONS (9 hours)
Automobile sensor, Home appliance sensor, Aerospace sensors, sensors for manufacturing, medical diagnostic sensors, environmental monitoring.

Course Number and Title

EC1106 BIOMEDICAL INSTRUMENTATION

Credits / Contact Hours

3 / 45

Instructor Name

Mr.B.Srinath

Textbooks, References

- Leslie Cromwell, Fred J. Weibell and Erich A. Pfeifer, "Biomedical Instrumentation and Measurements", 2nd Edition, PHI, 2006
- Khandpur.R.S, "Handbook of Biomedical Instrumentation", 2nd edition, 12th reprint, Tata McGraw Hill, 2008.
- Joseph J. Carr and John M. Brown, "Introduction to Biiomedical Equipment Technology", 4th edition, Pearson Education, 2008.
- John G. Webster, "Medical Instrumentation Application and Design", 3rd edition, Wiley India, 2008.

Purpose

The purpose of this course is to introduce the students to the basics of Electro-physiology and its measurements, non-electrical parameters related to various systems of human body and their measurements, Electrodes and Transducers used in bio signal acquisition. This course will enable the students to learn the basic principles of different instruments/equipment used in the health care industry. Also student will get to know about various Medical Imaging techniques used for diagnosis along with other diagnostic and therapeutic devices.

Prerequisites	Co-requisites
EC1001	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Required

Instructional Objectives

1. To understand the Origin of Bioelectric potential and their measurements using appropriate electrodes and Transducers.
2. To understand how to measure various biochemical and nonelectrical parameters of human system.
3. To understand the Electro-physiology of various systems and recording of the bioelectric signals.
4. To understand the working principles of various Imaging techniques.
5. To understand the design aspects of various Assist and Therapeutic Devices..

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X		X	X		X		X			
Mapping of instructional objectives with student outcome	1,2		1,2,5	3,4		3,5		5			

List of Topics Covered

UNIT I-BIOPOTENTIAL ELECTRODES AND TRANSDUCERS (9 hours)

Electrode theory- Electrode electrolyte interface, half-cell potential, Hydrogen, Calomel, Ag-AgCl electrode, needle and wire electrode, surface electrodes, microelectrode-metal micropipette.

Physiological Transducers: Resistive transducers - Thermistor, Inductive Transducers - Capacitive Transducers - Photoelectric Transducers -Piezoelectric Transducers -, Biochemical Transducers- pH, pCo2 and pO2 electrodes.

UNIT II-BIO ELECTRIC POTENTIALS AND ELECTRO PHYSIOLOGICAL MEASUREMENTS (9 hours)

Sources of Bioelectric potentials - Resting and Action potential - Propagation of Action potential

Electrophysiology of Heart, Nervous System and Muscle Activity

Bio-signals: ECG - EEG, Evoked potential – EMG- ERG- Electrodes and Lead System, Typical waveforms and Signal characteristics

Signal Conditioning circuits: Design of low Noise Medical Amplifier, Isolation Amplifier, Protection Circuits and Electrical Safety.

UNIT III-NON-ELECTRICAL PARAMETER MEASUREMENTS (9 hours)
Measurement of Blood Pressure, Blood Flow, Plethysmography, Cardiac Output, Heart Sounds- Lung Volumes and their measurements- Auto analyzer –Blood cell counters, Oxygen saturation of Blood.

UNIT IV-MEDICAL IMAGING TECHNIQUES (9 hours)
X-ray machine – Computer Tomography – Angiography – Ultrasonography – Magnetic Resonance Imaging System – Nuclear Imaging Techniques – Thermography – Lasers in Medicine – Endoscopy.

UNIT V-TELEMETRY, ASSIST AND THERAPEUTIC DEVICES (9 hours)
Bio telemetry – Elements and Design of Bio telemetry system. Assist and Therapeutic devices: Cardiac Pacemakers – Defibrillators – Artificial Heart Valves – Artificial Heart Lung machine – Artificial Kidney – Orthopadeic Prosthetics – Respiratory therapy equipment – Patient Monitoring System.

Course Number and Title

EC1107 CONTROL ENGINEERING

Credits / Contact Hours

3 / 45

Instructor Name

Mr.P.K.Senthil Kumar

Textbooks, References

- Gopal, "Control Systems, Principles & Design", Tata McGraw Hill, New Delhi, 2002.
- Ogata.K, "Modern Control Engineering", 5th Edition, Pearson Education India, New Delhi, 2010.
- Nagrath.I.J. & Gopal.M, "Control Systems Engineering", New Age International Publishers, 2006.
- Bandyopadhyay.M.N, "Control Engineering Theory and Practice", Prentice Hall of India, 2003.

Purpose

To understand the fundamental need for control system and to derive its transfer function.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. To understand the methods of representation of systems and deriving their transfer function model.
2. To give basic knowledge is obtaining the open loop and closed loop frequency responses of systems.
3. Applications of control systems.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X		X	X	X						
Mapping of instructional objectives with student outcome	1		1	2	2						

List of Topics Covered

UNIT I-SYSTEMS AND THEIR REPRESENTATION (9 hours)
Control systems- Basic elements in control systems – Open and closed loop systems – Electrical analogy of mechanical and thermal systems – Transfer function –Block diagram reduction techniques – Signal flow graphs.

UNIT II-TIME RESPONSE (9 hours)
Time response – Time domain specifications – Types of test input – I and II order system response – Error coefficients – Generalized error series – Steady state error – P, PI, PID modes of feedback control.

UNIT III-FREQUENCY RESPONSE (9 hours)
Frequency response of the system – Correlation between time and frequency response – Gain and Phase margin – Bode plot - Polar plot.

UNIT IV-STABILITY OF CONTROL SYSTEM (9 hours)
Characteristics equation – Location of roots in S plane for stability – Routh Hurwitz criterion – Root locus construction – Effect of pole, zero addition.

UNIT V-APPLICATIONS (9 hours)
Transfer functions of Synchros – AC and DC servomotors – Potentiometers – Encoders- Gear trains-Single stage and two stage amplifiers transfer functions- case studies.

Course Number and Title

EC1108 COMPUTER ARCHITECTURE AND ORGANIZATION

Credits / Contact Hours

3 / 45

Instructor Name

Mr.A.K.Mariselvam

Textbooks, References

- John P.Hayes, "Computer architecture and Organisation", Tata McGraw-Hill, Third dition, 2012.
- Carl.V. Hamacher, Zvonko Varanesic.G. and Safat G.Zaky, "Computer Organisation", V Edition, Reprint 2012,Tata McGraw-Hill Inc.
- Morris Mano, "Computer System Architecture", Third Edition,Prentice-Hall of India, 2000.
- Paraami, "Computer Architecture", Eighth impression, 2011, Oxford Press.
- Pal Chaudhuri. P, "Computer organization and design", 2nd Edition, Prentice Hall of India, 2007.

Purpose

To study the basic structure of a digital computer and to discuss in detail the organization of the Control unit, the Arithmetic and Logical unit, the Memory unit and the I/O unit.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. To have a thorough understanding of the basic structure and operation of a digital computer.
2. To discuss in detail the operation of the arithmetic unit including the algorithms &implementation of fixed-point and floating-point addition, subtraction, multiplication &division.
3. To study in detail the different types of control and the concept of pipelining.
4. To study the hierarchical memory system including cache memories and virtual memory.
5. To study the different ways of communicating with I/O devices and standard I/O interfaces..

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X									
Mapping of instructional objectives with student outcome	1,2	2									

List of Topics Covered

UNIT I-INTRODUCTION (9 hours)
Evolution of Computers, VLSI Era, System Design- Register Level, Processor Level, CPU Organization, Data Representation, Fixed – Point Numbers, Floating Point Numbers, Instruction Formats, Instruction Types. Addressing modes.

UNIT II-DATA PATH DESIGN (9 hours)
Fixed Point Arithmetic, Addition, Subtraction, Multiplication and Division, Combinational and Sequential ALUs, Carry look ahead adder, Robertson Algorithm, Booth's algorithm, non-restoring division algorithm, Floating Point Arithmetic, Coprocessor, Pipeline Processing, Modified booth's Algorithm

UNIT III-CONTROL DESIGN (9 hours)
Hardwired Control, Micro programmed Control, Multiplier Control Unit, CPU Control Unit, Pipeline Control, Instruction Pipelines, Pipeline Performance, Superscalar Processing, Nano Programming.

UNIT IV-MEMORY ORGANIZATION (9 hours)
Random Access Memories, Serial - Access Memories, RAM Interfaces, Magnetic Surface Recording, Optical Memories, multilevel memories, Cache & Virtual Memory, Memory Allocation, Associative Memory.

UNIT V-SYSTEM ORGANIZATION (9 hours)
Communication methods, Buses, Bus Control, Bus Interfacing, Bus arbitration, IO and system control, IO interface circuits, Handshaking, DMA and interrupts, vectored interrupts, PCI interrupts, pipeline interrupts, IOP organization, multiprocessors, RISC and CISC processors, Superscalar and vector processor.

Course Number and Title

EC1109 EMBEDDED SYSTEMS

Credits / Contact Hours

3 / 45

Instructor Name

Mr.S.Nivash

Textbooks, References

- Andrew N Sloss, D. Symes and C. Wright, "*ARM system developers guide",* Morgan Kauffman/ Elsevier, 2006.
- Michael J. Pont, *"Embedded C",* Pearson Education, 2007.
- Wayne Wolf, *"Computers as Components: Principles of Embedded Computer System Design",* Elsevier, 2006.
- Steve Heath, *"Embedded System Design",* Elsevier, 2005.

Purpose

To provide sufficient Knowledge to understand the embedded systems design embedded programming and their operating system.

Prerequisites	Co-requisites
Nil	EC1016A

Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. To provide in-depth knowledge about embedded processor, its hardware and software
2. To explain programming concepts and embedded programming in C and assembly language.
3. To explain real time operating systems, inter-task communication and an embedded software development tool.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X	X							
Mapping of instructional objectives with student outcome		1,2	2,3	1,3							

List of Topics Covered

UNIT I-INTRODUCTION TO EMBEDDED SYSTEM AND ARM ARCHITECT (9 hours)
Challenges of Embedded Systems – Embedded system design process. Embedded processors – ARM processor – Architecture, ARM and Thumb Instruction sets.

UNIT II-EMBEDDED C PROGRAMMING (9 hours)
C-looping structures – Register allocation – Function calls – Pointer aliasing – structure arrangement – bit fields – unaligned data and endianness – inline functions and inline assembly – portability issues.

UNIT III-OPTIMIZING ASSEMBLY CODE (9 hours)
Profiling and cycle counting – instruction scheduling – Register allocation – conditional execution – looping constructs – bit manipulation – efficient switches – optimized primitives.

UNIT IV-RTOS PRINCIPLE (9 hours)
Operating systems and its internals - Multitasking and Real time Operating Systems – Task Swapping Methods – Scheduler Algorithms – Priority Inversion – Task , Thread and Process – Choosing Operating System – Commercial Operating Systems – Linux.

UNIT V-EMBEDDED SOFTWARE DEVELOPMENT PROCESS (9 hours)
Meeting real time constraints – Multi-state systems and function sequences. Embedded software development tools – Emulators and debuggers. Design methodologies – Case studies – Complete design of example embedded systems.

Course Number and Title

EC1110 VIRTUAL INSTRUMENTATION USING LABVIEW

Credits / Contact Hours

3 / 45

Instructor Name

Mrs.Hema

Textbooks, References

- Sumathi & P.Surekha, " LabVIEW based Advanced Instrumentation" Springer, 2007.
- Jovitha Jerome, "Virtual Instrumentation Using LabVIEW", PHI Learning Pvt. Ltd, 2010.
- Cory L.Clark, "Labview Digital Signal Processing and Digital Communication".
- Herbert. A. J. "The structure of Technical English", Orient Longman, 1995
- Sanjay Gupta, Joseph John, "Virtual Instrumentation using LabVIEW", 2nd Edition, Tata McGraw Hill Education Private Limited, 2010.
- Gary W. Johnson, Richard Jennings , "LabVIEW Graphical Programming", Fourth Edition, McGraw-Hill publications, 2006
- Technical Manuals for DAS Modules of Advantech and National Instruments.

Purpose

To enable the students to understand basics, programming techniques, data acquisition and interfacing techniques of virtual instrumentation and to use VI for different applications.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. The students will be able to familiarize the basics and need of VI.
2. The students will be able to learn LABVIEW software basics.
3. To get better understanding of data acquisition techniques.
4. The students can have an exposure to different interfacing techniques.
5. The students can able to design some real time application using LABVIEW software.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X		X						X
Mapping of instructional objectives with student outcome	1,3,4,5	2,5	2,5		2,4,5		,				2,3,4

List of Topics Covered

UNIT I-VIRTUAL INSTRUMENTATION (9 hours)
Historical perspective, Need of VI, Advantages of VI, Define VI, block diagram & architecture of VI, data flow techniques, graphical programming in data flow, comparison with conventional programming.

UNIT II-VI PROGRAMMING TECHNIQUES (9 hours)
VIS and sub-VIS, loops & charts, arrays, clusters, graphs, case & sequence structures, formula modes, local and global variable, string & file input.

UNIT III-DATA ACQUISITION BASICS (9 hours)
Introduction to data acquisition on PC, Sampling fundamentals, Input/Output techniques and buses.ADC, DAC, DIO, Counters & timers, PC Hardware structure, timing, interrupts, DMA, Software and Hardware Installation, Simple applications using NI MyDAQ and NI ELVIS.

UNIT IV-LABVIEW IN SIGNAL PROCESSING (9 hours)
Waveform Generation, Sampling, Quantization, Aliasing, Signal Reconstruction. Fourier transforms Power spectrum, Correlation methods, windowing & flittering. Digital Filter Design, IIR/FIR Filtering system Design, Adaptive Filter design.

UNIT V-FREQUENCY DOMAIN PROCESSING (9 hours)
Discrete Fourier Transform and Fast Fourier Transform, STFT, Wavelet Transform, Signal Processing applications.

Course Number and Title

EC1111 DIGITAL TELEVISION

Credits / Contact Hours

3 / 45

Instructor Name

Dr.Diwakar.R.Marur

Textbooks, References

- Philip J. Cianci, "HDTV and the Transition to Digital Broadcasting: Understanding New Television Technologies", Focal Press, 2007.
- Iain E. G. Richardson, "H.264 and MPEG-4 and Video compression video coding for Next-generation Multimedia", John Wiley & Sons Ltd., 2003.
- Ibrahim.K.F, "Newnes Guide to Television and Video Technology", Newnes Publishers, 2007.
- Charles poynton, "Digital Video and HDTV Algorithms and Interfaces", Morgan Kaufman publishers, 2007.

Purpose

Television technology has now become a vital tool to the information revolution that is sweeping across the countries of the world. This syllabus aims at a comprehensive coverage of Digital Television systems with the emphasis on television evolution.

Prerequisites	Co-requisites
EC1012	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. To study the evolution of television systems
2. To apply digitization principles on composite television signal
3. To study types of compression standards
4. To know the television display, storage devices

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X		X		X						
Mapping of instructional objectives with student outcome	1-3		1,2		1-4						

List of Topics Covered

UNIT I-INTRODUCTION (9 hours)
Raster images – Quantization – Image structure – Brightness and contrast – Raster scanning – Resolution – Introduction to luma and chroma.

UNIT II-DIGITIZATION (9 hours)
Image digitization – Perception and visual acuity – Luminance and lightness – CIE system of colorimetry – Color science – Video signal processing – Gamma – Luma and color differences.

UNIT III-DIGITAL TELEVISION (9 hours)
Digital Television types – JPEG – Video compression – MPEG2, MPEG4, H264, Motion – JPEG (M-JPEG) compression.

UNIT IV-HIGH DEFINITION TV (9 hours)
HDTV evolution and role of Grand Alliance – HDTV compressed video and audio streams – Packetized transport – Transmission – HDTV receiver – HDTV standards – Metadata broadcasting.

UNIT V-DTV FUTURE AND ACCESSORIES (9 hours)
3D TV – Plasma, LCD, Digital Light Processing – HDMI – Digital Video Disk (DVD), Blue Ray Disk, Super hi-vision.

Course Number and Title

EC1112 DIGITAL IMAGE PROCESSING

Credits / Contact Hours

3 / 45

Instructor Name

Mr.P.Vijaya kumar

Textbooks, References

- Rafael C Gonzalez and Richard E Woods, “Digital Image Processing”, Pearson Education, 3rd Edition, 2003.
- Jayarman.S, Esakkirajan.S and Veerakumar.T, “Digital Image Processing”, Tata McGraw Hill, 2010.
- Jain.A.K, “Fundamentals of Digital Image Processing”, Pearson Education, 1989.
- William K Pratt, “Digital Image Processing”, John Willey, 2001.
- Millman Sonka, Vaclav Hlavac, Roger Boyle, and Broos Colic, “Image Processing Analysis and Machine Vision”, Thompson learning, 1999.

Purpose

The purpose of this course is to introduce the basic concept and methodologies for digital image processing.

Prerequisites	Co-requisites
EC1017	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

The students undergoing this course will be able to know

1. Fundamentals of image processing.
2. Various transforms used in image processing.
3. Image processing techniques like image enhancement, reconstruction, compression and segmentation.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X		X	X						
Mapping of instructional objectives with student outcome	1,2	1		2	1,2,3						

List of Topics Covered

UNIT I-DIGITAL IMAGE FUNDAMENTALS (9 hours)
Introduction-Elements of Digital Image Processing system- elements of visual perception – image sensing and acquisition – Image sampling and quantization - image representation -Some basic relationship between pixels.

UNIT II-IMAGE TRANSFORMS (9 hours)
Introduction - 2D Discrete Fourier Transform – Properties- Importance of Phase -Walsh – Hadamard – Discrete Cosine Transform, Haar, –KL transforms –Singular Value Decomposition.

UNIT III-IMAGE ENHANCEMENT (9 hours)
Enhancement through point operation- Histogram manipulation – Gray level transformation- Neighbourhood operation – Median filter - Image Sharpening- Bit plane slicing - Homomorphic Filtering – Zooming operation.

UNIT IV-IMAGE RESTORATION (9 hours)
Model of Image Degradation/restoration process –Inverse filtering -Least mean square (Wiener) filtering – Constrained least mean square restoration – Singular value decomposition-Recursive filtering.

UNIT V-IMAGE COMPRESSION AND SEGMENTATION (9 hours)
Image compression schemes – Information theory – Run length, Huffman and arithmetic coding –Vector quantization - JPEG. Image Segmentation – Classification – Thresholding – edge based segmentation – Hough transform – Active contour.

Course Number and Title

EC1113 RADAR AND NAVIGATIONAL AIDS

Credits / Contact Hours

3 / 45

Instructor Name

Mrs.K.Suganthi

Textbooks, References

- Skolnik.M.I, "Introduction to RADAR systems", Mc-Graw Hill, 3rd Edition, 1981.
- Nagaraja.N.S. "Elements of Electronic Navigation", Tata Mc-Graw Hill, 2nd Edition, 1993.
- Nadav Levanon, "RADAR Principles", John Wiley and Sons, 1989.
- Brookner, "RADAR Technology", Artech House, 1986.
- Mark, Richards.A, "Fundamentals of radar signal processing", Mc-Graw Hill, Electronic Engineering, 1st Edition, 2005.
- Bagad.V.S, "Radar Systems", Technical publications, 1st edition,2008.

Purpose

Main objective of this course is to make the students understand the basic concept in the field of Radar and Navigational aids. Students are taught about different types of Radar Systems.

Prerequisites	Co-requisites
EC1018	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. To study RADAR theory.
2. To study and learn different types of RADAR and their working principle.
3. To study RADAR signal detection methods.
4. To study RADAR Navigation techniques

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X			X						
Mapping of instructional objectives with student outcome	1,2	3			1,4						

List of Topics Covered

UNIT I-RADAR EQUATIONS (7 hours)
RADAR Block Diagram & operation – RADAR Frequencies – RADAR Equation – Detection of signals in Noise – RADAR cross section of targets – RADAR cross section fluctuations – transmitter power – pulse repetition frequency – system losses and propagation effects.

UNIT II-MTI AND PULSE DOPPLER RADAR (11 hours)
Introduction to Doppler & MTI RADAR – Delay Line canceller – Moving Target Detector – Pulse Doppler RADAR – Non-Coherent MTI – CW RADAR – FMCW RADAR – Tracking RADAR – Monopulse Tracking – Conical Scan and Sequential Lobing.

UNIT III-RADAR SIGNAL DETECTION AND PROPAGATION ON WAVES (9 hours)
Detection criteria – automatic detection – constant false alarm rate receiver – Ambiguity diagram – pulse compression – introduction to clutter – surface clutter RADAR equation – anomalous propagation and diffraction.

UNIT IV-RADIO NAVIGATION (9 hours)
Adcock directional finder – automatic directional finder – Decca Navigation System – Tactical Air Navigation – Instrument Landing System – Ground Controlled Approach.

UNIT V-RADAR TRANSMITTER AND RECEIVER (9 hours)
Linear beam power tubes – Solid state RF power sources – solid state devices used in RADAR – Magnetron- crossed field amplifiers – other aspects of radar transmitter – RADAR Receiver – Receiver noise figure – super heterodyne receiver – dynamic range – RADAR Displays.

Course Number and Title

EC1114 COMMUNICATION SWITCHING TECHNIQUES

Credits / Contact Hours

3 / 45

Instructor Name

Mrs.M.Neelaveni Ammal

Textbooks, References

- Flood.J.E, "Telecommunications Switching, Traffic and Networks", Pearson Education Ltd., 1999.
- Thiagarajan Viswanathan, "Telecommunication Switching Systems and Network"s, Prentice Hall of India Pvt. Ltd, 1992.

Purpose

To learn the basic principles of switching, signaling, and traffic in the context of telecommunication networks.

Prerequisites	Co-requisites
MA1024 & EC1018	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. To study the concepts of message switching, circuit switching, strowger switching, crossbar switching, electronic switching, and digital switching.
2. To understand the problems of congestion, queuing, and to study methods like Grade of Service, and Blocking Probability to provide an estimate of the amount of traffic present in various systems.
3. To solve problems in single-stage networks, strict-sense non-blocking networks, and sectionalized switching networks.
4. To study concepts like Reliability, Availability, and Security in various types of switching systems.
5. To learn the different kinds of signaling, circuit and packet switching techniques.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X		X		X						
Mapping of instructional objectives with student outcome	1,4,5		4		2,3,4,5						

List of Topics Covered

UNIT I-BASIC SWITCHING SYSTEMS FOR TELECOMMUNICATION (9 hours)
Crossbar switching – Electronic space division switching – Time division switching – Time multiplexed switching – n-stage combination switching - hybrid time and space division multiplexes.

UNIT II-TRAFFIC ENGINEERING (9 hours)
Congestion – Network traffic load and Parameters – Traffic measurement – Lost-call system – Grade of Service and Blocking probability – Modeling switching systems – Incoming traffic and service time characterization – Blocking models and loss estimates – Queuing systems – Simulation models.

UNIT III-SWITCHING NETWORKS (9 hours)
Single-stage networks – Gradings – Link systems – Grades of service of link systems – Application of graph theory to link systems – Use of expansion – Call packing – Rearrangeable networks – Strict-sense non-blocking networks – Sectionalized switching networks.

UNIT IV-TIME-DIVISION SWITCHING AND CONTROL OF SWITCHING SYSTEMS (9 hours)
Space and time switching – Time-division switching networks – Grades of service of time-division switching networks – Non-blocking networks – Synchronization – Call-processing functions – Common control – Reliability, availability and security – Stored program control.

UNIT V-SIGNALING AND PACKET SWITCHING (9 hours)
Customer line signaling – FDM carrier systems – PCM signaling – Inter-register signaling – Common-channel signaling principles – CCITT signaling – Digital customer line signaling – Statistical multiplexing – Local area and wide area networks – Large scale and Broadband networks.

Course Number and Title

EC1115 ASIC DESIGN

Credits / Contact Hours

3 / 45

Instructor Name

Dr.J.Selvakumar

Textbooks, References

- Smith.M.J.S, *"Application Specific Integrated Circuits",* Addison Wesley Longman Inc., 1996. (Pearson Education Reprint 2006).
- Sarafzadeh.M. and Wong.C.K, *"An Introduction to VLSI Physical Design",* McGraw Hill, 2nd Edition, 1996.
- Wolf Wayne, *"FPGA based system design",* Pearson Education, 2005.
- Design manuals of Altera, Xilinx and Actel.
- Jan M. Rabaey. Anantha Chandrakasan, Borivoje Nikolic, *"Digital Integrated Circuits",* Prentice-Hall Publication, 2nd Edition, 2002.

Purpose

The purpose of this course is to introduce the students the basics of designing and using ASIC's. The operation of tools used in the design is also explained.

Prerequisites	Co-requisites
EC1012	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. To give basic knowledge of ASIC internals.
2. To impart knowledge on ASIC types and tools used in the design.
3. To give basic understanding of tools used.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X		X	X					X	X	
Mapping of instructional objectives with student outcome	1,2		2,3	1,3					2,3	1,2	

List of Topics Covered

UNIT I-INTRODUCTION TO ASICS (9 hours)
Introduction to ASICs: Full-custom and Semi -custom ASIC – CMOS logic – ASIC library design.

UNIT II-PROGRAMMABLE ASICS (9 hours)
Programmable ASICs – Anti fuse – static RAM – EPROM and technology – Actel ACT – Xilinx LCA – Altera flex – Altera MAX Logic cells – I/O cells – Interconnects – Low level design entry: Schematic entry.

UNIT III-SIMULATION AND SYNTHESIS (9 hours)
Logic synthesis: A comparator MUX, Inside a logic synthesizer, VHDL and logic synthesis, FSM synthesis, memory synthesis – Simulation: Types of simulation – logic systems – how logic simulation works.

UNIT IV-ASIC TESTING (9 hours)

Boundary scan test – Faults – Fault simulation – Automatic test pattern generation algorithm: D-algorithm, PODEM – Built in self test.

UNIT V-ASIC CONSTURCTION (9 hours)
System partitioning – power dissipation – partitioning methods – floor planning and placement:– Routing: Global routing, detailed routing, special routing – Introduction to SOC.

Course Number and Title

EC1116 EMBEDDED C AND MICROCONTROLLER

Credits / Contact Hours

3 / 45

Instructor Name

Mr.K.Ramesh

Textbooks, References

- Andrew N Sloss, Symes.D, Wright.C, *" Arm system developers guide"*, Morgan Kauffman/ Elsevier, 2007.
- Steve Furber, *"ARM Systems-on-Chip architecture"* Addison Wesley, Reprint, 2012.
- Michael J. Pont, *"Embedded C"*, Addison Wesley, 2002.
- David Seal, *"ARM Architecture Reference Manual"*, Pearson Education, 2007.
- Jivan S. Parab, Vinod Shelake.G, Rajanish Kamot.K, and Gourish Naik.M, *"Exploring C for Microcontrollers- A Hands on Approach"*, Springer, 2007.
- www.nuvoton.com.

Purpose

The objective of the course is to provide strong foundation in ARM SOC architecture, as well as programming of ARM Microcontroller using Embedded C language, which is a great demand in the today's core industry. This course content satisfies the thrust to bridge the gap between the academic course and core industry skill set requirement.

Prerequisites	Co-requisites
Nil	EC1016A

Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. Understand fundamentals in ARM Architecture and its instruction set.
2. Appreciate the advantages in using ARM microcontrollers & systems development using ARM target boards.
3. Design systems applications using Embedded C programming.
4. Apply this knowledge to more real-time case study.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X			X						
Mapping of instructional objectives with student outcome	1-4	1-4			1-4						

List of Topics Covered

UNIT I-THE ARM PROCESSOR FUNDAMENTALS AND INSTRUCTION SET (9 hours)
ARM Register structure – Program Status register- Pipeline, Exception, Interrupts on vector table- core extension-ARM Processor families. Data processing instructions-Branch Instructions-Load-store instructions, software Interrupts-Program status resister instructions, loading instructions-ARMv5E Extensions, conditional execution.

UNIT II-THE THUMB INSTRUCTION SET AND ARM ARCHITECTURE (9 hours)
THUMB register usage, ARM-THUMB Interworking-other Branch instruction, Data Processing instruction-single register Load-store instructions- multiple register load store instruction-stack instruction-Software Interrupt instructions – ARM Processor Cores - ARM assembly language programming - writing and optimizing ARM assembly code - Instruction schedules.

UNIT III-ARCHITECTURAL SUPPORT FOR HIGH LEVEL LANGUAGE AND SYSTEM DEVELOPMENT (9 hours)
Conditional execution - looping constructs - Bit manipulation - Function and procedure - use of memory – ARM memory interface – AMBA bus architecture – Hardware system prototyping tools - the ARMulator - The JTAG BST architecture - The ARM Embedded trace - debug architecture.

UNIT IV-MEMORY HIERARCHY, EMBEDDED ARM CPU CORES AND ITS APPLICATIONS (9 hours)
Caches - Memory protection unit - Memory management unit - ARM CPU cores – The AMULET asynchronous ARM Processors. Embedded Operating Systems - Principle Components – Application case study – **VLSI Ruby II** Advanced communication processor – **nuvoTon Cortex M0 (Nu-LB-NUC140)** Microcontroller processor & its supporting tools.

UNITV-INTRODUCTION TO EMBEDDED C (9 hours)
C-looping structures – Register allocation – Function calls – Pointer aliasing – structure arrangement – bit fields – unaligned data and endianness – inline functions and inline assembly – portability issues. Embedded Systems programming in C – Binding & Running Embedded C program in Keil IDE – Dissecting the program -Building the hardware. Basic techniques for reading & writing from I/O port pins – switch bounce - LED Interfacing using Embedded C – Basics of SEOS

Course Number and Title

EC1117 CRYPTOGRAPHY AND NETWORK SECURITY

Credits / Contact Hours

3 / 45

Instructor Name

Mrs.K.Vadivukarasi

Textbooks, References

- William Stallings, *"Cryptography and Network Security",* Pearson Education, 5th Edition, New Delhi, 2011.
- Forouzan.B.A. and Mukhopadhyay.D, *"Cryptography and Network Security",* Tata Mc-Graw Hill, 2nd Edition, 2010.
- William Stallings, *"Cryptography and Network Security",* PHI, New Delhi, 2nd Edition, 1999.

Purpose

To study various aspects of Network Security Attacks, Services and Mechanisms

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. To understand the mathematical concepts of various Encryption, Authentication and Digital Signature Algorithms.
2. To standby the design of different general purpose and application specific security Protocols and standards.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X		X			X			
Mapping of instructional objectives with student outcome	1	1,2	2		1			1,2			

List of Topics Covered

UNIT I-INTRODUCTION (9 hours)
Security Services, Mechanisms and Attacks – Network Security Model-Classical Encryption Techniques – Steganography – Data Encryption Standard (DES).

UNIT II-ADVANCED BLOCK CIPHERS AND PUBLIC KEY CRYPTOSYSTEMS (9 hours)
Block cipher modes operation – Overview of IDEA, Blowfish, RC5, CAST-128 – Characteristics of advanced symmetric Block ciphers – Key Distribution – Principle – RSA algorithm – Public Key Management – Diffie Hellmen Key Exchange – X.509 Public Key Certificate Format.

UNIT III-MESSAGE AUTHENTICATION AND DIGITAL SIGNATURE (9 hours)
Message Authentication codes – MAC – HASH function – Principle of MD5, SHA-1 and HMAC algorithms-Digital Signature algorithm.

UNIT IV-NETWORK SECURITY (9 hours)
Authentication Application – Kerbros – Email Security – PGP – Network Security – IPSec – Web Security – SSL – SET.

UNIT V- SYSTEM SECURITY (9 hours)
Intrusion Detection – Password management – Malicious software – Viruses and countermeasures – Firewall Types and Configurations – Trusted System

Course Number and Title

EC1118 SATELLITE COMMUNICATION AND BROADCASTING

Credits / Contact Hours

3 / 45

Instructor Name

Ms.T.Ramya

Textbooks, References

- Dennis Roddy, *"Satellite Communications"*, Tata Mc-Graw Hill Publications, 4th Edition, 2008.
- Madhavendra Richharia, Leslie David, *"Satellite Systems for Personal Applications Concepts and Technology"*, Wiley-Blackwell, 2010.
- Wilbur L.Prichard, Henry G. Suyerhood, Ropert A. Nelson, *"Satellite Communication System Engineering"*, 2nd Edition, Pearson Education, 1993.
- Pratt, Timothy, Charles W. Bostian, *"Satellite Communication"*, John Wiley and Sons, 2nd Edition, New York, 1986.

Purpose

The main objective of this course is to make the students understand the basic concept in the field of satellite communication. This subject gives the students an opportunity to know how to place a satellite in an orbit. The students are taught about the earth and space subsystems. The satellite services like broadcasting are dealt thoroughly. This will help the student to understand and appreciate the subject.

Prerequisites	Co-requisites
EC1018	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

At the end of this course students will gain knowledge in topics such as

1. Orbital aspects involved in satellite communication.
2. Power budget calculation.
3. Satellite system and services provided.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X		X					X	
Mapping of instructional objectives with student outcome	1,2	1,3	1,3		1,2					1,3	

List of Topics Covered

UNIT I-SATELLITE ORBIT (9 hours)

Satellite orbits: Kepler's laws – Earth satellite orbiting satellite terms-Orbital elements – Orbital perturbations – Inclined Orbits – Sun synchronous orbit. **Constellation:** Geo stationary satellites – Non geostationary constellation – Launching of Geostationary satellites.

UNIT II-INK DESIGN (9 hours)
EIRP – Transmission Losses – Power Budget equation – System Noise Carrier to noise ratio – Uplink – Downlink – Effects of rain – Inter modulation Noise.

UNIT III-SPACE AND EARTH SEGMENT (9 hours)
Space Segment: Power Supply – Altitude control – Station keeping – Thermal Control – TT&C – Subsystems – Antenna subsystem –Transponders – Wideband Receiver. **Earth Segment:** receive only home TV system – Community antenna TV system.

UNIT IV-SATELLITE ACCESS (9 hours)
Single Access- Pre assigned FDMA – Demand Assigned FDMA – SPADE system- TWT amplifier operation – Downlink analysis – TDMA – reference bursts – Preamble – Postamble – Carrier recovery – Network synchronization – Pre assigned TDMA – Assigned –CDMA introduction.

UNIT V-BROADCAST AND SERVICES (9 hours)
Broadcast: DBS – Orbital Spacings- Power ratings – Frequency and Polarization – Transponder Capacity – Bit rate – MPEG – Forward Error Correction. ODU-IDU – Downlink Analysis – Uplink – Satellite Mobile services: VSAT–GPS.

Course Number and Title

EC1119 MOBILE COMPUTING

Credits / Contact Hours

3 / 45

Instructor Name

Mr.M.Mohana Sundaram

Textbooks, References

- Jochen Schiller, *"Mobile Communications"*, Pearson Education, 2nd Edition, 2002.
- Toh.C.K, *"Ad Hoc Mobile Wireless Networks: Protocols and Systems"*, Pearson Education, 2002.
- William Stallings, *"Wireless Communications and Networks"*, Pearson Education, 2nd Edition, 2002

Purpose

To understand the fundamentals and architectures of wireless communication standards and Mobile Adhoc networks.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. To study the introduction of wireless communication systems.
2. To study the specifications and functionalities of wireless protocols / standards.
3. To study the fundamentals of mobile Adhoc networks..

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X							X	X	X	
Mapping of instructional objectives with student outcome	1,2,3							1,2	2,3	1,2,3	

List of Topics Covered

UNIT I-INTRODUCTION (9 hours)
Introduction to Mobile Computing – Wireless transmission: Signal Propagation – Multiplexing – Modulation – Spread Spectrum and Cellular Systems.

UNIT II-WIRELESS PROTOCOLS (9 hours)
Infrastructure and adhoc networks – IEEE 802.11: Protocol architecture – Physical and MAC layer; Hiperlan2: Reference model and configurations – Physical layer – Data link layer & Convergence layer; Bluetooth: Protocol stack – radio layer – Baseband layer – Link manager protocol – L2CAP layer and security.

UNIT III-WIRELESS NETWORKING (9 hours)
Satellite systems – Cellular networks – Cordless systems – Wireless Local Loop – IEEE 802.16: System reference model – Protocol architecture – MAC layer & Physical layer.

UNIT IV-PACKET RADIO NETWORKS (9 hours)
Packet Radio Networks: Architecture and components of PRNETs – Routing in PRNETs – Pacing techniques – Media access and flow acknowledgement in PRNETs.

UNIT V-AD-HOC MOBILE NETWORKS (9 hours)
Types of Ad-hoc mobile communications & Host movements – Challenges facing Ad-hoc mobile networks – Problems in Ad-hoc channel access – Existing Ad-hoc MAC protocols: MACA – MACABI – PAMAs – DBTMA.

Course Number and Title

EC1120 BLUETOOTH TECHNOLOGY

Credits / Contact Hours

3 / 45

Instructor Name

Ms.A.Ramya

Textbooks, References

- Jennifer Bray and Charles F Sturman, *"Bluetooth: Connect Without Cables"*, Pearson Education, 2002.
- Stahun Farahani, *"Zigbee Wireless Networks and Transceivers"*, Elsevier Ltd, 2003.
- Jennifer Bray, Brain Senese, Gordon McNutt and Bill Munday, *"Bluetooth Application Developer's Guide"*, Syngress Media, 2001.
- Micheal Mille, *"Discovering Bluetooth"*, Sybex Incorporation, 2001.

Purpose

To Study the concepts of Bluetooth Technology.

Prerequisites	Co-requisites

Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. To study the fundamental concepts of Bluetooth module.
2. To analyze the protocol operation.
3. To gain knowledge on various low power modes and Quality of Service parameters.
4. To understand the testing methodology and the related standards.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X		X					X			
Mapping of instructional objectives with student outcome	1		2					3			

List of Topics Covered

UNIT I-THE BLUETOOTH MODULE (8 hours)
Introduction-overview - the Bluetooth module-antennas- Base band - Introduction-Bluetooth device address –Masters, slaves, and Pico nets-system timing-physical links-Bluetooth packet structure-logical channels-frequency hopping.

UNIT II-THE LINK CONTROLLER (10 hours)
The link controller-link control protocol-link controller operation-Pico net, scatter net operation-master/slave role switching-base band/link controller architectural overview -link manager-the host controller interface.

UNIT III-THE BLUETOOTH HOST (10 hours)
The bluetooth host-logical link control and adaptation protocol –RFCOMM- the service discovery protocol – the wireless access protocol-OBEX and IrDA-telephony control protocol.

UNIT IV-CROSS LAYER FUNCTIONS (8 hours)
Cross layer functions-Encryption and security-low power operations-controlling low power modes-hold mode-sniff mode-park mode-quality of service-managing Bluetooth devices.

UNITV-ZIGBEE NETOWRKS (9 hours)
Zigbee communication basics – Zigbee network layers and their functions – Zigbee MAC series, MAC frame format – Transceiver building block – Receiver sensitivity – 2.4 GHz and 868/915 MHz operation – FCC regulations – Applications – Home automation – Healthcare Industrial automation.

Course Number and Title

EC1121 COMMUNICATION NETWORK PROTOCOLS

Credits / Contact Hours

3 / 45

Instructor Name

Mrs.S.T.Aarthy

Textbooks, References

- Douglas E. Comer, *"Internetworking with TCP/IP", Principles, Protocols and Architectures", Pearson Education, Vol. I, 5th Edition, 2006.*
- Behrouz A. Forouzan, *"TCP/IP protocol suite",* Tata McGraw Hill, 4th Edition, 2010.
- Peterson (David. M.)., *"TCP/IP Networking",* Tata McGraw Hill, 5th Edition, 2011.
- Douglas E. Comer., *"Computer Networks and Internet",* Addison Wesley, 4th Edition, 2011.

Purpose

The course introduces the students to the emerging areas in Internetworking. This will enable the students to acquire a solid understanding of the different components involved in the seamless working of the Internet.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. To learn the technology of Data Networking.
2. To learn Internet addressing and routing methods.
3. To study Client Server model and Internet Security.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
			X						X		X
Mapping of instructional objectives with student outcome			1,2						1-3		2,3

List of Topics Covered

UNIT I-REVIEW OF UNDERLYING NETWORK TECHNOLOGIES (6 hours)
Motivation for internetworking- Internet Services- Introduction to Wide Area and Local Area Networks- Ethernet Technology- FDDI- Internetworking concepts and Architecture model.

UNIT II-INTERNET ADDRESSES (10 hours)
Classful Internet Addresses- Subnetting and Supernetting- ARP- ARP Packet format, Encapsulation & operation- ARP over ATM- Proxy ARP- RARP-ICMP –ICMP message types.

UNIT III-ROUTING (11 hours)
Internet Protocol-Connectionless Datagram Delivery- Forwarding IP Datagrams-IPV4 data grams -Packet format – Routing Architecture –Core ,Peers and Algorithms-Routing between peers- Border Gateway Protocol(BGP)-Routing within Autonomous systems-Routing Information Protocol- RIP-OSPF.

UNIT IV-CLIENT SERVER MODEL AND SOCKET INTERFACE (9 hours)
The client server model- UDP echo server- Time and date service-Socket abstraction- Specifying local and destination addresses- Sending and Receiving data-Handling multiple services, Domain name system – Distribution of name space-DNS resolution – DNS messages and records.

UNIT V-INTERNET SECURITY AND IPV6 (9 hours)
Protecting resources - IPSec- Authentication Header-Encapsulating security payload – Secure sockets-Secure Socket Layer (SSL) - Firewalls and Internet access- Packet filter firewall- Proxy firewall- IPv6-Features and packet format-IPV6 Source routing types- Comparison between IPV4 and IPV6.

Course Number and Title

EC1122 PHOTONICS AND OPTICAL NETWORKS

Credits / Contact Hours

3 / 45

Instructor Name

Dr.Shanthi prince

Textbooks, References

- Rajiv Ramaswamy, Kumar N. Sivaranjan and Galen H. Sasaki, "Optical Networks – A practical perspective", 3rd edition, Elsevier, 2010.
- Keiser, *"Optical Fiber Communication Systems"*, 4th edition, Tata McGrawHill. Edition, 2010.
- Joseph C.Palais *"Fiber Optic Communications"*, Fifth edition, Seventh impression, Pearson, 2012.
- Djafar.K. Mynbaev Lowell and Scheiner, *"Fiber Optic Communication Technology"*, Sixth impression, Pearson Education Asia, 9th impression, 2011.

Purpose

The course will provide students with the fundamental concepts in photonics, which have increasing applications in the area of information technology and communication, healthcare and life science, optical sensing, lightning, energy and manufacturing. The course will focus on the applications in optical communication and networks.

Prerequisites	Co-requisites
EC1022	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. To understand the interaction of photons and matter, the propagation of light in waveguides and optical fibers, the operation principles of light emitting diodes, semiconductor lasers, detectors amplifiers and network

components.

2. To understand the operating principles of optical communication systems including wavelength division multiplexing, Time division multiplexing and code division multiplexing.
3. To design simple optical communication link.
4. To describe the main types of architectures, protocols and standards governing modern optical networks..

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X								
Mapping of instructional objectives with student outcome	1,2	3	3,4								

List of Topics Covered

UNIT I-INTRODUCTION TO PHOTONICS (6 hours)
Review of wave nature and particle nature of light, Interaction of light with matter-emission and absorption of radiation. Review of optics- Reflection and refraction of plane waves; Fresnel's formulas, Interference and interferometers, Diffraction, Optical coherence, Polarization of light.

UNIT II-OPTICAL FIBER WAVEGUIDES, SOURCES AND DETECTORS (12 hours)
The propagation of light in optical waveguides, Classification of optical fibers, Single mode fiber, Material and Waveguide Dispersion, Dispersion shifted fiber, Signal Attenuation. Introduction to Non linear fiber optics. Laser Fundamentals: Stimulated and spontaneous Emission, Einstein relations, Optical feedback, threshold condition, Injection Laser Diode (ILD), Laser Modes. Photodetection, PIN and Avalanche Photo diode (APD), Quantum Efficiency, Responsivity and Speed of Response , Noise mechanism in photo detectors.

UNIT III-OPTICAL COMPONENTS AND SYSTEM DESIGN (9 hours)
Principle and Operation of couplers/splitters, WDM MUX/DEMUX - AWG, Isolators, Circulators, Fabry Perot Filters, Mach-Zehnder Interferometer, optical switches, EDFA, Semiconductor Optical Amplifier. Optical Link Design: Power penalty -Point- to- point links – System considerations – Link Power budget – Rise time budget.

UNIT IV-OPTICAL NETWORKS ARCHITECTURE (9 hours)
Optical network concepts – Topology – Metropolitan – Area Networks - SONET/SDH: – Optical specifications – SONET frame structure –Optical transport network - Broadcast and Select networks.

UNIT V-WDM NETWORK DESIGN (9 hours)
WDM network elements, WDM network design - Cost tradeoffs, virtual Topology design, Routing and wavelength assignment, statistical dimensioning models.

Course Number and Title

EC1123 RF SYSTEM DESIGN FOR WIRELESS COMMUNICATIONS

Credits / Contact Hours

3 / 45

Instructor Name

Mrs.J.Manjula

Textbooks, References

- Allan W. Scott, Rex Frobenius, *"RF Measurements for Cellular Phones and Wireless Data Systems"*, John

Wiley & Sons Publications, 2008.
- Qi Zheng Gu, *"RF System Design of Transceivers for Wireless Communications",* Nokia Mobile Phones,Inc. Springer, 2005.
- Joseph. J. Carr, *" RF Components and Circuits",* Newnes Publications, First edition, 2002.
- Behzad Razavi, *"RF Microelectronics",* Prentice Hall PTR, 1998.

Purpose

To learn about the specifications, design and analysis of RF systems for wireless communication applications.

Prerequisites	Co-requisites
EC1026	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. RF circuits and system specifications and analysis.
2. Transceiver architectures.
3. Overall picture of Wireless Transceivers.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X										
Mapping of instructional objectives with student outcome	1-3										

List of Topics Covered

UNIT I-INTRODUCTION TO RF AND WIRELESS SYSTEMS (9 hours)
Characteristics of RF signals, Wireless communication systems, Wireless Standards, Introduction to Multiple Access Techniques FDMA, TDMA,CDMA and OFDMA.

UNIT II-RF COMPONENTS AND CIRCUITS (9 hours)
Components: Capacitors, Inductors, Tuning and Matching.
Circuits: Low Noise Amplifiers, Mixers, Oscillators, Frequency Synthesizers, Power Amplifiers.

UNIT III-RADIO ARCHITECTURES (9 hours)
Two step transmitter Architecture, Homodyne Receiver Architecture, Super heterodyne Architecture, Direct Conversion (Zero IF) Architecture, Low IF Architecture, Digital IF Receivers and Band Pass sampling Radio Architectures.
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UNIT IV-SYSTEM ANALYSIS AND DESIGN (9 hours)
Receiver: Sensitivity & Noise Figure of Receiver, Inter modulation Characteristics, Single Tone Desensitization, Adjacent/Alternate channel selectivity, Receiver Dynamic Range and AGC system, System design and performance evaluation.
Transmitter: Transmitter power and spectrum, Modulation accuracy, Adjacent and alternate channel power, Noise emission calculation.

UNIT V-APPLICATIONS AND CASE STUDIES (9 hours)
Multimode and Multiband Super heterodyne Transceiver, Direct Conversion Transceiver
Case studies: FM Receiver, Pager Receiver, DECT transceiver, GSM Transceiver, Wireless LAN RFIC, Four band GSM, GPRS, EDGE handset.

Course Number and Title

EC1124 NEURAL NETWORK AND FUZZY LOGIC

Credits / Contact Hours

3 / 45

Instructor Name

Mr.B.Srinath

Textbooks, References

- Freeman J.A. and Skapura B.M., "Neural Networks, Algorithms Applications and Programming Techniques", Addison-Wesely, 1991.
- Martin T.Hagan, "Neural network design", Cengage publications, 2010.
- George J Klir and Tina A Folger, " Fuzzy sets, uncertainty and information", Prentice Hall of India, (reprint) 2012
- Laurene Fausett, "Fundamentals of Neural Networks: Architecture, Algorithms and Applications", Pearson Education, (reprint) 2006.
- Zimmerman.H.J, "Fuzzy set theory and its Applications", Kluwer academic Publishers, 2001.

Purpose

This course provides a way to study the Artificial Neural Networks and Fuzzy Logic concepts.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. To learn the various architectures of ANN.
2. To learn the methods of representing information in ANN like self organizing networks, associative and competitive learning.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X				X						
Mapping of instructional objectives with student outcome	1,2				1,2						

List of Topics Covered

UNIT I-INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS (9 hours)
Neuro-physiology - General Processing Element - ADALINE - LMS learning rule – MADALINE – XOR Problem – MLP - Back Propagation Network - Updation of output and hidden layer weights - application of BPN.

UNIT II-ASSOCIATIVE MEMORY & CPN (9 hours)
Associative memory - Bi-directional Associative Memory – Hopfield memory - traveling sales man problem Annealing, Boltzmann machine - learning – application - Counter Propagation network –architecture – training – Applications.

UNIT III-SELF ORGANIZING MAP & ART (9 hours)
Self-organizing map - learning algorithm - feature map classifier – applications - architecture of Adaptive Resonance Theory - pattern matching in ART network.

UNIT IV-CRISP SETS AND FUZZY SETS (9 hours)
Introduction – crisp sets an overview – the notion of fuzzy sets –Basic concepts of fuzzy sets – classical logic an overview – Fuzzy logic- Operations on fuzzy sets - fuzzy complement – fuzzy union – fuzzy intersection – combinations of operations – general aggregation operations.

UNIT V-FUZZY RELATIONS (9 hours)
Crisp and fuzzy relations – binary relations – binary relations on a single set– equivalence and similarity relations – Compatibility or tolerance relations– orderings – morphisms-fuzzy relation equations.

Course Number and Title

EC1125 DIGITAL LOGIC DESIGN WITH PLDS AND VHDL

Credits / Contact Hours

3 / 45

Instructor Name

Mr.R.Prithiviraj

Textbooks, References

- Charles. H. Roth, Jr, *"Digital Systems Design using VHDL"*, CENGAGE Learning, Third Indian Reprint, 2010.
- Zwolinski, *"Digital System Design With VHDL"*, 2/E, Pearson Education India, 2004.
- Ian Grout, *"Digital Systems Design with FPGAs and CPLDs"*, Newness, 2011.

Purpose

Learning design of digital circuits is a fundamental necessity for designing practical systems. To develop standard design practices for digital circuits at a higher level of abstraction a hardware description language is useful. This subject provides necessary instruments to achieve that goal.

Prerequisites	Co-requisites
EC1029	Nil

Required, Elective or Selected Elective (as per Table 5.1a)

Selected Elective

Instructional Objectives

1. Apply advanced theorems to simplify the design aspects of various practical circuits.
2. Design State Machines.
3. Implement various digital circuits using Programmable Logic Devices.
4. Implement combinational and sequential circuits using VHDL.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X			X						
Mapping of instructional objectives with student outcome		1- 4			1-4						

List of Topics Covered

UNIT I-ADVANCED TOPICS IN BOOLEAN ALGEBRA (8 hours)
Shannon's Expansion theorem and its application ,Consensus theorem, Reed-Muller Expansion technique, Multiplexer logic as function generators, Implementation of Multiple output logic functions, Static and Dynamic hazards, Design of static hazard-free and dynamic hazard-free logic circuits.

UNIT II-SEQUENTIAL CIRCUIT DESIGN (9 hours)
Mealy and Moore machines, clocked synchronous sequential circuit design procedure-state diagrams-state table-state reduction-state assignment, Incompletely Specified Sequential Machines.

UNIT III-DESIGN WITH PROGRAMMABLE LOGIC DEVICES (9 Hours)
Basic concepts, PROM as PLD, Programmable Array Logic (PAL), Programmable Logic Array (PLA), Design of combinational and sequential circuits using PLD's, Complex PLD (CPLD), Introduction to Field Programmable Gate Arrays (FPGA), Xilinx FPGAs-Xilinx 3000 series and 4000 series FPGA.

UNIT IV-INTRODUCTION TO VHDL (9 Hours)
VHDL Description of combination circuits, VHDL Modules- entity and architecture description, Sequential statements and VHDL processes, VHDL Data types and Operators, Concurrent and Sequential Assignment Statements(All types), Different types of Modeling in VHDL – Behavioral, dataflow and structural modeling, Variables, Signals and Constants in VHDL, Package in VHDL.

UNIT V-DIGITAL DESIGN WITH VHDL (10 HOURS)
Combinational Circuit Design using Structural, behavioral and data flow modeling (Circuits like Arithmetic circuits, decoders, encoders, multiplexers, demultiplexers, code converters, 4-bit binary adders, BCD adder, comparator, ALU etc.,), Design of Sequential Elements, Registers, Counters and Synchronous Sequential Circuits using VHDL.

APPENDIX A.2 – 2007-08

B.TECH. - ELECTRONICS AND COMMUNICATION ENGINEERING

PROGRAM CURRICULUM AND SYLLABUS

A.2.1 Mathematics and Basic Sciences Courses

Mathematics	
2007-08 Curriculum Course Code	**Name of the Course**
MA0101	Mathematics – I
MA0102	Mathematics – II
MA0211	Mathematics – III
MA0232	Probability and Random Processes
MA0321	Discrete Mathematics
MA0471	Linear Algebra and Statistics
Basic Sciences	
2007-08 Curriculum Course Code	**Name of the Course**
PH0101	Physics
CY0101	Chemistry
GE0105	Computer Literacy
PH0103	Physics Laboratory
CY0103	Chemistry Laboratory
PH0102	Materials Science
GE0102	Biology for Engineers
GE0104	Principles of Environmental Science
CS0140	Computer Practice

MATHEMATICS

Course Number and Title

MA0101 MATHEMATICS - I

Credits / Contact Hours

4 / 75

Instructor Name

Dr.K.Ganesan

Textbooks, References

- Grewal B.S, Higher Engg Maths, Khanna Publications, 38th Edition., Veerajan, T., Engineering Mathematics, Tata McGraw Hill Publishing Co., New Delhi,2000.
- Dr.V.Ramamurthy & Dr. Sundarammal Kesavan," Engineering Mathematics" – Vol I & II Anuradha Publications, Revised Edition 2006.
- Kreyszig.E, "Advanced Engineering Mathematics", 8th edition, John Wiley & Sons. Singapore,2001.
- Kandasamy P etal. "Engineering Mathematics", Vol.I (4th revised edition), S.Chand &Co., New Delhi,2000.
- Narayanan S., Manicavachagom Pillay T.K., Ramanaiah G., "Advanced Mathematics for Engineering students", Volume I (2nd edition), S.Viswanathan Printers and Publishers, 1992.
- Venkataraman M.K., "Engineering Mathematics" – First Year (2nd edition), National Publishing Co., Chennai,2000.

Purpose

To impart analytical ability in solving mathematical problems as applied to the respective branches of Engineering.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

At the end of the course, student should be able

1. To apply advanced matrix knowledge to Engineering problems.
2. To improve their ability in solving geometrical applications of differential calculus problems.
3. To equip themselves familiar with the functions of several variables.
4. To familiarize with the applications of differential equations.
5. To expose to the concept of three dimensional analytical geometry

Student Outcomes from Criterion 3 covered by this Course

	a	b	c	d	e	f	g	h	i	j	k
Student outcome	X				X						
Mapping of instructional objectives with student outcome	1-5				1-5						

List of Topics Covered

UNIT 1 MATRICES (9 hours)

Characteristic equation – Eigen values and eigen vectors of a real matrix – Properties of eigen values – Caley- Hamilton

theorem – Orthogonal reduction of a symmetric matrix to diagonal form – Orthogonal matrices – Reduction of quadratic form to canonical form by orthogonal transformations.

UNIT 2 GEOMETRICAL APPLICATIONS OF DIFFERENTIAL CALCULUS (9 hours)
Curvature – Cartesian and polar coordinates – Circle of curvature – Involutes and Evolutes – Envelopes – Properties of envelopes.

UNIT 3 FUNCTIONS OF SEVERAL VARIABLES (9 hours)
Function of two variables – Partial derivatives – Total differential – Taylor's expansion – Maxima and Minima – Constrained Maxima and Minima by Lagrangean Multiplier method – Jacobians

UNIT 4 ORDINARY DIFFERENTIAL EQUATIONS (9 hours)
Simultaneous first order linear equations with constant coefficients – Linear equations of second order with constant and variable coefficients – Homogeneous equation of Euler type – Equations reducible to homogeneous form.

UNIT 5 THREE DIMENSIONAL ANALYTICAL GEOMETRY (9 hours)
Direction cosines and ratios – Angle between two lines – Equation of a plane – Equation of a straight line – Co-planar lines – Shortest distance between skew lines – Sphere – Tangent plane – Plane section of a sphere – Orthogonal spheres.

Course Number and Title

MA0102 MATHEMATICS II

Credits / Contact Hours

4 / 75

Instructor Name

Dr.K.Ganesan

Textbooks, References

- Grewal B.S, *Higher Engg Maths*, Khanna Publications, 38th Edition.
- Veerajan, T., *Engineering Mathematics*, Tata McGraw Hill Publishing Co., New Delhi, 2000.
- Dr.V.Ramamurthy & Dr. Sundarammal Kesavan, *Engineering Mathematics – Vol I & II* Anuradha Publications, Revised Edition 2006.
- Kreyszig.E, *Advanced Engineering Mathematics, 8th edition*, John Wiley & Sons. Singapore,2001.
- Kandasamy P etal. *Engineering Mathematics, Vol.I (4th revised edition)*, S.Chand &Co., New Delhi,2000.
- Narayanan S., Manicavachagom Pillay T.K., Ramanaiah G., *Advanced Mathematics for Engineering students, Volume I (2nd edition)*, S.Viswanathan Printers and Publishers, 1992.
- Venkataraman M.K., *Engineering Mathematics – First Year (2nd edition)*, National Publishing Co., Chennai, 2000.

Purpose

To impart analytical ability in solving mathematical problems as applied to the respective branches of Engineering.

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. At the conclusion of the course, students should have understood Multiple Integrals , Laplace Transforms, Vector Calculus and Functions of a complex variable including contour integration and able to apply to all their Engineering problems.

Student Outcomes from Criterion 3 covered by this Course

	a	b	c	d	e	f	g	h	i	j	k
Student outcome	X				X						
Mapping of instructional objectives with student outcome	1				1						

List of Topics Covered

UNIT 1 MULTIPLE INTEGRALS (9 hours)
Double integration in Cartesian and polar coordinates – Change of order of integration – Area as a double integral – Triple integration in Cartesian coordinates.

UNIT 2 LAPLACE TRANSFORMS (9 hours)
Transforms of simple functions – Basic operational properties – Transforms of derivatives and integrals – Initial and final value theorems – Inverse transforms – Convolution theorem – periodic functions – Applications of Laplace transforms for solving linear ordinary differential equations up to second order with constant coefficients only.

UNIT 3 VECTOR CALCULUS (9 hours)
Gradient, divergence, curl – Solenoidal and irrotational fields – Vector identities (without proof) – Directional derivatives – Line, surface and volume integrals – Statements of Green's, Gauss divergence and Stroke's theorems only – Verification and applications to cubes and parallelopipeds only.

UNIT 4 ANALYTIC FUNCTIONS (9 hours)
Definition of Analytic Function – Cauchy Riemann equations – Properties of analytic functions - Determination of harmonic conjugate – Milne-Thomson's method – Conformal mappings: 1/z, az az+b and bilinear transformation.

UNIT 5 COMPLEX INTEGRATION (9 hours)
Line integral – Cauchy's integral theorem (without proof) – Cauchy's integral formulae (with proof) – application of Cauchy's integral formulae – Taylor's and Laurent's expansions (statements only) – Singularities – Poles and Residues – Cauchy's residue theorem (with proof) - Evaluation of line integrals.

TUTORIAL 30 hours
TOTAL 75 hours

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Course Number and Title

MA0211 MATHEMATICS – III

Credits / Contact Hours

4 / 75

Instructor Name

Dr.K.Ganesan

Textbooks, References

- Grewal B.S., "*Higher Engineering Mathematics*"36th edition, Khanna Publishers, 2002.
- Kreyszig.E, "*Advanced Engineering Mathematics*", 8th edition, John Wiley & Sons, Singapore, 2000.
- Kandasamy P etal. "*Engineering Mathematics*", Vol. II & Vol. III (4th revised edition), S.Chand & Co., New Delhi, 2000.
- Narayanan S., Manicavachagom Pillay T.K., Ramanaiah G., "*Advanced Mathematics for Engineering students*", Volume II & III (2nd edition), S.Viswanathan Printers and Publishers, 1992.
- Venkataraman M.K., "*Engineering Mathematics*" – Vol.III – A & B (13th edition), National Publishing Co., Chennai, 1998.

Purpose

To equip the students with the knowledge of slightly advanced topics of mathematics.

Prerequisites	Co-requisites
MA0101, MA0102	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

After the completion of the course, the students should be able to apply

1. The rudiments of Fourier series
2. The theory and problems of PDE
3. The applications of PDE to boundary value problems.
4. Fourier transforms and to their branches of engineering.

Student Outcomes from Criterion 3 covered by this Course

	a	b	c	d	e	f	g	h	i	j	k
Student outcome	X				X						
Mapping of instructional objectives with student outcome	1-4				1-4						

List of Topics Covered

UNIT 1 FOURIER SERIES (9 hours)

Dirichlet's conditions – General Fourier series – Half range Sine and Cosine series – Parseval's identity – Harmonic

Analysis.

UNIT 2 PARTIAL DIFFERENTIAL EQUATIONS (9 hours)
Formation – Solution of standard types of first order equations – Lagrange's equation – Linear homogeneous partial differential equations of second and higher order with constant coefficients - Classification of second order linear partial differential equations.

UNIT 3 ONE DIMENSIONAL WAVE & HEAT EQUATION (9 hours)
Boundary and initial value problems - Transverse vibrations of elastic string with fixed ends – Fourier series solutions – One dimensional heat equation - Steady and transient states – problems.

UNIT 4 TWO DIMENSIONAL HEAT EQUATION (9 hours)
Two dimensional heat equation – Steady state heat flow equation – Laplace Equation Cartesian form – Laplace equation in polar form – heat flow in circular plates including annulus - Fourier series solution.

UNIT 5 FOURIER TRANSFORMS (9 hours)
Statement of Fourier integral theorem – Fourier transform pairs – Fourier Sine and Cosine transforms – Properties – Transforms of simple functions – Convolution theorem – Parseval's identity.

TUTORIAL 30 hours
TOTAL 75 hours

Course Number and Title

MA0232 PROBABILITY AND RANDOM PROCESSES

Credits / Contact Hours

4 / 60

Instructor Name

Dr.K.Ganesan

Textbooks, References

- T. Veerarajan, "Probability, Statistics and Random Processes", Tata McGraw – Hill Publishing Company Limited, New Delhi, 2004.
- Trivedi K S, " *Probability and Statistics with reliability, Queueing and Computer Science Applications*", Prentice Hall of India, New Delhi, 1984

Purpose

To introduce the students to the idea of probability and random process, an important mathematical tool in signal processing.

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

At the end of the course, the students should be fully equipped with the knowledge of

1. Probability and Random variables
2. 2 – D Random variables
3. The concepts of Random process
4. The Correlation Functions and
5. The applications of Fourier Transforms like Spectral Density and others.

Student Outcomes from Criterion 3 covered by this Course

	a	b	c	d	e	f	g	h	i	j	k
Student outcome	X				X						
Mapping of instructional objectives with student outcome	1-5				1-5						

List of Topics Covered

UNIT 1 PROBABILITY AND RANDOM VARIABLES: (9 hours)
Probability theory – Random Variables – Moments – Moment generating function – Binomial, Poisson, Geometric, Exponential, Normal distributions, functions of Random Variables, Chebyshev inequality.

UNIT 2 TWO DIMENSIONAL RANDOM VARIABLES (9 hours)
Two dimensional Random Variables – Marginal and conditional distributions – Transformation of Random Variables – central limit theorem – simple problems.

UNIT 3 RANDOM PROCESSES (9 hours)
Classification of Random processes – Stationarity – WSS and SSS processes – Poisson Random process – Pure Birth process – Renewal Process – Markov Chain and transition probabilities.

UNIT 4 CORRELATION FUNCTIONS: (9 hours)
Autocorrelation function and its properties – Cross Correlation function and its properties – Linear System with Random inspects.

UNIT 5 SPECTRAL DENSITY (9 hours)
Power spectral Density Function – Properties – System in the form of convolution – Unit Impulse Response of the System – Einstein – Weiner-Khinchine Relationship – Cross Power Density Spectrum – Properties.

TUTORIAL 15hours
TOTAL 60hours

Course Number and Title

MA0321 DISCRETE MATHEMATICS

Credits / Contact Hours

3 / 60

Instructor Name

Dr.K.Ganesan

Textbooks, References

- Lan Doerr and Kenneth Levasseur, "Applied Discrete Structures for Computer Science", Galgotia Publications (P) Ltd.(**Unit I** - Chapter 3 Section 3.1 - 3.8, **Unit II** - Chapter 2, Chapter 4 Section 4.2 - 4.5, Chapter 6 Section 6.1, 6.2, 6.4, 6.5, Chapter 7, **Unit III** - Chapter 8 Section 8.3, 8.4 Chapter 11 Section 11.25 Chapter 15 Section 15.1, 15.2, 15.4 15.5, **UnitIV** - Chapter 9, Section 9.1 - 9.5, Chapter 10 Section 10.1 - 10.5, **Unit V** - Chapter 13 Section 13.1-13.3, 13.7, Chapter 14 Section 14.2, 14.3)
- Tremblay J.P. and Manohar R., "Discrete Mathematical Structures with applications to Computer Science", Tata Mc Graw Hill Publishing Co., 2000
- Venkataraman M.K., etal. "Discrete Mathematics", National Publishing Co.
- Seymour Lipschutz, Marc Lars Lipson, "Discrete Mathematics", Mc Graw Hill Inc., 1992
- Kolman and Busby, "Discrete Mathematical Structures for Computer Science", 1987
- Iyengar N.Ch.S.N. etal," Discrete Mathematics", Vikas Publishing Ltd.
- Sundaresan V. etal. "Discrete Mathematics", A.R. Publications
- Solairaju etal. "Discrete Mathematics", Anuradha Publications

Purpose

To impart analytical ability to describe, analyze and solving mathematical problems as applied to the respective branches of Engineering in a logical and systematic fashion.

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

6. To understand Logic and mathematical reasoning and to count /enumerate objects in a systematic way. To understand Mathematical induction and recursion.
7. To understand Set theory, relations and functions and to Read, understand and construct mathematical arguments
8. To understand Recurrence Relation, Generating functions and Algebraic Systems and their applications in coding theory - Group codes.

Student Outcomes from Criterion 3 covered by this Course

	a	b	c	d	e	f	g	h	i	j	k
Student outcome	X				X						
Mapping of instructional objectives with student outcome	1-3				1-3						

List of Topics Covered

UNIT-I MATHEMATICAL LOGIC (12 hours)

Propositions and Logical operators - Truth tables and propositions generated by a set - Equivalence and Implication - Tautologies - Laws of logic - Proofs in Propositional calculus - Direct proofs - Conditional conclusions - Indirect proofs - Propositions over a universe - Mathematical Induction - The existential and universal quantifiers - Predicate calculus including theory of inference.

UNIT-II SET THEORY (12 hours)

Laws of Set theory - Partition of a set - Minsets - The duality principle - Relations - Graphs of relations - Hasse diagram - Matrices of relations - Closure operations on relations - Warshall's algorithm - Functions - Combinatorics.

UNIT-III RECURRENCE RELATION & ALGEBRAIC SYSTEMS (12 hours)

Recurrence relations - Solving a recurrence relation - Recurrence relations obtained from solutions - Generating functions - Solution of a recurrence relation using generating functions - Closed form expression for generating function. Groups - Cyclic groups and subgroups - Normal subgroups - Coding theory - Group codes.

UNIT-IV GRAPH THEORY (12 hours)

Basic concepts - Data structures for graphs - Connectivity - Traversals graph optimization - The traveling salesman problem and networks and the maximum flow problem - Trees - Spanning Trees - Rooted trees - Binary Trees - Kruskal's algorithm - Traversals of Binary trees.

UNIT-V BOOLEAN ALGEBRA & FORMAL LANGUAGES (12 hours)

Boolean algebra - Posets - Lattices - Application of Boolean Algebra to switching theory. Languages - Recognition and generation - Phase structure grammars and languages - Finite state Machine - Recognition in regular languages.

Course Number and Title

MA0471 LINEAR ALGEBRA AND STATISTICS

Credits / Contact Hours

4 / 60

Instructor Name

Dr.K.Ganesan

Textbooks, References

- S.C.Gupta & V.K.Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand and Sons, New Delhi,11th edition, 2007.
- K.S.Narayanan and T.K.Manicavachagam Pillai, S.Viswanathan "Modern Algebra. Vo II"(Printers & Publisher)1983.

REFERENCES

- Dr.S.Kandasamy & others S.Chand,"Engineering Maths (Vol III)", Delhi,April-2005.
- S.C.Gupta & V.K.Kapoor, Fundamentals of Applied Statistics, Sultan Chand and Sons, New Delhi, 2003.
- W. Ewans & G.Grant, Statistical Methods in Bio informatics - An Introduction

Purpose

To develop an understanding of the methods of probability and statistics which are used to model engineering problems.

Prerequisites	Co-requisites
Nil	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To learn about vector space and linear transformations.
2. To learn about inner product space
3. To have knowledge in regression and correlation
4. To learn about testing of hypothesis
5. To learn about ANOVA.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X				X						
Mapping of instructional objectives with student outcome	1-5				1-5						

List of Topics Covered

UNIT I VECTOR SPACE AND LINEAR TRANSFORMATION (12 Hours)

Vector space-Subspaces-Linear combination, Linear span-Linear independence and dependence-Basis and Dimension-Algebra of linear transformations. .(Theorems without proof)

UNIT II INNER PRODUCT SPACE (12 Hours)
Inner product space-Normed Vector Space-Orthogonality-Grahm-Schmidt Orthoginalisation Process. (Theorems without proof)

UNIT III REGRESSION AND CORRELATION (12 Hours)
Regression methods - Principle of least squares - Correlation - Multiple and Partial correlation - Linear and non-linear regression - Multiple linear regression.

UNIT IV TESTING OF HYPOTHESES (12 Hours)
Large sample tests based on Normal Distribution – Small sample tests based on t, F distributions – Chi square tests for goodness of fit and independence of attributes.

UNIT V ANALYSIS OF VARIANCES (12 Hours)
Introduction to test based on F-distribution - One way and Two way classification of ANOVA - Completely Randomised Design - Randomised Block Design - Latin square Design

Course Number and Title

PH0101 PHYSICS

Credits / Contact Hours

3 / 45

Instructor Name

Dr. Krishna Mohan

Textbooks, References

- Arumugam, M., “Engineering Physics”, 2nd edition, Anuradha Publishers, Kumbakonam, 2003.
- Gaur and Gupta, “Engineering Physics”, 7th edition, Dhandapani and Sons, New Delhi, 1997.
- Thiruvadigal, J. D., Ponnusamy, S., Vasuhi, P. S. and Kumar, C., “Physics for Technologists”, 5th edition,

Vibrant Publication, Chennai, 2007.
- Vasudeva, A. S., "Modern Engineering Physics", revised edition, S. Chand and Company Ltd., New Delhi, 2004.
- Vasudevan, D. N., "Fundamentals of Magnetism and Electricity", 11th edition, S. Chand and Company Ltd., New Delhi, 1983.
- Nair, K. P. R., "Atoms, Molecules and Lasers", Narosa Publishing House, New Delhi, 2006.
- Pillai, S. O., "Solid State Physics",5th edition, New Age International (P) Ltd., New Delhi, 2004.
- Khan, B. H., "Non-Conventional Energy Resource"s, Mechanical Engineering Series, Tata McGraw Hill Publishing Company Ltd., New Delhi, 2006.

Purpose

The purpose of this course is to develop scientific temper and analytical capability through learning physical concepts and their applications in engineering and technology. Comprehension of some basic physical concepts will enable the students to logically solve engineering problems.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

At the end of the course, the student will be able to:
1. Understand the general scientific concepts required for technology,
2. Apply the concepts in solving engineering problems,
3. Explain scientifically the new developments in engineering and technology, and
4. Get familiarized with the concepts, theories, and models behind many technological applications.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X		X		X						X
Mapping of instructional objectives with student outcome	1		4		2						3

List of Topics Covered

UNIT 1 PROPERTIES OF MATTER AND SOUND (9 hours)
Properties of Matter: Hooke's law – Twisting couple on a cylinder – Shafts – Torsion pendulum – Bending of beams – Bending moment – Uniform bending and non-uniform bending – I shape girder. **Sound:** Shock waves – Mach number (simple problems) – Ultrasonic production (magnetostriction and piezoelectric methods) and application – Acoustics of buildings – Sources and impacts of noise – Sound level meter – Control of noise pollution.

UNIT 2 ELECTROMAGNETISM AND MICROWAVES (9 hours)
Electromagnetism: Divergence, curl and gradient – Maxwell's equations – Wave equation for electromagnetic waves – Propagation in free space – Poynting vector – Rectangular and circular wave guides. **Microwaves:** Properties and applications – Generation by magnetron and reflex klystron oscillator – Traveling wave tube – Biological effects.

UNIT 3 OPTICS (9 hours)
Photometry: Principles and Lummer-Brodhun photometer. **Lasers:** Principles and characteristics – Types of lasers (CO_2, excimer, NdYAG, GaAs, free electron) – Holographic mass storage. **Optical Fiber:** Principles – Physical structure and types – Optical fiber communication. **Photo elasticity:** Theory and applications.

UNIT 4 CRYSTAL PHYSICS AND CRYOGENICS (9 hours)
Crystal Physics: Crystal directions – Planes and Miller indices – Basic symmetry elements – Translational symmetry elements – Reciprocal lattice – Diamond and HCP crystal structure – Imperfections in crystals. **Cryogenics:** Methods

of liquefaction of gases (cascade process, Linde's process, and adiabatic demagnetization process) – Measurement of cryogenic temperatures.

UNIT 5 ENERGY PHYSICS (9 hours)

Introduction to non-conventional energy sources – Solar cells – Thermoelectric power generators – Thermionic power generator – Magneto hydrodynamic power generator – Fuel cells (H_2O_2) – Solid state batteries (Lithium) – Low voltage and high voltage nuclear cells – Thermocouple based nuclear cell – Ultra capacitors.

Course Number and Title

CY0101 CHEMISTRY

Credits / Contact Hours

3 / 45

Instructor Name

Dr. R. Jeyalakshmi

Textbooks, References

- Jain.P.C and Monika Jain, "Engineering Chemistry", Danpat Raj publishing company (P) Ltd, New Delhi – 2002.
- Dara.S.S, "Text book of Engineering Chemistry", S. Chand & Company Ltd, New Delhi 2003.
- Willard H.A., Merit L.L and Dean J.A., " Instrumental methods of analysis " 6th Edition Van Nostrand, 1986.
- Kuriacose J.C. and Rajaram J. "Chemistry in Engineering and Technology", Volume II, Tata McGraw Hill p.b. Co., 1988.
- Jeyalakshmi.R & Ramar. P, "Engineering Chemistry", 1st Edition, Devi Publications, Chennai 2006.
- Kamaraj.P & Arthanareeswari. M, "Applied Chemistry", 2nd Edition, Sudhandhira Publications, 2003.
- Arivalagan. K," Engineering Chemistry", 1st Edition, Mass publications, 2007.
- P.Kamatchi, "Applied Chemistry-I", Ponnuswamy publications, Chennai.
- Dr. Helen P Kavitha , "Engineering Chemistry – I" ILA Publications, 2002.

Purpose

To impart a sound knowledge on the principles of chemistry involving the different application oriented topics required for all engineering branches.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

The students should be conversant with

1. The role of applied chemistry in the field of engineering.
2. The knowledge of water quality parameters and the treatment of water.
3. The principles involved in corrosion and its inhibitions.
4. Important analytical techniques, instrumentation and the applications.
5. Knowledge with respect to the phase equlibria of different systems.

Student Outcomes from Criterion 3 covered by this Course

	a	b	c	d	e	f	g	h	i	j	k
Student outcome	X	X	X		X						
Mapping of instructional objectives with student outcome	1-5	1-5	1-5		1-5						

List of Topics Covered

UNIT 1 TECHNOLOGY OF WATER (9 hours)
Water quality parameters: Physical, Chemical & Biological - Hardness of water – estimation of hardness (EDTA method & O. Hehner"s method), Alkalinity – determination – disadvantages of using hard water in boilers: Scale, sludge formation – disadvantages – prevention – treatment: Internal conditioning – phosphate, calgon and carbonate conditioning methods – External: Zeolite, ion exchange methods - desalination – reverse osmosis and electrodialysis - domestic water treatment.

UNIT 2 CORROSION AND ITS CONTROL (9 hours)
Corrosion: Basic concepts – principles, mechanism of chemical, electrochemical corrosion – Pilling Bedworth rule – galvanic corrosion – differential aeration corrosion - pitting corrosion - stress corrosion - factors influencing corrosion.
Corrosion control: cathodic protection – sacrificial anodic method – corrosion inhibitor. Protective coatings: surface preparation for metallic coatings - electro plating and electroless Plating - chemical conversion coatings – anodizing, phosphating & chromate coating.

UNIT 3 PHASE EQUILIBRIA (9 hours)
Phase rule: Statement – explanation of the terms involved - one component system (water system only). Condensed phase rule - thermal analysis – two component systems: simple eutectic, Pb-Ag; Br, Cd - solid solution Cu-Ni and compound formation Mg-Zn - applications of eutectics.

UNIT 4 POLYMERS AND REINFORCED PLASTICS (9 hours)
Classification of polymers – types of polymerization reactions – mechanism of addition polymerization: free radical, ionic and ziegler – Natta - effect of structure on the properties of polymers – strength, plastic deformation, plastics elasticity and physical nature –Preparation and properties of important resins:- Polyethylene, PVC, PMMA, Polyester, Teflon Bakelite, Epoxy resins, compounding of plastics, moulding methods - injection, extrusion, compression and calendaring - reinforced plastics – FRP – Carbon, Graphite, Glass– applications.

UNIT 5 INSTRUMENTAL METHODS OF ANALYSIS (9 hours)
Basic principles, instrumentation of potentiometry, flame photometry – applications. Elementary theory – principle – instrumentation of UV – visible spectroscopy and atomic absorption spectroscopy and infrared spectroscopy.

Course Number and Title

GE0105 COMPUTER LITERACY

Credits / Contact Hours

1 / 30

Instructor Name

Ms.D.Devahema

Textbooks, References

- *"Introduction to Information Technology"* ITL Education Solutions Ltd., Pearson 2nd Edition, 2006.

Purpose

This Lab Course will enable the students to understand the basics of computer and to know the basics of MS-Office

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per table 5.1)

Required

Instructional Objectives

1. To learn the basics of computer.
2. To work on MS-Word, MS-Excel, MS-Power Point and MS-Access

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X				X						
Mapping of instructional objectives with student outcome	1-2				1-2						

List of Topics Covered

EXPERIMENTS TO IMPLEMENT

Study experiment on evolution of computer programming languages.

1. Suggest some of the Network Topologies that can be incorporated in your campus. Justify your choice.
2. Experiments to demonstrate directory creation and file creation.
3. Create a document with all formatting effects.
4. Create a document with tables.
5. Create labels in MS word.
6. Create a document to send mails using mail merge option.
7. Create an Excel File to analyze the student's performance. Create a chart for the above data to depict it diagrammatically.
8. Create Excel sheet to use built-in-function.
9. Create Excel sheet to maintain employee information and use this data to send mails using mail merge.
10. Create a Power Point presentation for your personal profile with varying animation effects with timer.
11. Consider student information system which stores student personal data, mark information and non academic details.
    * Use MS-Access to create Tables and execute SQL queries to do this following
    * Display all student records.
    * Display student details with respect to his identity.
    * Delete some records from the table.
    * Find total marks obtained by student in each list.

Course Number and Title

PH0103 PHYSICS LABORATORY

Credits / Contact Hours

1 / 30

Instructor Name

Dr. T. Kalaivani

Textbooks, References

- Chattopadhyay, D., Rakshit, P. C. and Saha, B., "*An Advanced Course in Practical Physics*", 2nd edition, Books & Allied Ltd., Calcutta, 1990.
- Chauhan and Singh, "*Advanced Practical Physics"*, revised edition, Pragati Prakashan, Meerut, 1985.
- Thiruvadigal. J. D., Ponnusamy. S., Vasuhi. P. S. and Kumar. C, "*Hand Book of Practical Physics"*, 5th edition, Vibrant Publication, Chennai, 2007.

Purpose

The purpose of this course is to develop scientific temper and analytical capability among the engineering students.

Prerequisites	Co – requisites
NIL	PH0101

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

At the end of the course, the student will be able to:

1. Understand scientific concepts in measurement of different physical variables
2. Develop the skill in arranging and handling different measuring instruments
3. Get familiarized with the errors in various measurements and planning / suggesting how these contributions may be made of the same order so as to make the error in the final result small.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X			X						
Mapping of instructional objectives with student outcome	1	3			2						

List of Topics Covered

LIST OF EXPERIMENTS (30 hours)

1. Determination of Young's Modulus of the material – Uniform bending
2. Determination of Rigidity Modulus of the material – Torsion Pendulum
3. Determination of velocity of Ultrasonic waves in liquids
4. Determination of dispersive power of a prism using spectrometer
5. Determination of laser parameter – Divergence and wavelength for a given laser source – laser grating
6. Particle size determination using laser
7. Study of attenuation and propagation characteristics of optical fiber cable
8. Calibration of voltmeter using potentiometer.
9. Calibration of ammeter using potentiometer.
10. Construction and study of regulation properties of a given power supply using IC

Course Number and Title

CY0103 CHEMISTRY LAB

Credits / Contact Hours

1 / 30

Instructor Name

Dr. R. Jeyalakshmi

Textbooks, References

Chemistry department manual, Edition, 2003.

Purpose

An integrated laboratory course consists of experiments from applied chemistry and is designed to illustrate the underlying principles of measurement techniques, synthesis, dynamics and chemical transformation.

Prerequisites	Co-requisites
NIL	CY0101

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. Students should be able to understand the basic concept and its applications.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X		X						X
Mapping of instructional objectives with student outcome	1	1	1		1						1

List of Topics Covered

LIST OF EXPERIMENTS (30 hours)

1. Preparation of standard solutions.
2. Estimation of total hardness, permanent and temporary hardness by EDTA method.
3. Conductometric titration – determination of strength of an acid.
4. Estimation of iron by potentiometer – titration.
5. Determination of molecular weight of polymer by viscosity average – method.
6. Determination of dissolved oxygen in a water sample by Winkler”s method
7. Determination of Na / K in water sample by Flame photometry.
8. Estimation of Copper in ore.
9. Estimation of nickel in steel.
10. Determination of total alkalinity and acidity of a water sample.

Course Number and Title

PH0102 MATERIAL SCIENCE

Credits / Contact Hours

3 / 60

Instructor Name

Dr.C.Prefrential Kala

Textbooks, References

- S.O. Kasap, *Principles of Electronic Materials and Devices,* Tata McGraw Hill Edition, New Delhi, 2002.
- Van Vlack, L.H., *Material Science for Engineers*, 6th edition, .Addision Wesley, 1985.
- Thiruvadigal, J. D., Ponnusamy, S. and Vasuhi.P. S., *Materials Science*, 5th edition, Vibrant Publications, Chennai, 2007.
- Rolf E. Hummel, *Electronic Properties of materials*, Narosa Publishing House, New Delhi, 1994.
- Raghavan.V., *Materials Science & Engineering – A First Course*, 5th edition, Prentice Hall of India, New Delhi,2005.
- Khanna. O. P., *A Text Book of Material Science & Metallurgy*, Revised edition, Dhanpat Rai Publications, New Delhi,2006.
- Sujata V. Bhat, *Biomaterials*, 2nd edition, Narosa Publishing House, New Delhi, 2006.
- Mick Wilson, Kamali Kannangara, Michells Simmons and Burkhard Raguse, *Nano Technology – Basic Science and Emerging Technologies*, 1st edition, Overseas Press,New Delhi,2005.

Purpose

The purpose of this course is to develop comprehension of the rapidly changing technological scenario and the requisite expertise for appropriate selection of materials for specific engineering applications.

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

At the end of the course, the student will be able to:

1. **Understand electrical properties of materials,**
2. **Understand the properties and applications of semi conducting materials,**
3. **Understand general properties and applications of magnetic and dielectric materials,**
4. **Understand the behavior of materials on exposure to light,**
5. **Understand general properties and application of modern engineering and bio materials, and**
6. **Get familiarized with the concepts of Nano Science and Technology.**

Student Outcomes from Criterion 3 covered by this Course											
Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X		X	X						X
Mapping of instructional objectives with student outcome	1-5	1-5		6	1-5						1-5

List of Topics Covered

UNIT 1 ELECTRONIC AND PHOTONIC MATERIALS (6 hours)

Electronic materials: Importance of Classical and Quantum free electron theory of metals – Fermi energy and Fermi Dirac distribution function – Variation of Fermi level with temperature in intrinsic and extrinsic semiconductors – Hall effect – Dilute Magnetic Semiconductors (DMS) and their applications – High temperature Superconductivity. Photonic materials: LED and LCD materials – Photo conducting materials – Nonlinear optical materials (elementary ideas) and their applications.

UNIT 2 MAGNETIC, DIELECTRIC AND MODERN ENGINEERING MATERIALS (6 hours)

Magnetic materials: Ferrites and garnets – Magnetic bubbles and their applications – Giant Magneto Resistance (GMR) – Colossal Magneto Resistance (CMR).

Dielectric materials: Various polarization mechanisms in dielectrics (elementary ideas) and their frequency and temperature dependence – Dielectric loss – Piezo electric and ferro electric materials and their applications. Modern engineering materials: Shape memory alloys – Metallic glasses – Advanced ceramics and composites.

UNIT 3 BIO MATERIALS (6 hours)

Classification of biomaterials – Comparison of properties of some common biomaterials – Effects of physiological fluid on the properties of biomaterials – Biological responses (extra and intra vascular system) – Metallic, Ceramic and Polymeric implant materials – Introduction to bio sensors and tissue engineering.

UNIT 4 NANO MATERIALS AND NANOTECHNOLOGY (6 hours)

Basic concepts of Nano science and technology – Quantum wire – Quantum well – Quantum dot – Properties and technological advantages of Nano materials – Carbon Nanotubes and applications – Material processing by Sol – Gel method, Chemical Vapour deposition and Physical Vapour deposition – Microwave Synthesis of materials – Principles of SEM, TEM and AFM .

UNIT 5 MECHANICAL PROPERTIES OF MATERIALS (6 hours)

Stress Strain diagram for different engineering materials – Engineering and true stress strain diagram – Ductile and brittle material – Tensile strength – Hardness – Impact strength – Fatigue – Creep – Fracture (Types and Ductile to brittle transition) – Factors affecting mechanical properties.

PRACTICALS (30 hours)

1. Band gap determination using Post office box.
2. Dielectric constant measurement.
3. Photoconductivity measurement.
4. Resistivity determination for a semiconductor wafer using Four probe method.
5. Determination of Hall coefficient and carrier type for a semiconductor material.
6. To trace the hysteresis loop for a magnetic material.
7. Magnetic susceptibility – Quincke's method.
8. Determination of thermal conductivity – Lee's Disc method
9. Visit to Nano Technology Laboratory (optional)

Course Number and Title

GE0102 BIOLOGY FOR ENGINEERS

Credits / Contact Hours

2 / 30

Instructor Name

Mr. K. Balagangadharan

Textbooks, References

- J.M.Berg, J.L.Tymosczko and L.Sryer. Biochemistry,W.H. Freeman Publications.
- STUDENT COMPANION to accompany Biochemistry, Fifth Edition -Richard I. Gumport
- Frank H. Deis, Nancy Counts Gerber, Roger E. Koeppe, II Molecular motors
- Alberts, 2003 Molecular Biology of the cell
- Lodish, 2004 Molecular cell biology

Purpose

To provide a basic understanding of biological mechanisms from the perspective of engineers.

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To familiarize the students with the basic organization of organisms and subsequent building to a living being. With this knowledge, the student will be then imparted with an understanding about the machinery of the cell functions that is ultimately responsible for various daily activities. Nervous and immune systems will be taught as examples of this signaling machinery.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X			X							
Mapping of instructional objectives with student outcome	1			1							

List of Topics Covered

UNIT 1 FROM ATOMS TO ORGANISMS (6 hours)
The Cell: the Basic Unit of Life - Molecular Components of Cells - Expression of Genetic Information - Protein Structure and Function- Cell Metabolism - Cells Maintain Their Internal Environments - Cells Respond to Their External Environments - Cells Grow and Reproduce - Cells Differentiate

UNIT 2 THE MOLECULAR DESIGN OF LIFE (6 hours)
Biochemistry and the Genomic Revolution- . DNA Illustrates the Relation between Form and Function- Biochemical Unity Underlies Biological Diversity-. Chemical Bonds in Biochemistry -. Biochemistry and Human Biology-. Protein Synthesis Requires the Translation of Nucleotide Sequences Into Amino Acid Sequences-.2. Aminoacyl-Transfer RNA Synthetases Read the Genetic Code- A Ribosome Is a Ribonucleoprotein Particle (70S) Made of a Small (30S) and a Large (50S) Subunit-Protein Factors Play Key Roles in Protein Synthesis-. Eukaryotic Protein Synthesis Differs from Prokaryotic Protein Synthesis Primarily in Translation Initiation

UNIT 3 CATALYTIC STRATEGIES (6 hours)
Proteases: Facilitating a Difficult Reaction-. Making a Fast Reaction Faster: Carbonic Anhydrases-. Restriction Enzymes: Performing Highly Specific DNA-Cleavage Reactions- Nucleoside Monophosphate Kinases: Catalyzing Phosphoryl Group Exchange between Nucleotides Without Promoting Hydrolysis- metabolism-anabolism and catabolism-photosynthesis and carbon fixation- biological energy production.

UNIT 4 MECHANOCHEMISTRY (6 hours)
How Protein Motors Convert Chemical Energy into Mechanical Work- Brief Description of ATP Synthase Structure- The F1 Motor: A Power Stroke-A Pure Power Stroke- Coupling and Coordination of Motors- Measures of Efficiency- F1-Motor of ATP synthase- The Bacterial Flagellar Motor- Motor Driven by H_ and Na_ Ion Flux- Proton Motive Force, Sodium-motive Force, Ion Flux- Molecular Motor Directionality- Chimeric Kinesin Motors- Backwards Myosins- Chimeric Myosin Motors- Bidirectional Dyneins?

UNIT 5 SENSORY AND IMMUNO SYSTEMS (6 hours)
General Principles of Cell Signaling-Signaling via G-Protein-linked Cell-Surface Receptors-Signaling via Enzyme-linked Cell-Surface Receptors-Target-Cell Adaptation-The Logic of Intracellular Signaling: Lessons from Computer-based "Neural Networks"-The Cellular Basis of Immunity-The Functional Properties of Antibodies-The Fine Structure of Antibodies-The Generation of Antibody Diversity-T Cell Receptors and Subclasses-MHC Molecules and Antigen Presentation to T Cells-Cytotoxic T Cells-Helper T Cells and T Cell Activation-Selection of the T Cell Repertoire

Course Number and Title

GE0104 PRINCIPLES OF ENVIRONMENTAL SCIENCE

Credits / Contact Hours

2 / 30

Instructor Name

Dr.H.Suhana

Textbooks, References

- Sharma.B.K. and Kaur, *Environmental Chemistry* Goel Publishing House, Meerut, 1994.
- De.A.K., *Environmental Chemistry*, New Age International (p) lt., , New Delhi, 1996.
- Kurian Joseph & R. Nagendran, *Essential of Environmental Studies* Pearson Education, 2004.
- Dara S.S., *A Text Book of Environmental Chemistry and pollution contro,* S.Chand & Company Ltd., New Delhi, 2004.
- Jeyalakshmi.R, *Principles of Environmental Science*, 1st Edition, Devi Publications, , Chennai 2006.
- Kamaraj.P & Arthanareeswari.M, *Environmental Science – Challenges and Changes*, 1st Edition, Sudhandhira Publications, 2007.
- Arivalagan.K, Ramar.P & Kamatchi.P, *Principles of Environmental Science*, 1st Edition, Suji Publications, 2007.

Purpose

The course provides the comprehensive knowledge in environmental science, environmental issues and the management.

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. The importance of environmental education, ecosystem and ethics.
2. Knowledge with respect to biodiversity and its conservation.
3. To create awareness on the various environmental pollution aspects and issues.
4. To educate the ways and means to protect the environment.
5. Important environmental issues and protection

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
			X		X	X		X	X	X	
Mapping of instructional objectives with student outcome			5		2	4		1,3	3	2, 5	

List of Topics Covered

UNIT 1 ENIVRONMENT AND ECOSYSTEMS (6 hours)
Environmental education: definition - scope - objectives and importance. Concept of an ecosystem – types (terrestrial and aquatic ecosystems) – structure and function – ecological succession - food chains, food webs and ecological pyramids

UNIT 2 BIODIVERSITY (6 hours)
Introduction: definition - genetic, species and ecosystem diversity - value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - threats to biodiversity: habitat loss, poaching of wildlife - endangered and endemic species of India, Conservation of biodiversity: in-situ and ex-situ conservations.

UNIT 3 POLLUTION AND WASTE MANAGEMENT (6 hours)
Air and water pollution – classification of pollutants and their effects – control measures of air pollution. Waste water treatment (general) – primary, secondary & tertiary stages.
Solid waste management: causes - effects of municipal waste, hazardous waste, bio medical waste - process of waste management.

UNIT 4 CURRENT ENVIRONMENTAL ISSUES (6 hours)
Environmental ethics -issues and possible solutions- population explosion, climatic change, ozone layer depletion, global warming, acid rain and green house effect.
Sustainable development: definition, objectives and environmental dimensions of sustainable development- environmental audit for sustainable development.

UNIT 5 ENVIRONMENTAL PROTECTION (6 hours)
National and international concern for environment: Important environmental protection acts in India – water, air (prevention and control of pollution) act, wild life conservation and forest act – functions of central and state pollution control boards - international effort – key initiatives of Rio declaration, Vienna convention, Kyoto protocol and Johannesburg summit.

Course Number and Title

CS0140 COMPUTER PRACTICE

Credits / Contact Hours

2 / 45

Instructor Name

Mr.J Godvin Ponsam

Textbooks, References

- Computer Practice Laboratory Manual, SRM University.
- Kanetkar P.Yashwant,"Let us C", BPB publications, 2002.
- Ashok N.Kamthane, "Programming with ANSI and Turbo C", Pearson Education, 2006.
- Herbert Schildt, "The Complete Reference C++", Tata McGraw Hill, 2001, 3rd Edition.
- Robert Lafore, "Object Oriented Programming in Microsoft C++", The Waite Group, Galgotia Publications Pvt. Ltd., 2002

Purpose

To introduce programming languages, C and C++ as tools to solve problems and to provide hands on training.

Prerequisites	Co-requisites
Nil	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

After completing the course, the students should be able to

1. Understand the program development life cycle
2. Design algorithms to solve simple problems using computers
3. Convert algorithms into C and C++ programs and execute

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X									X
Mapping of instructional objectives with student outcome	1-3	1-3									1-3

List of Topics Covered

UNIT 1 PROGRAMMING FUNDAMENTALS (3 hours)
Computer Basics; Program Development Life Cycle: Flow Chart, Algorithm, Compilation and Execution; Introduction to C Language: program structure, variables, keywords, data types; Input / Output functions: scanf, printf; simple programs.

UNIT 2 DECISION AND LOOP CONTROL STRUCTURE (3 hours)
Logical operators; Decision statements: if/else, switch/case statements; Loop control statements – for, while, do/while.

UNIT 3 ARRAYS AND FUNCTIONS (3hours)
Arrays:
Introduction to arrays; one dimensional arrays: declaration, reading and printing array elements, sorting and searching.
Functions:
Definition; declaration of functions; return statement; recursion.

UNIT 4 INTRODUCTION TO OOP CONCEPTS (3hours)
OOP concepts: data hiding, encapsulation, inheritance, overloading, polymorphism; classes and objects; constructor and destructor; simple program in C++.

UNIT – V INHERITANCE AND OVERLOADING (3hours)
Inheritance – single, multiple, multilevel; Overloading – Function overloading, Operator overloading.

LIST OF EXERCISES

Note to the Instructors: Design exercise problems to demonstrate the use of C and C++ in the area of specialization.

1. Programs to demonstrate the use of scanf ( ) and printf( ) functions
2. Programs to evaluate arithmetic expressions
3. Programs using conditional statements
4. Programs using for, while , do…while
5. Programs on arrays
6. Programs to perform matrix addition and multiplication
7. Programs to implement functions
8. Programs to illustrate recursion
9. Program to create classes and objects using C++
10. Program to implement Constructor and Destructor in C++
11. Program to implement single inheritance in C++
12. Program to implement Function overloading in C++
13. Program to implement Operator overloading in C++

PRACTICAL 30 HOURS
TOTAL 45 HOURS

A.2.2 General Education Courses and others

General Education Courses	
2007-08 Curriculum Course Code	**Name of the Course**
LE0101	English
GE0107	NSS/NCC/NSO/YOGA
GE0108	Value Education
LE0201/ LE0203/ LE0205	German / Japanese / French Language Phase – I
LE0202/ LE0204/ LE0206	German / Japanese / French Language Phase – II
Others	
PD 0101	Personality Development – I
PD0102	Personality Development – II
PD0201	Personality Development – III
PD0202	Personality Development – IV
PD0301	Personality Development – V
PD0302	Personality Development – VI
MB0302	Business Management for Engineers

Course Number and Title

LE0101 ENGLISH

Credits / Contact Hours

2/45

Instructor Name

Ms.R.Vinodha

Textbooks, References

- Abraham Benjamin Samuel 'Practical Communication Communicative English LSRW2000'– SRMEC – June 2006 Revised Edition.
- Staff of the Department of Humanities and Social Science, Anna University, "English for Engineers / Technologist Vol.-I". Orient Longman, 1990.
- Herbert. A. J. "The structure of Technical English" Orient Longman 1995.
- Pickett and Laster, 'Technical English, Writing, Reading and Speaking', New York Harper and Row Publications, 1997.
- "Interactive course in phonetics and spoken English" published by Acoustics Engineers (ACEN) 2002.
- Munter, Mary, "Business Communication Strategy and Skill", Prentice Hall Inc.,New Jersey, 1987.

Purpose

To provide an adequate mastery of communicative English Language training primarily - reading and writing skills, secondarily listening and speaking skills.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To provide language training to the engineering students which will enable them to understand and acquire knowledge in technical subjects.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
				X		X	X		X		
Mapping of instructional objectives with student outcome				1		1	1		1		

List of Topics Covered

UNIT 1 LISTENING (3 hours)
Listening Practice – Hints on Listening – Listening Practice

Note Taking: Note Taking Strategies

UNIT 2 SPEAKING (3 hours)
Definitions: Expressing Opinions (agreement / disagreement)-Offering Suggestions – Technical Definitions –Describing Objects – speaking practice.
Phonetics: Pronunciation-Phonetic Transcription-Stress-Intonation

UNIT 3 READING (3 hours)
Comprehension: Skimming-scanning-close reading-Comprehension – Transferring Information – Exercise – An unseen passage should be given and questions may be asked in the form of True or False statements, MCQ, short answers.
Transcoding : Interpreting tables, flow charts, pie chart, bar diagram, tree diagram, graphs.

UNIT 4 WRITING (3 hours)
Art of Writing: Writing Language – Rules for effective writing – Technical Essay Writing – Exercise
Report Writing: Technical Writing – Lab Report – Exercise
Letter Writing : Formal Letters – Letter to the Editor – Letter Inviting Dignitaries – Letter of Application Curriculum Vitae – Placing an Order.
Dialogue Writing

UNIT 5 FOCUS ON AND COMMUNICATION AND "COMPUNICATION" (3 hours)
Communication: Basic Concepts – Process – Kinds – Routes – Forms – Factors – Barriers – Triangles Communication (Communicate through Computers – Power Point & Tele Conference).

Course Number and Title	
GE0107 NSS/NCC/NSO/YOGA	
Credits / Contact Hours	
1 / 30	
Instructor Name	
Mr.Harikumar	
Textbooks, References	
• Vedatri Maharshi , *"Yoga for Modern Age"* • Vedatri Maharshi, " *Simplified Physical Exercises"*	
Purpose	
To imbibe in the minds of students the concepts and benefits of NCC/NSS/NSO/YOGA and make them practice the same	
Prerequisites	**Co-requisites**
NIL	NIL
Required, Elective or Selected Elective (as per Table 5.1b)	

Required

Instructional Objectives

1. To enable the students to gain knowledge about NCC/NSS/NSO/YOGA and put the same into practice

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
				X		X					
Mapping of instructional objectives with student outcome				1		1					

List of Topics Covered

YOGA SYLLABUS

PRACTICE		**LECTURE**
I	Meditation – Agnai, Asanas, Kiriyas, Bandas, Muthras	Benefits of Agnai Meditation
II	Meditation Santhi Physical Exercises (I & II)	Benefits of santhi Meditation
III	Kayakalpa Yoga Asanas, Kiriyas, Bandas, Muthras	Lecture & Practice
IV	Meditation Santhi Physical Exercises III & IV	Analysis of Thought
V	Meditation Thuriyam Kayakalpa Asanas, Kiriyas, Bandas, Muthras	Benefits of Thuriyam
VI	Meditation Thuriyam Kayakalpa Asanas, Kiriyas, Bandas, Muthras	Attitude
VII	Meditation Thuriyam Kayakalpa Asanas, Kiriyas, Bandas, Muthras	Importance of Arutkappy & Blessings
VIII	Meditation Santhi Kayakalpa Asanas, Kiriyas, Bandas, Muthras	Benefits of Blessings
		Hours = 30

II. NATIONAL SPORTS ORGANISATION (NSO)

Each student must select two of the following games and practice for two hours per week. An attendance of 80% is compulsory to earn the credits specified in the curriculum.

List of games:

1. Basket Ball
2. Football
3. Volley Ball
4. Ball Badminton
5. Cricket
6. Throw ball

III. NATIONAL CADET CORE (NCC)

Any student enrolling as a member of National Cadet Core (NCC) will have to attend sixteen parades out of twenty parades each of four periods over a span of an academic year.
Attending eight parades in first semester will qualify a student to earn the credits specified in the curriculum.

IV. NATIONAL SERVICE SCHEME (NSS)

A student enrolling as member of NSS will have to complete 60 hours of training / social service to be eligible to earn the credits specified in the curriculum.

Course Number and Title

GE0108 VALUE EDUCATION

Credits / Contact Hours

1 / 15

Instructor Name

Mrs.B.Monika Nair

Textbooks, References

1. Dr. S. Ignacimuthu S. J., Values for life, Better yourself Books, Bandra Mumbai-600 050 (1999).
2. Values(Collection of Essays)., Published by : Sri Ramakrishna Math., Chennai—4.,(1996)
3. Prof. R.P.Dhokalia., Eternal Human Values NCRT –Campus Sri Aurobindo Marg., New Delhi - 110011.
4. Swami Vivekananda., Education., Sri Ramakrishna Math., Chennai-4(1957)
5. Tirukural (English Translation by Dr.G.U.Pope).
6. The Bible
7. The Kuran
8. The Bagavath Geetha

Purpose

To provide guiding principles and tools for the development of the whole person recognizing that the individual is comprised of Physical, Intellectual, Emotional and Spiritual dimensions.

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To help individuals think about and reflect on different values.
2. To deepen understanding, motivation and responsibility with regard to making personal and social choices and the practical implications of expressing them in relation to themselves, others, the community and the world at large.
3. To inspire individuals to choose their own personal, social, moral and spiritual values and be aware of practical methods for developing and deepening

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
						X			X		
Mapping of instructional objectives with student outcome						1-3			1-3		

List of Topics Covered

UNIT 1 (3 hours)

Value Education—Introduction – Definition of values – Why values? – Need for Inculcation of values – Object of

Value Education – Sources of Values – Types
Values:

i) Personal values
ii) Social values
iii) Professional values
iv) Moral and spiritual values
v) Behavioral (common) values

UNIT 2 (3 hours)

Personal values – Definition of person – Self confidence – Self discipline – Self Assessment – Self restraint – Self motivation – Determination – Ambition – Contentment – Humility and Simplicity - Sympathy and Compassion – Gratitude -Forgiveness – Honesty – Courtesy.

UNIT 3 (3 hours)

Social values – Definition of Society – Units of Society - Individual, family, different groups – Community – Social consciousness – Equality and Brotherhood – Dialogue – Tolerance – Sharing – Responsibility – Co-operation Freedom – Repentance and Magnanimity.

UNIT 4 (3 hours)

Professional values – Definition – Competence – Confidence – Devotion to duty –Efficiency – Accountability – Respect for learning /learned – Willingness to learn-Open and balanced mind – Team spirit – Professional Ethic – Willingness for Discussion – Aims – Effort – Avoidance of Procrastination and slothfulness –Alertness.

UNIT 5 (3 hours)

Behavioral values – Individual values and group values – Good manners at home and outside – Equality – Purity of thought, speech and action – Understanding the role of religion – Faith – Understanding the commonness of religions – respect for other faiths – unity in diversity – Living together – Tolerance – Non-violence – Truthfulness – Common aim – Unified effort towards peace – Patriotism.

Course Number and Title

LE0201 GERMAN LANGUAGE PHASE I

Credits / Contact Hours

2 / 30

Instructor Name

Mrs.A.K.Bharathi

Textbooks, References

- Grundkurs Deutsch
- Momentmal (Max Mueller Bhavan – Goethe Institute, Germany).

Purpose

Enabling the Engineering Students to one more Foreign Language, especially German, which is scientific and technical language. This may be useful in the field of employment opportunities as well as helping them to develop projects on browsing German websites.

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. Developing pronunciation so that they can read the text and e-mail during their employment, instructing them to write their own C V and developing a fundamental conversation with any German national

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
							X				
Mapping of instructional objectives with student outcome							1				

List of Topics Covered

UNIT 1 INTRODUCTION (10 hours)
German Language, Alphabets and Pronunciation.

THEMEN
Name, Land, Leute, Beruf, Familie geschwister, Einkaufen, Reisen, Zahlen, Haus, Freunden, Essen and Stadium, Fest, Zeit.

UNIT 2 LISTENING (10 hours)
Listening to the cassette and pay special attention to the meaning and sounds. Listening Comprehension – Announcements / Airport / Station / General.

UNIT 3 READING (10 hours)
Listening to the cassette and reading it allowed.
READING COMPRENSION BASICS / STATION / NEWS / NOTICE BOARDS.

GLOSSARY
Technical Words Lesson (1-5)

SCHEME OF EVALUATION

Internal 50 = Listening – 10 Marks, Speaking – 20 Marks, Reading – 10 Marks and Writing = 10 Marks
External 50 – 3 hours final written exam

Course Number and Title

LE0203 JAPANESE LANGUAGE PHASE I

Credits / Contact Hours

2 / 30

Instructor Name

Ms.R.Rekhaa

Textbooks, References

1. Nihongo Shoho I main Text sold in India by the Japanese Language Teachers Association Pune.
2. Hiragana and Katakana Work Book published by AOTS Japan

3. Grammar and Kotoba (Work Book)
4. Japanese for Dummies.(Conversation) CD.

SCHEME OF EVALUATION

Internal 50 = Listening – 10 Marks, Speaking – 20 Marks, Reading – 10 Marks and Writing = 10 Marks
External 50 – 3 hours final written exam

Purpose

1. In view of globalization, learning Foreign Language by Engineering graduates enhances their employment opportunities.
2. Get awareness of understanding of International culture.
3. Widening the Linguistic Skills of the Students.

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

To learn the scripts of Japanese Languages namely Hiragana, Katakana and Kanji, Vocabularies etc. To learn basic grammar and acquire basic communication skills. To understand Japanese culture.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
							X				
Mapping of instructional objectives with student outcome							1				

List of Topics Covered

UNIT 1 (8 hours)
Alphabets (Hiragana), Self Introduction, Greetings, Classroom expressions, Numbers, Conversation.
UNIT 2 (8 hours)
Alphabets Hiragana (continued),Vocabularies.Counters .Time expression. Conversation

UNIT 3 (8 hours)
Katakana and related vocabulary.Kanjis –introduction. conversation.

UNIT 4 (6 hours)
Lesson-1 Watashiwa Nihonjin desu. Grammar,Marume &Sentence pattern.Marume.
Conversation.

Course Number and Title

LE0205 FRENCH LANGUAGE PHASE I

Credits / Contact Hours

2 / 30

Instructor Name

Mrs.A.Sharada

Textbooks, References

- Panorama – Goyal Publishers
- Apprenons le Francais I, Sarawathy publication.

SCHEME OF EVALUATION

Internal 50 = Listening – 10 Marks, Speaking – 20 Marks, Reading – 10 Marks and Writing = 10 Marks
External 50 – 3 hours final written exam

Purpose

1. As language skills are as valuable as technical skills knowledge of French enables the engineering graduates in career orientation.
2. As a second international global Lang after English there is a wider choice of job opportunities in the international employment market and also multinationals in India and an understanding of French culture thro language.

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. Characterized by the Roman script, grammar, vocabulary and colloquial expressions are taught which enables them to communicate effectively with any native speaker.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
							X				
Mapping of instructional objectives with student outcome							1				

List of Topics Covered

UNIT 1 INTRODUCTION AND PRONUNCIATION (8 hours)

Introduction of the French Language, Alphabets and Pronunciation, Greetings (Wishing, Thanking and Bidding good bye), Introducing oneself & someone Presenter quelqu'un et se presenter - conversational French sentences based on the topics discussed above.

UNIT 2 VOCABULARY (6 hours)

Numbers and Dates, Days, Months and Seasons, Time, Nouns, Professions and Nationalities. Conversational sentences on weather, time, and professions.

UNIT 3 GRAMMAR (5 hours)

Basic Verbs (Avoir, Etre, Aller, Faire) – Conjugation – Present tense, Affirmative, Negative, Interrogative, Adjectives (Qualitative), Subject Pronouns and Disjunctive Pronouns.

UNIT 4 CONVERSATION AND LISTENING 6 hours

Conversational sentences on physical description and expressions with verbs like avoir, etre and faire

UNIT 5 GRAMMAR (5 hours)

Prepositions (a, de,dans, en, sur,sous, pour….),Contracted Articles, Question Tag

(Qui, Quel, Ou, ……etc)

Course Number and Title

LE0202 GERMAN LANGUAGE PHASE - II

Credits / Contact Hours

2 / 30

Instructor Name

Mrs.A.K.Bharathi

Textbooks, References

- Grundkurs Deutsch Mo`ntmal

  (Prescribed by Max Mueller Bhavan – Goethe Institute, Germany).

SCHEME OF EVALUATION
Internal 50 = Listening – 10 Marks, Speaking – 20 Marks, Reading – 10 Marks and Writing = 10 Marks
External 50 – 3 hours final written exam

Purpose

Enabling the Engineering Students to one more Foreign Language, especially German, which is scientific and technical language. This may be useful in the field of employment opportunities as well as helping them to develop projects on browsing German websites.

Prerequisites	Co-requisites
LE0201	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. Developing pronunciation so that they can read the text and e-mail during their employment, instructing them to write their own C V and developing a fundamental conversation with any German national.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
							X				
Mapping of instructional objectives with student outcome							1				

List of Topics Covered

UNIT 1 SPEAKING; (20 hours)
Dialogue – Questioning / Basic queries / Conversational with practical exposure.

UNIT 2 GRAMMATIK (WRITING) (10 hours)
Verben, Wortstellung, Nomen, Pronomen, Artikel, Nominitativ, Akkusativ, Dativ, Adjective, Prasens, Perfect and Neben Satze.

GLOSSARY
Technical words. Lesson (6-10)

Course Number and Title

LE0204 JAPANESE LANGUAGE PHASE II

Credits / Contact Hours

2 / 30

Instructor Name

Ms.R.Rekhaa

Textbooks, References

- Nihongo Shoho Imain Text sold in India by the Japanese Language Teachers Association , Pune.
- Hiragana and Katakana Work Book published by AOTS Japan
- Grammar and Kotoba (Work Book)
- Japanese for Dummies.(Conversation) CD.

SCHEME OF EVALUATION
Internal 50 = Listening – 10 Marks, Speaking – 20 Marks, Reading – 10 Marks and Writing = 10 Marks
External 50 – 3 hours final written exam

Purpose

1. In view of globalization, learning Foreign Language by engineering graduates enhances their employment opportunities.
2. Get awareness of understanding of International culture.
3. Widening the Linguistic Skills of the Students.

Prerequisites	Co-requisites
LE0203	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To learn the scripts of Japanese Languages namely Hiragana, Katakana and Kanji, Vocabularies etc. To learn basic grammar and acquire basic communication skills. To understand Japanese culture.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
							X				
Mapping of instructional objectives with student							1				

outcome											

List of Topics Covered

UNIT 1 (8 hours)
Lesson 2-{Korewa Tsukue desu } – Grammar, Sentence pattern, Marume .
Conversation

UNIT 2 (7 hours)
Lesson 3 – [Kokoni denwa ga arimasu] - Grammar, Sentence pattern, Marume .Copnversation

UNIT 3 (9 hours)
Lesson 4– {Asokoni hito ga imasu} - Grammar, Sentence pattern, Marume .
Lesson 5– {Akairingo wa ikutsu arimasu ka}-Grammar, Sentence pattern, Marume . Conversation.

UNIT 4 (6 hours)
Lesson 6– {Barano hana wa ippon ikura desu ka}- Grammar, Sentence pattern.Marume.Conversation

Course Number and Title

LE0206 FRENCH LANGUAGE PHASE II

Credits / Contact Hours

2 / 30

Instructor Name

Mrs.A.Sharada

Textbooks, References

- Panorama – Goyal Publishers
- Apprenons le Francais II, Sarawathy Publications

SCHEME OF EVALUATION
Internal 50 = Listening – 10 Marks, Speaking – 20 Marks, Reading – 10 Marks and Writing = 10 Marks
External 50 – 3 hours final written exam

Purpose

1. As language skills are as valuable as technical skills knowledge of French enables the engineering graduates in career orientation.
2. As a second international global Lang after English there is a wider choice of job opportunities in the international employment market and also multinationals in India and an understanding of French culture thro language.

Prerequisites	Co-requisites
LE0205	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. Characterized by the Roman script, grammar, vocabulary and colloquial expressions are taught which

enables them to communicate effectively with any native speaker

Student Outcomes from Criterion 3 covered by this Course

	a	b	c	d	e	f	g	h	i	j	k
Student outcome							X				
Mapping of instructional objectives with student outcome							1				

List of Topics Covered

UNIT 1 (6 hours)
Sports (Ski, natation, tennis, Tour de France), Cuisine (French dishes),Cinema
(Review of a film) – Articles on these topics and group discussion will be followed.

UNIT 2 GRAMMAR (6 hours)
Possessive Adjectives, Demonstrative Adjectives, Past tense – Passé Compose(Verbe Auxiliare:.Etre et Avoir)

UNIT 3 (6 hours)
Culture and Civilization French Monuments (Tres celebres), French History (Jeanne d' Arc, Louis XIV, Prise de la Bastille), Culture and Civilisation (vin, fromage, mode, parfums)

UNIT 4 (6 hours)
Transport system, government and media in France – articles on these topics.

UNIT 5 (6 hours)
Comprehension and Grammar Comprehension passages and conversational sentences in different situations (at the restaurant, at the super market)

Course Number and Title

PD0101 PERSONALITY DEVELOPMENT - I

Credits / Contact Hours

0 / 30

Instructor Name

Mr.Harikumar

Textbooks, References

Purpose

The purpose of this course is to build confidence and inculcate various soft skills and to help students to identify and achieve their personal potential.

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To guide thought process.
2. To groom student's attitude.
3. To develop communication skill.
4. To build confidence.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
				X		X	X		X		
Mapping of instructional objectives with student outcome				1-4		1-4	1-4		1-4		

List of Topics Covered

METHODOLOGY
The entire program is designed in such a way that every student will participate in the class room activities. The activities are planned to bring out the skills and talents of the students which they will be employing during various occasions in their real life.
1. Group activities + individual activities.
2. Collaborative learning.
3. Interactive sessions.
4. Ensure Participation
5. Empirical Learning

UNIT – 1 (6 hours)
Self-analysis SWOT - Time management - Creative chain story telling

UNIT – 2 (6 hours)
Vocabulary games I – Attitude - Interpersonal skills

UNIT – 3 (6 hours)
Motivation I - Vocabulary games II - Article review

UNIT – 4 (6 hours)
Team building exercise - Critical thinking - Event Management

UNIT – 5 (6 hours)
Business situation - Leadership Qualities - Review

SCHEME OF INSTRUCTION
Marks allocated for regular participation in all oral activities in class

SCHEME OF EXAMINATION
Complete internal evaluation on a regular Basis

Course Number and Title

PD0102 PERSONALITY DEVELOPMENT - II

Credits / Contact Hours

30

Instructor Name

Ms.B.Revathi

Textbooks, References

N/A

Purpose

The purpose of this course is to build confidence and inculcate various soft skills and to help students to identify and achieve their personal potential

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To guide thought process.
2. To groom student's attitude.
3. To develop communication skill.
4. To build confidence

.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
				X		X	X		X		
Mapping of instructional objectives with student outcome				1-4		1-4	1-4		1-4		

List of Topics Covered

METHODOLOGY

The entire program is designed in such a way that every student will participate in the class room activities. The activities are planned to bring out the skills and talents of the students which they will be employing during various occasions in their real life.

1. Group activities + individual activities.
2. Collaborative learning.
3. Interactive sessions.
4. Ensure Participation.
5. Empirical Learning

UNIT – 1 (6 hours)

Puzzles I - Poster design/Caption/Slogan writing (Social issues) - Bone of contention I – debate

UNIT – 2 (6 hours)

Bone of contention II - Puzzle II - Survey and Reporting (favorite channel, music, food)

UNIT – 3 (6 hours)

Interpretation of Visuals of I & II - Vocabulary games III

UNIT – 4 (6 hours)

Book Review - Quiz I - Presentation Skills I

UNIT – 5 (6 hours)
Presentation Skills II - Analytical Thinking - Review

EVALUATION
1. Activities assessed by both group and individual participation
2. Continuous assessment based on daily participation

SCHEME OF INSTRUCTION
Marks allocated for regular participation in all oral activities in class

SCHEME OF EXAMINATION
Complete internal evaluation on a regular Basis

Course Number and Title	
PD0201 PERSONALITY DEVELOPMENT - III	
Credits / Contact Hours	
1 / 30	
Instructor Name	
Mr.Jayapragash	
Textbooks, References	
Purpose	
The purpose of this course is to build confidence and inculcate various soft skills and to help students to identify and achieve their personal potential.	
Prerequisites	**Co-requisites**
NIL	NIL
Required, Elective or Selected Elective ((as per Table 5.1b)	
Required	
Instructional Objectives	

1. To guide thought process.
2. To groom student's attitude.
3. To develop communication skill.
4. To build confidence.

METHODOLOGY

The entire program is designed in such a way that every student will participate in the class room activities. The activities are planned to bring out the skills and talents of the students which they will be employing during various occasions in their real life.

1. Group activities + individual activities.
2. Collaborative learning.
3. Interactive sessions.
4. Ensure Participation.
5. Empirical Learning

Student Outcomes from Criterion 3 covered by this Course

	a	b	c	d	e	f	g	h	i	j	k
Student outcome	X			X							
Mapping of instructional objectives with student outcome	1-4			1-4							

List of Topics Covered

UNIT – 1 (6 hours)
Goal Setting - Problem Solving - Emotional Quotient

UNIT – 2 (6 hours)
Assertiveness - Stress Management - Quiz II

UNIT – 3 (6 hours)
Lateral Thinking (Situational) - Team Work (Role Plays) Impromptu - Text Analysis

UNIT – 4 (6 hours)
Business plan presentation I - Business plan presentation II - Chinese Whisper

UNIT – 5 (6 hours)
Picture Perfect - Case Studies - Review

SCHEME OF INSTRUCTION
Marks allocated for regular participation in all oral activities in class

SCHEME OF EXAMINATION
Complete internal evaluation on a regular Basis

Course Number and Title

PD0202 PERSONALITY DEVELOPMENT IV

Credits / Contact Hours

1 / 30

Instructor Name

Mrs.Mythreyi Koppur

Textbooks, References

N/A

Purpose

The purpose of this course is to build confidence and inculcate various soft skills and to help students to identify and achieve their personal potential

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

To guide thought process.

1. To groom student's attitude.
2. To develop communication skill.
3. To build confidence.

METHODOLOGY

The entire program is designed in such a way that every student will participate in the class room activities. The activities are planned to bring out the skills and talents of the students which they will be employing during various occasions in their real life.

1. Group activities + individual activities.
2. Collaborative learning.
3. Interactive sessions.
4. Ensure Participation.
5. Empirical Learning

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
							X				
Mapping of instructional objectives with student outcome							1-3				

List of Topics Covered

UNIT – 1 (6 hours)
Motivation II - Interpretation of Visuals of I & II

UNIT – 2 (6 hours)
Humor in real life - Body language - Collage and poster designing and slogan writing

UNIT – 3 (6 hours)
Brain Teasers – JAM - Current News Update I

UNIT – 4 (6 hours)
Current News Update II - Enactment (SKIT –I) - Enactment (SKIT – II)

UNIT – 5 (6 hours)
Survey and Reporting (heroes, sports persons etc.) - Quiz III - Review

EVALUATION:

1. Activities assessed by both group and individual participation
2. Continuous assessment based on daily participation

SCHEME OF INSTRUCTION
Marks allocated for regular participation in all oral activities in class

SCHEME OF EXAMINATION
Complete internal evaluation on a regular Basis

Course Number and Title

PD0301 PERSONALITY DEVELOPMENT - V

Credits / Contact Hours

2 / 45

Instructor Name

Mrs.Mythreyi Koppur

Textbooks, References

Purpose

The purpose of this course is to build confidence and inculcate various soft skills and to help students to identify and achieve their personal potential

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

At the end of the course the students will be able to

1. Acquire the important soft skills for employment
2. Take part in group discussions and job interviews confidently
3. Appear for placement aptitude tests confidently
4. Gain self confidence to face the placement process

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
				X		X	X				
Mapping of instructional objectives with student outcome				1-4		1-4	1-4				

List of Topics Covered

UNIT – 1 (9 hours)
Syllogism - Binary Logic [cause & effect] - Assertive & Counter Argument - Simple Interest - Time & Work - Time & Distance

UNIT – 2 (9 hours)
Upstream &Downstream Reasoning - Verbal Comprehension I - Verbal Comprehension II- Compound Interest Logarithms - Surds & Indices

UNIT – 3 (9 hours)
Verbal Reasoning I - Verbal Reasoning II - Verbal Reasoning III – Percentage – Test – Averages

UNIT – 4 (9 hours)
Deductive Reasoning I - Deductive Reasoning II - Language Usage I - Decimal Fractions - Profit & Loss - Probability

UNIT – 5 (9 hours)
Language Usage II - Logic Games I - Logic Games II – Area - Pipes & Cisterns - Test

Course Number and Title

PD0302 PERSONALITY DEVELOPMENT VI

Credits / Contact Hours

2 / 45

Instructor Name

Ms.B.Revathi

Textbooks, References

Purpose

The purpose of this course is to build confidence and inculcate various soft skills and to help students to identify and achieve their personal potential.

Prerequisites	Co-requisites
Nil	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

At the end of the course the students will be able to
1. Acquire the important soft skills for employment
2. Take part in group discussions and job interviews confidently
3. Appear for placement aptitude tests confidently
4. Gain self confidence to face the placement process

Student Outcomes from Criterion 3 covered by this Course

	a	b	c	d	e	f	g	h	i	j	k
Student outcome	X			X							
Mapping of instructional objectives with student outcome	1-4			1-4							

List of Topics Covered

UNIT – 1 (9 hours)
Self Introduction- Narration - Current News Update – Numbers - Height & Distance - Square & Cube Roots

UNIT – 2 (9 hours)
Current Tech Update - Verbal Aptitude Test I - GD –I - Odd man out series - Permutation & Combination - Problems on ages

UNIT – 3 (9 hours)
GD –II - Resume Writing - Mock Interview I / reading comprehension - Problems on trains – Allegation of Mixtures - Test

UNIT – 4 (9 hours)
Mock Interview II / reading comprehension - Mock Interview III/ reading comprehension - GD – III - Ratio & Proportion - Clocks - H.C.F & L.C.M

UNIT – 5 (9 hours)
GD – IV - Verbal Aptitude Test II – Review – Partnership – Puzzles - Test

A.2.3 Engineering Topics - I

General Engineering Courses and others

2007-08 Curriculum Course Code	Name of the Course
GE0101	Basic Engineering – I
ME0120	Workshop Practice
GE0106	Basic Engineering – II
ME0130	Engineering Graphics
EE0231	Electrical Engineering
EC0203	Electron Devices
EC0301	Electronic Measurements and Instrumentation
EC0303	Control Systems

Course Number and Title

GE0101 BASIC ENGINEERING – I

Credits / Contact Hours

4 / 3 0

Instructor Name

Mrs.A.Vijaya

Textbooks, References

PART-A CIVIL ENGINEERING

- Raju K.V.B., Ravichandran P.T., "Basics of Civil Engineering", Ayyappa Publications, Chennai, 2000.
- Ramesh Babu, "Civil Engineering ", VRB Publishers, Chennai, 2000.
- Rangwala,S.C., "Engineering Materials", Charotar Publishing House, Anand, 1980.
- National Building Code of India, Part V, "Building Materials", 2005
- Surendra Singh, "Building Materials", Vikas Publishing Company, New Delhi, 1996

Purpose

To get exposed to the glimpses of Civil Engineering topics that is essential for an Engineer.

Prerequisites	Co-requisites
Nil	Nil

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To know about different materials and their properties.
2. Engineering aspects related to buildings.
3. To know about importance of surveying.
4. To know about the transportation systems.
5. To get exposed to the rudiments of engineering, related to Dams, Water Supply, Transportation system and Sewage Disposal.

Student Outcomes from Criterion 3 covered by this Course

	a	b	c	d	e	f	g	h	i	j	k
Student outcome	X				X						
Mapping of instructional objectives with student outcome	1-5				1-5						

List of Topics Covered

UNIT 1 BUILDING MATERIALS AND THEIR PROPERTIES 10hours

Introduction - Civil Engineering – Building Materials – Brick, Stone, Cement, Steel, Concrete, timber – Properties – Uses. Units – Stress, strain and three modulii of elasticity – factor of safety - Centre of Gravity and Moment of Inertia for rectangle and circular section – simple problems.

UNIT 2 BUILDINGS AND THEIR COMPONENTS 10hours

Buildings – Classification - Components of buildings and their functions Foundations - functions – classification of foundations – Bearing capacity Floorings – functions - Types - Cement Concrete flooring – Mosaic flooring - Marble flooring Roofs - Types – Requirements – Madras Terrace roof. Tall structure – types of structural systems.

UNIT 3 UTILITY AND SERVICES 10hours

Surveying - Objective – Principles – Classification – Instruments used for Surveying. Dams - Purpose – Selection of site – Classification – Gravity dam (cross-section details only) Transportation system - Classification – Roadway - components – classification of roads - Railway – Cross-section of permanent way- components parts and functions. Docks and Harbour – classification – Terminology Bridges –components of a bridge - types of bridges. Water supply - Sources - Standards of drinking water (BIS) – elementary treatment methods – RO System Sewage disposal – Septic tank – function and components.

Course Number and Title

ME0120 WORKSHOP PRACTICE

Credits / Contact Hours

2 / 60

Instructor Name

Mr.A.Rajasekaran

Textbooks, References

1. Gopal, T.V., Kumar, T., and Murali, G., *"A first course on workshop practice – Theory, practice and work book"*, Suma Publications, 2005.
1. Kannaiah,P. & Narayanan,K.C. "*Manual on Workshop Practice"*, Scitech Publications, Chennai, 1999.
2. Venkatachalapathy, V.S. "*First year Engineering Workshop Practice"*, Ramalinga Publications, Madurai, 1999.

Purpose

To provide the students with, hands on experience on different trades of engineering like fitting, carpentry, smithy, welding and sheet metal.

Prerequisites	Co-requisites
NIL	GE0101

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

To familiarize with

1. The basics of tools and equipments used in fitting, carpentry, sheet metal, welding and smithy.
2. The production of simple models in the above trades.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X									
Mapping of instructional objectives with student outcome	1-2	1-2									

List of Topics Covered

LIST OF EXPERIMENTS

EMPHASIS TO BE LAID ON REAL LIFE APPLICATIONS WHEN FRAMING THE EXERCISES.

UNIT 1 FITTING 12 hours
Tools & Equipments – Practice in Filing and Drilling.
Making Vee Joints, Square, dovetail joints, Key Making.

UNIT 2 CARPENTARY 12hours
Tools and Equipments- Planning practice. Making Half Lap, dovetail, Mortise & Tenon joints, a mini model of a single door window frame.

UNIT 3 SHEET METAL 12hours
Tools and equipments - Fabrication of a small cabinet, Rectangular Hopper, etc.

UNIT 4 WELDING 12hours
Tools and equipments - Arc welding of butt joint, Lap Joint, Tee Fillet. Demonstration of Gas welding, TIG & MIG.

UNIT 5 SMITHY 12hours
Tools and Equipments –Making simple parts like hexagonal headed bolt, chisel.

Course Number and Title

GE0106 BASIC ENGINEERING – II

Credits / Contact Hours

4 / 30

Instructor Name

Dr.M.Sangeetha and Dr.C.S.Boopathy

Textbooks, References

PART A - ELECTRICAL ENGINEERING

- Muthusubramanian.R, Salivahanan.S, Muraleedharan.K.A, "Basic Electrical, Electronics and Computer Engineering", Tata McGraw - Hill, 1999.
- Mehta V K ,Principles of Electronics S Chand & Co,1980
- Kothari D P and Nagrath I J ,Basic Electrical Engineering , Tata McGraw Hill,1991
- Mithal G K , Electronic Devices and Circuits, Khanna Publications,1997.

PART B - ELECTRONICS ENGINEERING

- Muthusubramanian.R, Salivahanan.S, Muraleedharan.K.A, "Basic Electrical, Electronics and Computer

Engineering", Tata McGraw - Hill, 1999.
- Metha V.K, "Principles of Electronics", S. Chand & Co., 1980.
- Kalsi H S, Electronics Instrumentation", ISTE publication,1995
- Kothari D. P and Nagrath IJ, "Basic Electrical Engineering", Tata McGraw- Hill, 1991.
- Thomas L.Floyd "Electronic devices", Addison Wesley Longman (Singapore) Pvt . Ltd., 5th Edition.

Purpose

This course provides comprehensive idea about circuit analysis, working principles of machines and common measuring instruments. It also provides fundamentals of electronic devices, transducers and integrated circuits.

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

At the end of the course students will be able
1. To understand the basic concepts of magnetic circuits, AC & DC circuits.
2. To explain the working principle, construction, applications of DC & AC machines and measuring instruments.
3. To gain knowledge about the fundamentals of electric components, devices, transducers and integrated circuits.

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Student Outcomes from Criterion 3 covered by this Course

	a	b	c	d	e	f	g	h	i	j	k
Student outcome	X				X						
Mapping of instructional objectives with student outcome	1-3				1-3						

List of Topics Covered

PART A - ELECTRICAL ENGINEERING

UNIT 1 ELECTRICAL MACHINES 12 hours

Definition of mmf, flux and reluctance, leakage flux, fringing, magnetic materials and B-H relationship. Problems involving simple magnetic circuits, Faraday's laws, induced emfs and inductances, brief idea on Hysteresis and eddy currents. Working principle, construction and applications of DC machines and AC machines (1-phase transformers, 3-phase induction motors, single phase induction motors – split phase, capacitor start and capacitor start & run motors).

UNIT 2 AC & DC CIRCUITS 10 hours

Circuit parameters, Ohms law, Kirchhoff's law. Average and RMS values, concept of phasor representation. RLC series circuits and series resonance, RLC parallel circuits (includes simple problems in DC & AC circuits)
Introduction to three phase systems – types of connections, relationship between line and phase values. (qualitative treatment only)

UNIT 3 WIRING & LIGHTING 8 hours

Types of wiring, wiring accessories, staircase & corridor wiring, Working and characteristics of incandescent, fluorescent, SV & MV lamps. Basic principles of earthing, simple layout of generation, transmission & distribution of power.

PART B - ELECTRONICS ENGINEERING

UNIT 1 ELECTRONIC COMPONENTS AND DEVICES 12 hours

Passive components: Resistors- Inductors and Capacitors and their types.

Semiconductor: Energy band diagram- Intrinsic and Extrinsic semiconductors- PN junction diodes and Zener diodes – characteristics.
Transistors: PNP and NPN transistors – theory of operation – Transistor configurations – characteristics – comparison.
Special semiconductor devices: FET – SCR – LED – V I characteristics – applications.
Rectifiers: Half wave and full wave rectifier – capacitive filter – wave forms – ripple factor – regulation characteristics.

UNIT 2 TRANSDUCERS AND MEASURING INSTRUMENTS 9 hours
Transducers: General features and classification of transducers, Resistive Transducers – Potentiometer, Unbonded strain gauge-Bonded strain gauge-Load cell, Inductive transducers – Differential output transducers – LVDT, Flow transducers, Temperature Transducers – Thermistors, Thermocouple and pyrometers.
Measuring Instruments: Basic principles and classification of instruments, Moving coil and Moving iron instruments, CRO – Principle of operation.

UNIT 3 DIGITAL ELECTRONICS & LINEAR ICs 9 hours
Digital Fundamentals: Number systems – Boolean Theorems – DeMorgan's Theorem - Logic gates – Implementation of Boolean Expression using Gates.
Integrated Circuits: IC fabrication – Monolithic Technique- Function of Operational Amplifier.

Course Number and Title

ME0130 ENGINEERING GRAPHICS

Credits / Contact Hours

3 / 75

Instructor Name

Mr.A.Rajasekaran

Textbooks, References

- Jeyapoovan, T., *"Engineering Drawing and Graphics using AutoCAD 2000"*, Vikas Publishing house Pvt Ltd, NewDelhi, 2005.
- Narayanan, K.L & Kannaiah, P., *"Engineering Graphics"*, Scitech Publications, Chennai, 1999.
- Bhatt, N.D., "*Elementary Engineering Drawing (First Angle Projection)"*, Charotar Publishing Co., Anand, 1999.
- Venugopal, K. "*Engineering Drawing & Graphics"*, New Age international Pvt. Ltd., 2001.
- Natarajan, K.V. "*Engineering Drawing & Graphics"*, Private Publication, Chennai, 1990.
- Shah, M.B. and Rana, B.C., "*Engineering Drawing"*, Pearson Education (Singapore) Pvt. Ltd., Delhi – 110 092, 2005.

Purpose

1. To draw and interpret various projections of 1D, 2D and 3D objects.
2. To prepare and interpret the drawings of buildings.

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

To familiarize with

1. The construction of geometrical figures
2. The projection of 1D, 2D & 3D elements
3. Sectioning of solids and development of surfaces
4. Preparation and interpretation of building drawing

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X				X						
Mapping of instructional objectives with student outcome	1-4				1-4						

List of Topics Covered

UNIT 1 FUNDAMENTALS OF ENGINEERING GRAPHICS (2 hours)
Lettering, two dimensional geometrical constructions, conics, representation of three-dimensional objects – principles of projections – standard codes – projection of points.

UNIT 2 PROJECTION OF LINES AND SOLIDS (4 hours)
Projection of straight lines, projection of solids – auxiliary projections

UNIT 3 SECTIONS AND DEVELOPMENTS (3 hours)
Sections of solids and development of surfaces.

UNIT 4 PICTORIAL PROJECTIONS (4 hours)
Conversion of projections: Orthographic projection, isometric projection of regular solids & combination of solids.

UNIT 5 BUILDING DRAWING (2 hours)
Building Drawing – plan, elevation and section of single storied residential (or) office building with flat RCC roof and brick masonry walls having not more than 3 rooms (planning / designing is not expected in this course).

PRACTICAL 60hours
TOTAL 75hours

Course Number and Title

EE0231 ELECTRICAL ENGINEERING

Credits / Contact Hours

3 / 45

Instructor Name

Dr.C.S.Boopathy

Textbooks, References

- K.B. Raina, S.K. Bhattacharya, "*Electrical Design Estimating & Costing*", New Age International (P)

Ltd., 2001.
- B.L.Theraja, A.K. Theraja, "*A text books of Electrical Technology – Vol.II, AC & DC Machines*", Publication Division of Nirja Construction & Development Co. (P) Ltd., New Delhi, 1994.
- S.L.Bhatia, "*Hand Book of Electrical Engineering*", Khanna Publications, 1997.
- S.K.Battacharya, "*Electrical Machines*", Tata McGraw Hill Publishing Company Ltd., New Delhi, 1994.
- Kosow, "*Electric Machinery and Transformer*", Prentice Hall of India., 2nd Edition, 1991.
- J.B.Gupta, "*Theory & Performance of Electrical Machines*", Katsur Publishing House (Regd), 1994.

Purpose

To give students a fair knowledge on the working of various electrical machines.

Prerequisites	Co-requisites
GE0106	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. Analyze the performance of different types of electrical machines.
2. Appreciate the applications of them.
3. Design distributing systems

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X				X						
Mapping of instructional objectives with student outcome	1-3				1-3						

List of Topics Covered

UNIT 1 DC MACHINES (9 hours)
Constructional details of DC machine – working principle of DC generator – Types of Generators – EMF equation – No load and load characteristics.
Principle of operation of DC motors – Back emf – Torque equation – characteristics of shunt, series and compound motors – speed control & starters (Qualitative treatment only)

UNIT 2 TRANSFORMER (9 hours)
Principle of operation – Constructional features of single phase transformers – Types of transformer – EMF equation – Transformer on No load and on load – Effects to resistance and leakage reactance of the windings - Equivalent circuit – Voltage regulation.
Three Phase induction motor: Construction – Principle of operation – Production of rotating magnetic field – Slip – Torque equation – Torque slip characteristics – Methods of speed control and starters (Qualitative treatment only).

UNIT 3 FRACTIONAL HORSE POWER MOTORS (9 hour)
Construction and working principle of single phase motor – split phase, capacitor start & capacitor run motors – Universal motors.

UNIT 4 SYNCHRONOUS MACHINE (9 hours)
Constructional features of synchronous generator – types – emf equation – brief idea of armature reaction – voltage regulation (EMF method only) – Phasor diagram.
Synchronous Motor: Working principle of synchronous motors – Types of excitation – Constant load variable excitation – Constant excitation variable load – Phasor diagram – Starting methods.

UNIT 5 ELECTRIC DISTRIBUTION SYSTEMS (Qualitative treatment only) **(9 hours)**
Electric supply system – Distribution system wiring layout – Domestic, Commercial & Industrial – Protection of

Electric installation against Over load, Short circuit & Earth fault – Earthing – necessity – Types of Earthing .

Course Number and Title

EC0203 ELECTRON DEVICES

Credits / Contact Hours

3 / 45

Instructor Name

Mr.U.Hari

Textbooks, References

- Ben G. Streetman and Sanjay Kumar Banerjee. "*Solid State Electronic Devices*", 6th Edition, Pearson Education
- Robert L. Boylestad and Louis Nashelsky , "*Electronic Devices and Circuit Theory*" , 9th Edition – Pearson Education , International Edition.
- Donald A. Neamen, "*Semiconductor Physics and Devices*, 2nd Edition, Irwin publishers.
- S.M. Sze , "*Physics of Semiconductor Devices*", 2nd edition, Wiley Eastern
- Stanley G. Burns and Paul R. Bond ," *Principles of Electronics*" Circuits , Galgotia Publishers

Purpose

The purpose of this course is to provide a basis for understanding the characteristics, operation and limitations of semiconductor devices. This course brings together the quantum theory of solids, semiconductor material physics, and semiconductor device physics.

Prerequisites	Co-requisites
GE0106	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To understand the operational characteristics of a Semiconductor in Equilibrium and Non-Equilibrium conditions.
2. To understand the working of PN junction diodes and special purpose diodes.
3. To understand the basic working physics of BJT and FET both in ideal and non-ideal conditions.

Student Outcomes from Criterion 3 covered by this Course

	a	b	c	d	e	f	g	h	i	j	k
Student outcome	X	X									
Mapping of instructional objectives with student outcome	1-3	1-3									

List of Topics Covered

UNIT 1 ENERGY BANDS AND EXCESS CARRIERS IN SEMICONDUCTORS (9 hours)

Energy bands and excess carriers in semiconductors: Bonding forces and Energy Bands in Solids – Charge Carriers

in Semiconductors – Carrier concentrations – Drift of Carriers in Electric and Magnetic Fields – Invariance of the Fermi level at Equilibrium.
Excess carriers in semiconductors: Optical Absorption – Luminescence – Carrier Lifetime and Photoconductivity – Diffusion of Carriers.

UNIT 2 SEMICONDUCTOR JUNCTIONS (9 hours)
Junctions : Equilibrium Conditions – Forward and Reverse Biased Junctions – Reverse Bias Breakdown – Transient and AC Conditions – Deviations from the Simple Theory – Metal-Semiconductor Junctions.
Field Effect transistors: Transistor Operation – The junction FET – The Metal-Semiconductor FET – The Metal-Insulator-Semiconductor FET – The MOS FET

UNIT 3 SOLID STATE DEVICES-I (9 hours)
Bipolar Junction Transistors: Fundamentals of BJT Operation – Amplification with BJT's – Minority Carrier Distributions and Terminal Currents – Generalized Biasing – Switching – Other Important Effects – Frequency Limitations of Transistors – Hetero junction Bipolar Transistors
Opto-electronic devices:
Photodiodes – Light Emitting Diodes – Lasers and Semiconductor Lasers

UNIT 4 SOLID STATE DEVICES-II (9 hours)
Charge transfer devices: Dynamic Effects in MOS Capacitors – The basic CCD – Improvements on the Basic Structure – Applications of CCD's.
High-frequency and high-power devices: Tunnel Diodes – IMPATT Diode – Gunn Diode – PNPN Diode – SCR – IGBT – DIAC – TRIAC - UJT.

UNIT 5 POWER SUPPLIES (9 hours)
Half wave Rectification – Full wave Rectification – General filter consideration – Capacitor Filter – RC Filter – Discrete Transistor Voltage Regulation – IC Voltage Regulators – Practical Applications – SMPS.

Course Number and Title

EC0301 ELECTRONIC MEASUREMENTS & INSTRUMENTATION

Credits / Contact Hours

3 / 45

Instructor Name

Mr.B.Srinath.

Textbooks, References

- Albert.D. Helfrick and William. D. Cooper, "*Modern Electronic Instrumentation and Measurement Techniques*", Pearson education.
- H. S. Kalsi, "*Electronic Instrumentation*", Tata McGraw Hill Publishing Company Ltd., 1995.
- Earnest .O Doeblin, "*Measurement Systems Application and Design*", McGraw Hill International editions, 4th edition, 1990.
- A.K.Sawhney, "*A Course in Electrical and Electronic Measurements and Instrumentation*", Dhanapat Rai & Sons, 2000.
- A.J.Bouwens, "*Digital Instrumentation*", McGraw Hill, 1986.

- Geroge C. Barney, "*Intelligent Instrumentation*",IEEE, 1992.

Purpose

The purpose of this course is to introduce students to the various types of measurements made in electronics and the instruments used for measuring them. The main objective of this subject is to help students identify the different latest measurement techniques available for specific engineering applications.

Prerequisites	Co-requisites
EC0206	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. Understand the various measurement techniques available
2. Understand the basic working of instruments used for measurement
3. Understand the errors in measurements and their rectification

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
			X		X						
Mapping of instructional objectives with student outcome			1-3		1,2						

List of Topics Covered

UNIT 1 MEASUREMENTS AND ERRORS (9 hours)
Accuracy-Precision-Significant Figures-Types of Errors-Statistical Analysis-Limiting Errors-Bridge Measurements (AC and DC bridges) - Analysis of Linear Systems-Time Domain Response-I Order response for Step Input-Ramp Input-Impulse Input- Bourdon Tube-Pressure Gauge-Measurement of Flow.

UNIT 2 ELECTROMECHANICAL & DIGITAL INDICATING INSTRUMENTS (9 hours)
PMMC Mechanism-DC Ammeters and Voltmeters-Series and Shunt Type Ohmmeter-Alternating Current Indicating Instruments (Moving Iron instruments, electrodynamometer instrument)-D/A and A/D Converters-Digital Voltmeters-Vector Voltmeter-Guarding Techniques-Automation in Voltmeter.

UNIT 3 SIGNAL GENERATION AND ANALYSIS (9 hours)
Sine Wave Generator-Sweep Frequency Generator-Pulse and Square wave Generator-Function Generator-Analyzer-Wave Analyzer-Distortion Analyzer-Harmonic Distortion Analyzer-Spectrum Analyzer-Logic Analyzer.

UNIT 4 OSCILLOSCOPES AND RECORDERS (9 hours)
Simple CRO - Dual Beam-Dual Trace-Sampling Oscilloscope-Analog and Digital Storage Oscilloscope-Recorders-XY Recorder-Magnetic Recorders- Display Devices (LED, LCD, Alphanumeric displays).

UNIT 5 COMPUTER CONTROLLED TEST SYSTEMS (9 hours)
Testing an Audio Amplifier-Testing a Radio Receiver-Instruments used in Computer Controlled Instrumentation-Microprocessor based System and Measurement-Case Studies in Instrumentation-Electronic Weighing System-Digital Transducer.

Course Number and Title

EC0303 CONTROL SYSTEMS

Credits / Contact Hours

3 / 45

Instructor Name

Mr.P.K.Senthil kumar

Textbooks, References

- Katsuhiko Ogata, "*Modern Control Engineering*" second edition, Prentice Hall of India Private Ltd, New Delhi, 1995.
- Nagrath I J and Gopal .M. "*Control Systems Engineering*", I edition,Wiley and sons, 1985.
- Benjamin C Kuo, "*Automatic Control System*", 7th edition, Prentice Hall of India Private Ltd, New Delhi, 1993.
- Gajic Z., Lelic M., "*Modern Control System Engineering*", Prentice Hall of India Private Ltd, New Delhi, 1996.
- Richard .C. Dorf and Robert.H.Bishop, "*Modern Control System Engineering*", Addison Wesley, 1999.
- Katsuhiko Ogata, "*Modern Control Engineering*" 4th edition, Pearson education.

Purpose

To give an introduction to the analysis of linear control systems. This will permit an engineer to exploit time domain and frequency domain tools to design and study linear control systems.

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

At the conclusion of this course, the students will be able to:

1. Describe what feedback control is and basic components of control systems.
2. Describe the various time domain and frequency domain tools for analysis and design of linear control systems.
3. Describe the methods to analyze the stability of systems from transfer function forms.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X		X		X						
Mapping of instructional objectives with student outcome	1		2,3		1-3						

List of Topics Covered

UNIT 1 TRANSFER FUNCTIONS (9 hours)

Introduction and classification of control systems-linear, nonlinear, time varying, time in-variant, continuous, discrete, SISO and MIMO systems – definitions. Transfer function – Mathematical modeling of mechanical (translation and rotational), Electrical systems- mechanical-electrical analogies– Block Diagram reduction technique and Signal flow graphs.

UNIT 2 CONTROL SYSTEM COMPONENTS (9 hours)
Transfer function of potentiometers, armature controlled and field controlled dc motor. –tacho generators -gear trains-controllers (On – Off, P, PI,PD, PID)

UNIT 3 TRANSIENT AND STEADY STATE ANALYSIS (9 hours)
Transient and steady state response-definitions-mathematical expression for standard test signals-type and order of systems-step, ramp and impulse response of first order and second order under damped systems - Step response of second order critically damped and over damped systems - Time domain specifications of second order under damped systems - Steady state error analysis.

UNIT 4 STABILITY ANALYSIS (9 hours)
Stability analysis – characteristic equation – location of roots in S-plane for stability -Routh's stability criterion-relative stability analysis-root locus technique-construction of root loci for negative feed back systems.

UNIT 5 FREQUENCY DOMAIN ANALYSIS (9 hours)
Frequency response analysis-frequency domain specifications of second order systems-Bode plots and stability (gain and phase) margins- Need for compensation -Introduction to lead, lag, lead-lag compensating networks, minimum phase& non-minimum phase systems - polar plots-constant M and N circles-Nichols chart - Nyquist stability criterion

A.2.4 Engineering Topics - II

Professional Core Courses

2007-08 Curriculum Course Code	Name of the Course
EC0102	Electric Circuits
EC0122	Electric Circuits Lab
EC0201	Electromagnetic Theory & Waveguides
EC0205	Digital Systems
EC0207	Signals and Systems
EC0221	Electron Devices Lab
EC0223	Digital System Lab
EC0204	Electronic Circuits
EC0206	Linear Integrated Circuits
EC0208	Transmission Lines and Networks
EC0210	Communication Theory
EC0212	Digital Signal Processing
EC0222	Electronic Circuits Lab
EC0224	Communication Lab – I
EC0226	Comprehension –I
EC0305	Antenna and Wave Propagation
EC0307	Digital Communication
EC0309A	Microprocessors and Microcontrollers
EC0321A	Processor Lab
EC0323	Communication Lab – II
EC0325	Industrial Training –I
EC0302	Microwave and RF Design
EC0304	Optical Communication and Networks
EC0306	VLSI Devices and Design
EC0322	Microwave and Optical Communication Lab
EC0324	VLSI Design Lab
EC0326	Comprehension – II
EC0328	Computer Skills
EC0401	Computer Communication
EC0403	Wireless Communication
EC0421	Network Simulation Lab
EC0423	Industrial Training – II
EC0425	Seminar
EC0422	Project Work

Course Number and Title

EC0102 ELECTRIC CIRCUITS

Credits / Contact Hours

3 / 60

Instructor Name

Dr.K.Kalimuthu

Textbooks, References

- William H.Hyte,Jr, J.E.Kemmerly & Steven M.Durban, " *Engineering Circuit Analysis*" 6th edition, Mcgraw Hill,2002
- A.Sudhakar & Shyanmugam S.Palli " *Circuits & Network Analysis & Synthesis*", 2nd Edition, Tata McGraw Hill, 1994
- M.Arumugam & N.PremKumar, " *Electric Circuit Theory*", Khanna Publishers, New Delhi, 1991
- M.L Soni & J.C. Gupta, " *Electric Circuit Analysis"*, Dhanpat Rai & Sons , New Delhi, 1981
- Joseph Edminster, "Electric Circuits" Schaum's Outline Series, McGrawHill 2nd Edition.

Purpose

To expose basic circuit concepts, circuit modeling and methods of circuit analysis in time domain and frequency domain for solving simple and multi dimensional circuits including coupled circuits and three phase circuits.

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To understand the concept of circuit elements lumped circuits, waveforms, circuit laws and network reduction.
2. To solve the electrical network using mesh and nodal analysis by applying network theorems.
3. To understand the concept of active, reactive and apparent powers, power factor and resonance in series and parallel circuits.
4. To know the basic concepts of coupled circuits, three phase loads and power measurement.
5. To analyze the transient response of series and parallel A.C. circuits and to solve problems in time domain using Laplace Transform.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X		X						X
Mapping of instructional objectives with student outcome	1-5	5	5		1-4						5

List of Topics Covered

Unit 1 BASIC CIRCUIT CONCEPTS & LAWS: (6 hours)
Lumped Circuit elements, Ideal Sources (Dependent & Independent), Linear Passive elements –VI relationship of

Circuit elements- Definitions: Node, Loop, Path & Branch. – Examples – Kirchoff's Laws and Application (Both AC & DC) .

Unit 2 NETWORK THEOREMS: (Both DC & AC Circuit Analysis) (6 hours)
Source Transformation Theorem – Duality Theorem – Linearity & Super Position Principle – Thevenin's & Norton's Theorem – Reciprocity Theorem – Compensation Theorem – Tellegen's & Millman's Theorem – Maximum Power Transfer theorem – Substitution Theorem – Star – Delta Theorem.

UNIT 3 BASIC CONCEPTS OF AC & RESONANCE (6 hours)
AC Analysis: Concept of Phasor & Complex impedance/Admittance- Analysis of Simple series and Parallel Circuits- Active Power, Reactive Power, Apparent Power (Volt Amperes), Power Factor and Energy Associated with these Circuits – Concept of complex power – Phasor Diagram, impedance Triangle & Power Triangle associated with these circuits

Resonance: Introduction- series resonance-parallel resonance- Definition: Q Factor-half power frequency-resonant frequency- Bandwidth-Mathematical Expression for Different types of Resonant circuit.

UNIT 4 MAGNETICALLY COUPLED & 3- PHASE CIRCUITS: (6 hours)
Coupled Circuits: Mutual inductance – Co-efficient of Coupling- Dot Convention- Energy Consideration – Analysis of Coupled Circuits
3- Phase Circuits: Poly phase System – Phase Sequence – Analysis of 3 Phase Balanced/Unbalanced Circuits- Power and Power factor Measurement

UNIT 5 TRANSIENT ANALYSIS (6 hours)
Basics – Source free and Forced Response of RL, RC and RLC Series Circuits- Forced Response of RL, RC & RLC Series circuits with Sinusoidal Excitation – Time Constant & Natural frequency of Oscillation – Laplace Transform Application to the Solution of RL, RC & RLC Transient Circuits.

TUTORIAL	**30 hours**
TOTAL	**60 hours**

Course Number and Title

EC0122 ELECTRIC CIRCUITS LAB

Credits / Contact Hours

1 / 30

Instructor Name

Mrs. C.R. Uma Kumari

Textbooks, References

- **LABORATORY MANUAL**

Purpose

To inculcate strong practical skills on the fundamental theorems and transient circuit analysis.

Prerequisites	Co-requisites
NIL	EC0102

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To impart hands on experience in verification of circuit laws and theorems
2. To measure circuit parameters
3. To study circuit characteristics and simulation of time response

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
			X	X							
Mapping of instructional objectives with student outcome			1-3	1-3							

List of Topics Covered

LIST OF EXPERIMENTS (30 hours)

1. Verification of Kirchoff's voltage and Current Laws
2. Verification of Superposition Theorem
3. Verification of Thevenin's Theorem
4. Verification of Maximum Power Transfer Theorem
5. Verification of Tellegen's or Norton's Theorem
6. Time domain response of RL Transient Circuit.
7. Time domain response of RC Transient Circuit.
8. Series RLC Resonance Circuits(Frequency response& Resonant frequency)
9. Parallel RLC Resonance Circuits(Frequency response & Resonant frequency)
10. Measurement of real power, reactive power, power factor and impedance of RC, RL and RLC circuits using voltmeters and ammeters.

Course Number and Title

EC0201 ELECTROMAGNETIC THEORY AND WAVEGUIDES

Credits / Contact Hours

3 / 45

Instructor Name

Dr. M. Sangeetha

Textbooks, References

- William H.Hayt,Jr and John A.Buck., "*Engineering Electromagnetics*", Tata McGraw-Hill Publishing Ltd, 7th edition 2006.
- G.S.N.Raju., "*Electromagnetic Field Theory and Transmission* Lines" Pearson Education, First Indian print 2005
- Matthew N. O. Sadiku., "*Elements of Electromagnetics*", Oxford University Press,3rd edition, First Indian edition 2006
- Gangadhar K.A , "*Field Theory*", Khanna Publications,2000
- Muthusubramanian R and Senthil Kumar N, "*Electromagnetic field theory*",Anuradha publications,1999
- Edward Jordan and KG Balmain, "*Electromagnetic Waves and Radiationg Systems*", Pearson education, 2nd edition.

Purpose

To enable the students, to have a fair knowledge about the theory and problems of electromagnetism and waveguides.

Prerequisites	Co-requisites
MA0102	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. Understand the basic concepts of electric field and magnetic field
2. Compare between field and circuit theory
3. Need for impedance matching and different impedance matching techniques
4. Different types of waveguides

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X				X						
Mapping of instructional objectives with student outcome	1-4				1-4						

List of Topics Covered

UNIT 1 STATIC ELECTRIC FIELDS (9 hours)
Introduction to co-ordinate system-**Coulomb's law**: Electric field intensity-Field due to different types of charges-Electric Flux density. **Gauss law**: It's applications to symmetrical charge distributions- Concept of divergence. **Electric potential**: Potential field due to different types of charges-Potential gradient-The dipole-field due to dipole-Energy density in electrostatic field.

UNIT 2 STEADY MAGNETIC FIELDS (9 hours)
Biot Savart Law: Its applications**. Ampere's circuital law**: Its applications-Curl of magnetic field intensity-Magnetic flux and magnetic flux density-The scalar and vector magnetic potentials-Steady magnetic field laws.

UNIT 3 MAXWELLS EQUATIONS AND TIME VARYING FIELDS (9 hours)
Maxwell's Equations: For steady fields in point form and integral form-Faraday's law- displacement current-Maxwell's equations in point form and integral form for time-varying fields-Comparison of field and circuit theory. **Poynting Theorem:** Poynting vector

UNIT 4 GUIDED WAVES (9 hours)
Waves between parallel planes: Transverse electric waves-Transverse magnetic waves-characteristic of TE and TM waves-TEM waves. Velocity of propagation-Attenuation in parallel plane guides-Wave impedance

UNIT 5 WAVEGUIDE THEORY (9 hours)
Rectangular wave guides: TE waves and TM waves in Rectangular waveguides-Dominant mode-cutoff frequency in wave guides-Impossibility of TEM waves in waveguides. **Circular waveguides**: Wave impedance and characteristic impedance-Power flow in wave guides-Attenuation factor and Q of wave guides-Transmission line analogy for waveguides

Course Number and Title

EC0205 DIGITAL SYSTEMS

Credits / Contact Hours

3 / 45

Instructor Name

Dr.J.Selvakumar

Textbooks, References

- Morris Mano. M, "*Digital Design* ", Pearson education, Third Edition 2002.
- Ronald J. Tocci, "*Digital System Principles and Applications*" , PHI ,Sixth Edition, 1997.
- Floyd, "*Digital Fundamentals*" , Universal Book Stall, New Delhi,1986.
- Morris Mano. M, "*Digital Design* ", PHI, Second Edition.
- Ronald J. Tocci, "*Digital System Principles and Applications*", Pearson education 9th edition.

Purpose

The purpose of this course is to develop a strong foundation in analysis and design of digital electronics.

Prerequisites	Co-requisites
GE0106	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

At the end of the course students should be able to

1. Understand concepts of combinational and sequential circuits
2. Analyze the synchronous and asynchronous logic circuits
3. Understand concepts of memory, programmable logic and digital integrated circuits.

Student Outcomes from Criterion 3 covered by this Course

	a	b	c	d	e	f	g	h	i	j	k
Student outcome	X	X	X								
Mapping of instructional objectives with student outcome	1,2	1-3	1-3								

List of Topics Covered

UNIT 1 NUMBER SYSTEMS - BOOLEAN ALGEBRA AND LOGIC GATES (7 hours)
Number Systems - Boolean algebra – Canonical and standard forms. Digital logic gates – Integrated circuits. Map method – four and five variable map methods –Products of Sums Simplification - Don't care conditions .Quine - McClucskey Method.

UNIT 2 GATE LEVEL MINIMIZATION & COMBINATIONAL LOGIC (9 hours)
Two level implementation – NAND & NOR Implementations – EXOR Functions. Combinational Circuits – Analysis and design procedure – Binary adder - Subtractor – Decimal Adder – Binary Multiplier – Magnitude Comparator –

Decoders – Encoders – Multiplexers.

UNIT 3 SYNCHRONOUS SEQUENTIAL LOGIC (9 hours)
Sequential circuits - Latches – Flip-Flops - Analysis of Clocked Sequential Circuits – State Reduction and Assignment – Design Procedure.
Registers – Shift Registers – Ripple counters – Synchronous Counters – Other counters.

UNIT 4 AYSYNCHRONUS SEQUENTIAL LOGIC AND MEMORY (11 hours)
Introduction – Analysis Procedure – Circuit with Latches – Design Procedure – Reduction of State and Flow Tables – Race-Free state Assignment.
Memory – Introduction – Random-Access Memory – Memory Decoding – Read only memory.

UNIT 5 DIGITAL INTEGRATED CIRCUITS AND PROGRAMMABLE LOGIC (9 hours)
Introduction – Special Characteristics – Bipolar-Transistor Characteristics – RTL and DTL Circuits – TTL – ECL - MOS – CMOS – CMOS Transmission Gate Circuits – Programmable Logic Array – Programmable Array Logic - Sequential Programmable Devices.

Course Number and Title

EC0207 SIGNALS AND SYSTEMS

Credits / Contact Hours

3 / 60

Instructor Name

Mrs.S.Kolangiammal

Textbooks, References

- Simon Haykin and Barry Van Veen "*Signals and Systems*", John Wiley & Sons In, 2001.
- Alan V. Oppenheim et al, "*Signals and Systems*", Pearson Education., 1997.
- John G. Proakis and Manolakis, "*Digital Signal Processing, Principles, Algorithms and Applications*", PearsonEducation, 3rdedition, 2002.
- B.P. Lathi, "Linear Systems & Signals", Oxford Press, Second Edition 2005.

Purpose

The purpose of this course is to introduce students to the fundamentals of signals and systems which are basic to Digital Signal Processing. The main objective of this subject is to help the students to mathematically analyze different types of signals and their associated systems.

Prerequisites	Co-requisites
MA0102	MA0211

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

At the end of this course, the students will be able to understand the

1. Various classifications of both Continuous time and Discrete time Signals and Systems.
2. Spectral analysis of Periodic and Aperiodic Signals using Fourier series.
3. Analysis and characterization of the CT system through Laplace transform.
4. Analysis and characterization of the DT system through Z transform.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X								
Mapping of instructional objectives with student outcome	1-4	1-4	3,4								

List of Topics Covered

UNIT 1 CLASSIFICATION OF SIGNALS AND SYSTEMS (6 hours)
Classification of Signals: Continuous time signals - Discrete time signals – Periodic and Aperiodic signals – Even and odd signals – Energy and power signals –Deterministic and random signals –Complex exponential and Sinusoidal signals .Unit step, Unit ramp, Unit impulse – Representation of signals in terms of unit impulse .
Classification of Systems: Continuous time systems- Discrete time systems - Linear system – Time Invariant system – causal system – BIBO system – Systems with and without memory – LTI system.

UNIT 2 ANALYSIS OF CT SIGNALS (6 hours)
Fourier series: Representation of Continuous time Periodic signals – Properties of Continuous time Fourier series – Parseval's relation –Frequency spectrum – Power density spectrum –Band limited signals – complex analytic signals.
Fourier transform: Representation of Continuous time signals- Properties of Continuous time Fourier transform – Energy density spectrum.

UNIT 3 LTI CT SYSTEM (6 hours)
System modeling: Differential equation – impulse response – Frequency response – Convolution – Analysis and characterization of LTI system using Fourier methods and Laplace transform.

UNIT 4 ANALYSIS OF DT SIGNALS AND SYSTEMS (6 hours)
Representation of sequences – Discrete time Fourier transform (DTFT) - Discrete Fourier transform (DFT) and its properties - System modeling in terms of difference equation- impulse response – Convolution sum -Frequency response.

UNIT 5 Z TRANSFORM (6 hours)
Z transform: Unilateral &Bilateral Z transforms – properties. **Inverse Z transform**: Power series expansion – Partial fraction. Analysis and characterization of DT system using Z transform.

TUTORIAL 30 hours
TOTAL 60 hours

Course Number and Title

EC0221 ELECTRON DEVICES LAB

Credits / Contact Hours

2 / 45

Instructor Name

Mrs.R.Dayana

Textbooks, References

- LABORATORY MANUAL

Purpose

To verify practically, the fundamental characteristics of Electron Devices.

Prerequisites	Co-requisites
EC0122	EC0203

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To study experimentally the characteristics of diodes, BJT's and FET's.
2. To verify practically, the response of various special purpose electron devices.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X	X		X					
Mapping of instructional objectives with student outcome		1-2	1-2	1-2		1-2					

List of Topics Covered

LIST OF EXPERIMENTS (45 hours)

1. Characteristics of PN junction and Zener diode.
2. Input, Output and Transfer characteristics of CE and CC Amplifier.
3. Characteristics of LDR, Photo-diode and Photo transistor.
4. Transfer characteristics of JFET.
5. Transfer characteristics of MOSFET (with depletion and enchancement mode)
6. Characteristics of LED with three different wavelengths.
7. Half wave rectifier.
8. Full wave rectifier with 2 diodes.
9. Full wave rectifier with 4 diodes (Bridge rectifier).
10. Series voltage Regulator.
11. Shunt voltage Regulator.
12. Characteristics of Thermistor.

Course Number and Title

EC0223 DIGITAL SYSTEM LAB

Credits / Contact Hours

2 / 45

Instructor Name

Mrs.A.Maria Jossy.

Textbooks, References

- LABORATORY MANUAL

Purpose

To understand, the logical behaviors of digital circuits and apply them in appropriate applications.

Prerequisites	Co-requisites
NIL	EC0205

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To verify operation of logic gates and flip-flops.
2. To design and construct digital circuits

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X	X		X					
Mapping of instructional objectives with student outcome		1-2	1-2	1-2		1-2					

List of Topics Covered

LIST OF EXPERIMENTS (45 hours)

1. Study of Gates & Flip-flops.
2. Half Adder and Full Adder.
3. Magnitude Comparator (2-Bit).
4. Encoders and Decoders.
5. Multiplexer and Demultiplexer.
6. Code Converter.
7. Synchronous Counters.
8. Ripple Counter.
9. Mod – N Counter.
10. Shift Register – SISO & SIPO.

Course Number and Title

EC0204 ELECTRONIC CIRCUITS

Credits / Contact Hours

3 / 60

Instructor Name

Mrs.E.Chitra

Textbooks, References

1. Robert l. Boylsted, Louis Nashelsky," *Electronic Devices and circuit Theory*", Pearson, 1997.
2. G K Mithal, "*Electronic Devices & Circuits*", Khanna Publishers, 1993.
1. David A Bell, "*Electronic Devices and Circuits*", Prentice Hall of India, 1998.
2. Jacob Millman, Christos C Halkias, "*Electron Devices and Circuits*", Tata McGraw Hill, Edition 1991.
3. Donald L Schilling, Charles Belove, "*Electronic Circuits*", 3rd edition, 1989.
4. Stanley G. Burns , Paul R. Bond, " *Principles of Electronic Circuits* " , Galgottia publishers.

Purpose

The purpose of this course is to introduce to the students the basics of biasing transistor circuits, feedback amplifiers, large signal amplifiers, tuned amplifiers, oscillators, wave shaping circuit using transistor & analyzing different electronic circuits.

Prerequisites	Co-requisites
EC0203	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

At the end of this course the students will learn and apply
1. Operating point calculations and working of basic amplifiers.
2. Working of different types of feedback amplifiers & oscillators.
3. Frequency response and design of tuned amplifiers.
4. Basic working & design of wave shaping circuits.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X		X						
Mapping of instructional objectives with student outcome	1-4	1-4	2-4		1-4						

List of Topics Covered

UNIT 1 BIASING METHODS AND SMALL SIGNAL MODELS (BJT, JFET, MOSFET) (6 hours)
DC & AC Load Lines-Operating Point-Q- Point variation-various Biasing Methods- Small signal equivalent - Calculation of voltage gain, current gain, power gain, input impedance and output impedance.

UNIT 2 TRANSISTOR AMPLIFIER AND ANALYSIS (6 hours)
Small Signal analysis of BJT, JFET and MOSFET amplifiers - Cascade amplifier- Cascode amplifier- Darlington Bootstrap amplifier- Differential amplifier.

UNIT 3 FEEDBACK AMPLIFIERS AND OSCILLATORS (6 hours)
Concept of feedback- Types of feedback- Analysis of voltage & current feedback amplifiers
Barkhausen criterion for oscillation – mechanism for start of oscillation & stabilization of amplitude – Analysis of RC & LC oscillators.

UNIT 4 LARGE SIGNAL AND TUNED AMPLIFIERS (6 hours)
Class-A CE amplifier – Q point placement – Power calculation – Maximum dissipation Hyperbola – Transformer coupled Amplifier – Class-B push pull amplifier – Class-AB operation-– Direct coupled push pull amplifier – Amplifier using complementary symmetry- Heat sink.
Single Tuned Amplifiers – Double tuned & synchronously tuned amplifiers.

UNIT 5 FREQUENCY RESPONSE AND WAVE SHAPING CIIRCUITS (6 hours)
Low frequency and High frequency response of BJT and FET amplifier. Nonlinear wave shaping circuits: Astable -

Bistable - Monostable Multivibrators. Schmitt Trigger - Time Base Generators. **TUTORIAL 30 hours** **TOTAL 60 hours**

Course Number and Title

EC0206 LINEAR INTEGRATED CIRCUITS

Credits / Contact Hours

3 / 45

Instructor Name

Mrs.N.Saraswathi

Textbooks, References

- Roy Choudhury and Shail Jain, " *Linear Integrated Circuits*", Wiley Eastern Ltd,1995
- Ramakant A.Gayakwad, "*Op-Amps and Linear Integrated Circuits*", 4th edition, Pearson education.
- Coughlin & Driscoll, "*Operational-Amplifiers and Linear Integrated Circuits*", 6th edition, Pearson education.
- Sergio Franco, "*Design with operational amplifier and analog integrated circuits*", McGraw Hill, 1997.

Purpose

To enable the students to understand the fundamentals of integrated circuits and designing electronic circuits using it.

Prerequisites	Co-requisites
EC0203	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To design simple circuits like amplifiers using op-amps
2. To design waveform generating circuits
3. To design simple filter circuits for particular application
4. To gain knowledge in designing a stable voltage regulators

	a	b	c	d	e	f	g	h	i	j	k
Student outcome	X	X	X		X						
Mapping of instructional objectives with student outcome	1-3	1-3	1-3		2,4						

List of Topics Covered

UNIT 1 INTRODUCTORY CONCEPTS AND FUNDAMENTALS (9 hours)

Introduction to operational amplifier: Op-amp symbol, terminals, packages and specifications-Block diagram Representation of op-amp-Op-amp input modes-Op-amp Data sheets and interpretation-Ideal op-amp and practical op-amp-Open loop and closed loop configurations of op-amp **Practical Limitations of op-amp circuits:**-Bias and offset

currents / offset voltage-Frequency compensation and stability-Gain bandwidth product-Slew Rate-Drift-CMRR and PSRR **Basic op-amp circuits:** Inverting and Non-inverting voltage amplifiers-Voltage follower-Summing , scaling and averaging amplifiers-Differential amplifiers-AC amplifiers. **Internal Schematic of 741 op-amps**

UNIT 2 OP – AMP APPLICATIONS (9 hours)
Linear Applications: Instrumentation Amplifiers-V-to-I and I-to-V converters-Differentiators and Integrators. **Non-linear Applications:** Precision Rectifiers-Wave Shaping Circuits (Clipper and Clampers)-Log and Antilog Amplifiers-Analog voltage multiplier circuit and its applications-Operational Trans conductance amplifier (OTA)-Comparators and its applications-Sample and Hold circuit

UNIT 3 OSCILLATORS AND FREQUENCY GENERATORS (9 hours)
Op-amp oscillators: Positive feedback and the Barkhausan criterion-Wien Bridge and phase shift oscillators-Square / Triangle / Ramp function generators
Single Chip oscillators and Frequency generators: Voltage controlled oscillator-555 Timer-555 Monostable operation and its applications-555 Astable operation and its applications-Phase Locked Loop-Operation of 565 PLL-Closed loop analysis of PLL-PLL applications

UNIT 4 ACTIVE FILTERS AND VOLTAGE REGULATOR (9hours)
Filter Fundamentals: Filter types-Filter order and poles-Filter class or alignment (Butterworth, Bessel, Chebyshev and Elliptic or Cauer)
Realizing Practical Filters: Sallen-Key LPF and HPF Realizations-BPF Realization-Notch Filter (Band Reject) Realization-State Variable Filters-All Pass Filters **Switched Capacitor Filters, Voltage Regulators**-Need for Regulation-Linear Regulators-Monolithic IC Regulators (78xx,79xx,LM 317,LM 337,723)-Switching Regulators

UNIT 5 DATA CONVERSION DEVICES (9 hours)
Advantages and disadvantages of working in the digital domain, **Digital to Analog Conversion:** DAC Specifications-DAC circuits-Weighted Resistor DAC-R-2R Ladder DAC-Inverted R-2R Ladder DAC-Monolithic DAC, **Analog to Digital conversion:** ADC specifications-ADC circuits-Ramp Type ADC-Successive Approximation ADC-Dual Slope ADC-Flash Type ADC-Tracking ADC-Monolithic ADC

Course Number and Title

EC0208 TRANSMISSION LINES AND NETWORKS

Credits / Contact Hours

3 / 45

Instructor Name

Mr.B.Viswanathan.

Textbooks, References

- John D.Ryder, "*Networks, Lines and Fields*", PHI, 1991.
- Sudhakar. A, Shyammohan S Palli, "*Circuits and Networks – Analysis and Synthesis*", Tata McGraw Hill, 2nd Edition, 2002.
- Umesh Sinha, "*Transmission Lines and Network*", Satya Prakashan Publishing Company, New Delhi, 2001.

Purpose

To lay a strong foundation on the theory of transmission line and networks by highlighting their applications.

Prerequisites	Co-requisites
EC0201	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To become familiar with propagation of signals through lines.
2. Calculation of various line parameters by conventional and graphical methods.
3. Need for impedance matching and different impedance matching techniques.
4. Design of different types of filters, equalizer and attenuators.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X		X		X						
Mapping of instructional objectives with student outcome	1-4		3,4		1-4						

List of Topics Covered

UNIT 1 TRANSMISSION LINE THEORY (9 hours)
General theory of Transmission lines - the transmission line – general solution - The infinite line – Wavelength, velocity of propagation – Waveform distortion – the distortionless line - Loading and different methods of loading – Line not terminated in Z0 – Reflection coefficient – calculation of current , voltage, power delivered and efficiency of transmission – Input and transfer impedance - Open and short circuited lines – reflection factor and reflection loss.

UNIT 2 HIGH FREQUENCY TRANSMISSION LINES (8 hours)
Transmission line equations at radio frequencies - Line of Zero dissipation – Voltage and current on the dissipationless line, Standing Waves, Nodes , Standing Wave Ratio – Input impedance of the dissipationless line - Open and short circuited lines - Power and impedance measurement on lines - Reflection losses – Measurement of VSWR and wavelength.

UNIT 3 IMPEDANCE MATCHING IN HIGH FREQUENCY LINES (9 hours)
Impedance matching: Quarter wave transformer – Impedance matching by stubs – Single stub and double stub matching – Smith chart – Solutions of problems using Smith chart – Single and double stub matching using Smith chart.

UNIT 4 PASSIVE FILTERS (9 hours)
Characteristic impedance of symmetrical networks – filter fundamentals. Design of filters: Constant K, Low Pass, High Pass, Band Pass, Band Elimination, m-derived sections and composite.

UNIT 5 ATTENUATORS AND EQUALIZERS (10 hours)
Attenuators: T, π, Lattice Attenuators, Bridged – T attenuator, L-Type Attenuator. Equalizers: inverse network, series, full series, shunt, full shunt, constant resistance T, constant resistance π, constant resistance lattice and bridged T network.

Course Number and Title

EC0210 COMMUNICATION THEORY

Credits / Contact Hours

3 / 45

Instructor Name

Mrs.S.T.Aarthy.

Textbooks, References

- Simon Haykin, "*Communication System*", John Wiley & Sons, 4th Edition, 1991.
- R.. Singh & S.D. Spare, "*Communication Systems, Analog & Digital*", Tata Mc Graw Hill, 1995.
- K.Sam Shanmugam,"*Digital & Analog Communication System*", John Wiley & Sons.
- B.P.Lathi," *Modern Digital & Analog Communication*", Prison Books Pvt Ltd., 1989

Purpose

To study the basics of analog communication systems

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

To learn and understand
1. Various Amplitude modulation and demodulation systems
2. Various Angle modulation and demodulation systems
3. Basics of Noise theory and performance of various receivers
4. The fundamentals of information theory

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X			X						
Mapping of instructional objectives with student outcome	1,2	1,2			1-4						

List of Topics Covered

UNIT 1 AMPLITUDE MODULATION SYSTEMS (9 hours)
Need for modulation-AM modulation systems-Modulation index-Phase diagram-Power relations-Efficiency-Spectrum diagram of AM, DSB-SC & SSB systems.
Generation of AM Waves: Square law modulator-Product Modulator-Switching Modulator. Detection of AM waves: Envelope detector-Coherent detector. FDM.

UNIT 2 ANGLE MODULATION (9 hours)
Frequency Modulation - Transmission Bandwidth of FM signals-Frequency spectrum-Phase Modulation-relationship between FM & PM- Narrow Band FM & Wide Band FM.

Generation of FM Waves: Direct method- Indirect method of FM generation.
Detection of FM waves: Ratio Detector-PLL FM demodulator- Super heterodyne Receiver

UNIT 3 NOISE THEORY (9 hours)
Sources of Noise-Shot Noise-Resistor Noise-Calculation of Noise in Linear systems-Noise bandwidth-Available Power-Noise temperature-Noise in two port networks-Noise figure-Measurement of Noise figure-Signal in presence of noise-Narrow Band noise

UNIT 4 NOISE PERFORMANCE OF AM & FM RECEIVERS (9 hours)
Noises in AM receiver threshold effect-Noise in FM receivers capture effect-FM threshold effect-Pre emphasis & De emphasis in FM.

UNIT 5 INFORMATION THEORY (9 hours)
Information & Entropy- Rate of information-Discrete memory less channel-Joint Entropy & Conditional Entropy-Mutual information-Channel Capacity-Shannon's Theorem-Continuous Channel-Shannon-Hartley Theorem-BW S/N Trade-off.

Course Number and Title

EC0212 DIGITAL SIGNAL PROCESSING

Credits / Contact Hours

3 / 60

Instructor Name

Mrs.Sabitha Gauni.

Textbooks, References

- John .G. Proakis and Dimitris C. Manolakis , " *Digital Signal Processing Principles , Algorithms and Applications* , " Pearson Education, Third edition 2006.
- Sanjit Mitra, "*Digital Signal Processing* "*– A Computer based approach*", Tata Mcgraw Hill, New Delhi, 2001
- B.Venkataramani, M.Bhaskar, "Digital Signal Processors, Architecture, Programming and Application", Tata McGraw Hill, New Delhi, 2003.
- M.H.Hayes, "*Digital Signal Processing*", Tata McGraw Hill, New Delhi, 2003.

Purpose

The purpose of this course is to introduce the concepts of Digital signal processing and DSP Processor. The mathematical analysis of FIR and IIR filter design and simulation using MATLAB are dealt with in detail.

Prerequisites	Co-requisites
EC0207, MA0211	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

At the end of this course, the students will be able to understand the

1. Structures of Discrete time signals and systems
2. Frequency response and design of FIR and IIR filters.
3. Finite word length effect
4. DSP Processor- TMS320C5X.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X		X						X
Mapping of instructional objectives with student outcome	1	2,4	2		1,2						2

List of Topics Covered

UNIT 1 REVIEW OF DISCRETE TIME SIGNALS AND SYSTEMS (6 hours)
Overview of signals and systems- DFT-FFT using DIT and DIF algorithms - Realization of structures for discrete time systems – Direct form I & II, Cascade, Parallel forms – MATLAB programs for DFT and FFT.

UNIT 2 DESIGN AND IMPLEMENTATION OF IIR FILTERS (6 hours)
Design of analog filters using Butterworth and Chebyshev approximations – IIR digital filter design from analog filter using impulse invariance technique and bilinear transformations – Matlab programs IIR filters.

UNIT 3 DESIGN AND IMPLEMENTATION OF FIR FILTERS (6 hours)
Linear phase response- design techniques for FIR filters- Fourier series method and frequency sampling method – Design of Linear phase FIR filters using windows: Rectangular, Hanning and Hamming windows- Matlab programs FIR filters-FIR filter design using Decimation and Interpolation
.

UNIT 4 FINITE WORD LENGTH EFFECTS IN DIGITAL FILTERS (6 hours)
Fixed point arithmetic –effect of quantization of the input data due to Finite word length. Product round off – need for scaling – Zero input limit cycle oscillations - Limit cycle oscillations due to overflow of adders – Table look up implementation to avoid multiplications.

UNIT 5 PROCESSOR FUNDAMENTALS (6 hours)
Architecture and features: Features of DSP processors – DSP processor packaging(Embodiments) – Fixed point Vs floating point DSP processor data paths – Memory architecture of a DSP processor (Von Neumann – Harvard) – Addressing modes – pipelining – TMS320 family of DSPs (architecture of C5x).

TUTORIAL 30 hours
TOTAL 60 hours

Course Number and Title

EC0222 ELECTRONIC CIRCUITS LAB

Credits / Contact Hours

2 / 45

Instructor Name

Mrs.V.Sarada

Textbooks, References

- LAB MANUAL

Purpose

The purpose of the lab is to train the students to analyze electronic circuit and understand their functionality.

Prerequisites	Co-requisites
NIL	EC0204

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To study experimentally the working of amplifiers, regulators and analyze their behavior by plotting graphs.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X	X		X					X
Mapping of instructional objectives with student outcome		1	1	1		1					1

List of Topics Covered

LIST OF EXPERIMENTS (45 hours)

Group 1: (Using only discrete components)

9. Frequency response of RC coupled amplifier using BJT or FET.
10. Colpitts Oscillator.
11. Efficiency of Class-A or Class AB Amplifier.
12. Frequency response of Single Tuned Amplifier.
13. Frequency response of a BJT amplifier with and without feedback.

Group 2: (Using IC 741 – IC 555 and any other equivalent IC's)

9. Differential and Summing Amplifier.
10. Integrator and Differentiator.
11. Wein Bridge and RC Phase Shift oscillator.
12. Astable Multivibrator
13. Monostable Multivibrator
14. Bistable Multivibrator

Group 3: Simulation experiments (Using PSPICE and LABVIEW)

1. Active filters: Band pass filter and Notch filter.
2. Digital to Analog converter (any one method)
3. Analog to Digital converter (any one method)
4. Ramp Generator

Course Number and Title

EC0224 COMMUNICATION LAB -I

Credits / Contact Hours

2 / 45

Instructor Name

Mr.S.Manikandaswamy.

Textbooks, References

- Laboratory Manual

Purpose

To help the students to design and implement communication circuits. To give hands on training on simulation software.

Prerequisites	Co-requisites
NIL	EC0210

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To carry out AM and FM modulation experiments using discrete electronic components. Software's like MATLAB and Pspice are used to simulate the circuit operations.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X		X	X	X			X	X	X
Mapping of instructional objectives with student outcome	1	1		1	1	1			1	1	1

List of Topics Covered

LIST OF EXPERIMENTS (45 hours)

HARDWARE

1. Amplitude Modulator
2. Envelope Detector
3. Frequency Modulator using VCO
4. Frequency Demodulation using PLL
5. PAM modulation and demodulation
6. Pre emphasis and De-emphasis
7. Analog Multiplexing

SOFTWARE

8. Amplitude Modulation using PSpice
9. Frequency Modulation using PSpice

10. PAM modulation using PSpice
11. PAM demodulation using PSpice
12. pre emphasis and de emphasis using PSpice
13. Amplitude Modulation using MATLAB
14. Frequency Modulation using MATLAB

Course Number and Title

EC0226 COMPREHENSION -1

Credits / Contact Hours

1 / 30

Instructor Name

Mr.M.Aravindan.

Textbooks, References

Purpose

To provide a complete review of Electronics and Communication engineering topics covered in the first four semesters, so that a comprehensive understanding is achieved. It will also help students to face job interviews and competitive examinations.

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. **To provide overview of all Electronics & Communication engineering topics covered in the first four semesters.**
2. **To assess the overall knowledge level in the following topics of Electronics & Communication** .

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X	X	X						
Mapping of instructional objectives with student outcome	1-2	1-2	1-2	1-2	1-2						

List of Topics Covered

COMPREHENSION (30 hours)

A. Review of the following topics

1. Overview of Semiconductor devices.

2. Basics of Electromagnetism and waveguides.
3. Analysis and design of digital circuits.
4. Analysis of signals and systems.
5. Analysis and design of Electronic circuits.
6. Overview of Linear Integrated Circuits.
7. Overview of Transmission Lines and Networks.
8. Overview of Communication Theory.
9. Overview of Digital Signal Processing.

B. Seminar/group discussion

Students shall have seminar/group discussion sessions on the topics listed under A above under the guidance of staff.
(Evaluation is based on an end semester examination)

Course Number and Title

EC0305 ANTENNA AND WAVE PROPAGATION

Credits / Contact Hours

3 / 45

Instructor Name

Mr. S. Manikandaswamy.

Textbooks, References

- Constantine A.Balanis**,** "*Antenna Theory analysis and Design*",II Edition,John wiley and Sons.
- R.E.Collin, "*Antennas and Radio Wave Propagation*", McGraw Hill International Editions, 1985.
- Robert S. Elliott, "*Antenna Hand Book",* Joseph J. Carr, Galgotia Publication, New Delhi, 1995.
- K.D. Prasad, "*Antenna and Wave Propagation*", Tech India Publications, New Delhi, 1996.
- John. D. Kraus, "*Antennas"*, McGraw Hill International Editions, 1988.

Purpose

The purpose of this course is to enable the students to the basics of antennas and various types of antenna arrays and its radiation patterns. The main objective of this subject is to help students to identify the different latest antennas available for specific communication.

Prerequisites	Co-requisites
EC0208	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To study various antennas parameters.
2. To study the antenna arrays and radiation patterns of antennas.
3. To learn the basic working of antennas
4. To understand various techniques involved in various antenna parameter measurements.
5. To understand the propagation of radio waves in the atmosphere

Student Outcomes from Criterion 3 covered by this Course											
Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X		X						
Mapping of instructional objectives with student outcome	1-4	3,4	5		1,2						

List of Topics Covered

UNIT 1 ANTENNA FUNDAMENTALS AND VECTOR POTENTIALS (9 hours)
Isotropic Radiation, Power density and Intensity, Gain, Directive gain, Directivity, Effective area, Reciprocity theorem, Antenna efficiency, Radiation resistance, Terminal impedance, Beam width and Bandwidth.
Radiation from a small current element, Power radiated by a small current element and its radiation resistance, Half wave dipole, Radiation field of current distribution of center fed Dipole.

UNIT 2 ANTENNA ARRAYS (9 hours)
Various forms of antenna arrays – Broadside, End fire, Collinear, Parasitic arrays, Array of two point sources, Pattern Multiplication, Array of "N" sources – analysis of End fire and Broadside case, phased arrays, Binomial arrays.

UNIT 3 SPECIAL PURPOSE ANTENNAS (9 hours)
Traveling wave, Loop, Dipole and Folded dipole antennas, Horn antenna, Reflector antenna, Yagi- Uda antenna, Log periodic antenna, Helical and Micro strip antenna and applications of all types of antennas.

UNIT 4 ANTENNA MEASUREMENTS (9 hours)
Impedance, Gain, Radiation pattern, Beam width, Radiation resistance, Antenna efficiency, Directivity, Polarization and phase Measurements.

UNIT 5 RADIO WAVE PROPAGATION (9 hours)
Modes of propagation, Structure of atmosphere, Ionosphere layers, Mechanism of bending of waves, Effect of earths Magnetic field on Radio wave propagation. Virtual height, MUF, Skip distance, OWF, Ionosphere abnormalities, Multi-hop propagations, Space wave propagation, Super refraction.

Course Number and Title

EC0307 DIGITAL COMMUNICATION

Credits / Contact Hours

3 / 45

Instructor Name

Mr.A.Sriram

Textbooks, References

- Simon Haykin, "*Communication Systems*", (3/e) John Wiley & Sons, 1998.
- Taub & Schilling, "Principle *of Communication Systems*" (2/e)
- John G. Proakis, "Digital Communication", McGraw Hill Inc 2001.
- Bernard Sklar, "Digital Communication, Fundamentals and Application", Pearson Education Asia, 2nd Edition, 2001.

Purpose

To provide a comprehensive coverage of digital communication systems. The key feature of digital communication systems is that it deals with discrete messages and the purposes are to add organization and structure to this field.

Prerequisites	Co-requisites

EC0210, MA0232	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

To learn and understand

1. Pulse modulation and discuss the process of sampling, quantization and coding that are fundamental to the digital transmission of analog signals
2. Base band pulse transmission which deals with the transmission of pulse amplitude modulated signals in their base band form
3. Pass band data transmission methods

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X		X						
Mapping of instructional objectives with student outcome		1-3	1-3		1-3						

List of Topics Covered

UNIT 1 PULSE MODULATION (9 hours)
Sampling Process-Aliasing-Natural Sampling-Flat Sampling-PAM-PWM-PPM-Bandwidth-Noise trade off-TDM

UNIT 2 DIGITAL MODULATION SYSTEMS (9 hours)
Quantization of Signals-Quantization error-PCM Systems-Noise Considerations in PCM system-Over all Signal-to-noise ratio for PCM system-Threshold effect-Channel Capacity-Virtues, Limitations & Modification of PCM system-PCM Signal Multiplexing- Differential PCM- Delta Modulation-Noise Considerations in Delta Modulation- SNR Calculations-Comparison of PCM, DPCM & DM

UNIT 3 BASE BAND PULSE TRANSMISSION (9 hours)
Matched filter receiver-Probability error of the Matched filter-Intersymbol interference-Nyquist criterion for distortion less base band transmission-Correlative coding-Base band M-ary PAM transmission-Eye pattern.

UNIT 4 PASS BAND DATA TRANSMISSION (9 hours)
Pass Band Transmission Model-Generation, Detection, Signal Space Diagram, Probability of Error of BFSK, BPSK, QPSK Schemes- Comparison of BFSK, BPSK & QPSK.

UNIT 5 INTRODUCTION TO SPREAD SPECTRUM TECHNIQUES (9 hours)
Introduction-Discrete Sequence Spread Spectrum technique-Use of Spread Spectrum with CDMA-Ranging Using Discrete Sequence Spread Spectrum-Frequency Hopping Spread Spectrum-Generation & Characteristics of PN Sequence-Acquisition of FH a Signal-Tracking of FH a signal-Acquisition of a DS Signal-Tracking of a DS signal

Course Number and Title

EC0309A MICROPROCESSORS AND MICROCONTROLLERS

Credits / Contact Hours

3 / 45

Instructor Name

Mr. K. Ramesh

Textbooks, References

- A.K.Ray and K.M.Bhurchandi, "Advanced Microprocessors and Peripherals", Tata McGrawHill, 2000.
- Andrew N. Sloss, Dominic Symes, Chris Wright and John Rayfield, "ARM System Developer's Guide, Designing and Optimizing System Software", Elsevier. 2004.
- David Seal, "ARM Architecture Reference Manual", Pearson Education, 2007.
- Michael J. Pont, "Embedded C", Addison Wesley, 2002.
- Muhammad Ali Mazidi and Janice Gillispie Mazidi, "The 8051 – Microcontroller and Embedded systems", 7th Edition, Pearson Education , 2004.

- .Doughlas. V.Hall, " Microprocessor and Interfacing : Programming and Hardware", 2nd edition, McGraw Hill, 1991.
- Kenneth. J.Ayala, "8051 Microcontroller Architecture, Programming and Applications".2nd edition, Thomson. 3. nuvoTon (Nu-LB-NUC140) Driver and Processor Reference Manual; www.nuvoton.com

Purpose

The purpose of this course is to introduce students about Microprocessors and Microcontrollers.

Prerequisites	Co-requisites
EC0205	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. Understand Microprocessor 8086, ARM CORTEX-M0 and programming of them
2. Understand 8086, nuvoTon NU-LB-NUC140 processor based interfacing circuits necessary for vital applications.
3. Understand ARM C programming for nuvoTon Cortex M0 interfacing.
4. Understand basic concepts of 8051 micro-controller and its interfacing.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X						X	X	X
Mapping of instructional objectives with student outcome		1,2,4	1,2						4	1,2,4	3

List of Topics Covered

UNIT 1 MICROPROCESSOR- 8086 (11 hours)
Basic 8086 Architecture- Register & Memory Organization-Bus Operation- Minimum Mode-Maximum ModeTiming Diagram-Interrupts & Service Routines, Addressing Modes (including IO Addressing)- Instruction Format – Instruction Set- ALP in 8086.

UNIT 2 HIGH PERFORMANCE RISC ARCHITECTURE- INTRODUCTION (10 hours)
ARM: The ARM (nuvoTon –NU-LB-NUC140) architecture - ARM organization and implementation – The ARM instruction set - The thumb instruction set - Basic ARM ALP (32-bit addition, subtraction, multiplication, binary sorting).

UNIT 3 INTERFACING DEVICES WITH 8086 (7 hours)
IO and Memory Interfacing concepts–Programmable Interval Timer (8254)– Programmable Interrupt Controller (8259A) – Basic Treatment for Programmable DMA Controller (8257) –Programmable Communication Interface

(8251)-Stepper Motor Interfacing.

UNIT 4 MICROCONTROLLER-8051 (7 hours)
Register Set-Architecture of 8051 microcontroller- IO and Memory Addressing-Interrupts-Instruction SetAddressing Modes.

UNIT 5 INTERFACING THE 8051 MICROCONTROLLER (10 hours)
Timer-Serial Communication-Interrupts Programming (Elementary Treatment)-Interfacing to External Memory & ADCs. Introduction to Embedded C Programming -Basic techniques for reading & writing from I/O port pins.

Course Number and Title

EC0321A PROCESSOR LAB

Credits / Contact Hours

2 / 45

Instructor Name

Mrs.J.Subhashini

Textbooks, References

- LAB Manual.

Purpose

To make the students understand the basic programming of Microprocessor and DSP processor. Also, to introduce them to Microcontrollers and few interfacing circuits.

Pre-requisites	Co-requisites
NIL	EC0309A

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

To understand and gain knowledge about

1. Microprocessor (8086)
2. ARM Cortex M0 (NuvoTon-NU-LB-NUC140 Series)
3. Microcontroller (8051)
4. Interfacing circuits

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X	X	X	X				X	X
Mapping of instructional objectives with student outcome		1-4	1-4	1-4	1,3	2,4				2,4	2

List of Topics Covered

LIST OF EXPERIMENTS (45HOURS)

PART-I: Basic Assembly Language Programming

(a) 8086 Microprocessor:

1. 16 bit Addition, Subtraction, Multiplication and Division.
2. Largest and Smallest number
3. Ascending and Descending numbers
4. Sum of Series.

(b) 8051 Microcontroller:

6. Addition, Subtraction, Multiplication and Division.
7. One's and two's complement
8. Word Disassembly
9. Decimal to Hexa decimal Conversion

PART-II: Interfacing using 8086 Microprocessor

1. Stepper Motor Interface
2. Programmable Timer Interface.
3. Programmable Interrupt Controller.

PART-III: Interfacing with Microcontroller 8051 and ARM Cortex M0 (NU-LB-NUC140)

(For one experiment, performance comparison has to performed between ARM and 8051 Microcontroller)

4. Seven Segment Display for Counting (NU-LB-NUC140)
5. ADC Interfacing –input via POT.
6. Seven Segment Display for Key Pressed.
7. LCD Interfacing / GPIO Buzzer Interfacing for Intruder Alarm Systems

Course Number and Title	
EC0323 COMMUNICATION LAB-II	
Credits / Contact Hours	
2 / 45	
Instructor Name	
Mrs. S.T. Aarthy	
Textbooks, References	
LAB MANUAL	
Purpose	
To help the students to experiment on digital communication systems using kits and to use software's to simulate them.	
Pre-requisites	**Co-requisites**
EC0224	EC0307
Required, Elective or Selected Elective (as per Table 5.1b)	
Required	
Instructional Objectives	

1. To carry out experiments on various digital communications modulation schemes using kits. MATLAB software is used to simulate the digital modulation techniques.

Student Outcomes from Criterion 3 covered by this Course											
Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X	X	X	X			X	X	X
Mapping of instructional objectives with student outcome		1	1	1	1	1			1	1	1

List of Topics Covered

LIST OF EXPERIMENTS

HARDWARE

1. FSK Modulation and Demodulation.
2. PSK Modulation and Demodulation.
3. Pulse Code Modulation and Demodulation
4. Delta Modulation and Demodulation
5. Time Division Multiplexing
6. Data Formatting
7. Differential pulse code modulation and demodulation

SOFTWARE –MATLAB

8. FSK Modulation and Demodulation
9. PSK Modulation and Demodulation
10. QPSK
11. ASK Modulation and Demodulation
12. DPSK Modulation and Demodulation
13. Delta modulation and demodulation

Course Number and Title

EC0325 INDUSTRIAL TRAINING - I

Credits / Contact Hours

1

Instructor Name

Mr. E. Sivakumar

Textbooks, References

Purpose

To expose the students to the industrial working environment and make them industry ready.

Prerequisites	Co-requisites
Nil	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. Students have to undergo two-week practical training in Electronics and Communication Engineering related project site or design / planning office so that they become aware of the practical application of theoretical concepts studied in the class rooms.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
				X	X	X	X		X	X	X
Mapping of instructional objectives with student outcome				1	1	1	1		1	1	1

List of Topics Covered

Course Number and Title

MB0302 BUSINESS MANAGEMENT FOR ENGINEERS

Credits / Contact Hours

3 / 45

Instructor Name

Mrs. K. Subathra

Textbooks, References

- R. Pannerselvam, "*Engineering Economics*", PHI, 2001.
- O.P. Khanna, "*Industrial Engineering and Management*", Dhanpat Rai and sons, 1992.
- Kotler, "*Marketing Management*", Pearson education, 12th edition.
- Prasanna Chandra, "*Finance Sense for non-finance executives*", TMH.

Purpose

To provide engineering students with the management skills to enable them to assess, evaluate and take key management decisions by the application of management concepts.

Prerequisites	Co-requisites
Nil	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

At the end of the course, the students are expected to

1. Understand the various key concepts of micro economics.
2. Demonstrate the effect of time value of money and depreciation.
3. Apply the various project management techniques
4. Understand the various issues related to industrial safety.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
			X					X			
Mapping of instructional objectives with student outcome			1-4					1-4			

List of Topics Covered

UNIT-1 (8 hours)
Role and Importance of Economics for Engineers, Law of demand and supply, Break-even analysis, Pricing Policies.

UNIT-2 (8 hours)
Cost determination, Balance Sheet, Cost benefit analysis, Time Value of Money, Methods of Depreciation, Long Term and short term financing, Financial Institutions.

UNIT-3 (10 hours)
Management-Nature and functions, Project Management-Phases and Techniques, CPM, PERT, Human Aspects of Project Management-Issues and Problems, Managing-vs-leading a project.

UNIT-4 (10 hours)
Marketing Concepts, Marketing Mix, Product life cycle, Plant layout, Plant location, Material Handling, Productivity, Plant Maintenance and Industrial Safety.

UNIT-5 (9 hours)
Current Trends in financing, Role of Industrial Engineer and Applications of Industrial Engineering, Process of Project Management and the Future, Ethics and Project Management, E-Marketing-Ethical and legal issues

Course Number and Title

EC0302 MICROWAVE AND RF DESIGN

Credits / Contact Hours

3 / 45

Instructor Name

Dr. J. Manjula

Textbooks, References

- Samuel Y. Liao, "Microwave *Devices and Circuits*" ,3rd Edition, Pearson education.
- Reinhold Ludwig, Pavel Bretchko , '*RF circuit design , theory and applications'*, Pearson Asia Education , Edition 2001.
- R.E.Collin, "*Foundations for Microwave Engineering"*, 2nd Edition, Tata McGraw Hill, 1992.
- D.Pozar, *"Microwave Engineering*", John Wiley & Sons, New York, 1998.

- Mathew M. Radmanesh , "*Radio Frequency and Microwave Electronics*", Pearson Asia Education, Edition 2001.

Purpose

To introduce the students, to the basics of microwave devices, microwave measurements and modeling of RF circuits used in communication systems.

Prerequisites	Co-requisites
EC0204	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

To understand and gain complete knowledge about

1. Microwave devices such as Amplifiers, Oscillators
2. Microwave Components
3. Microwave Measurements
4. RF Basic concepts and RF Filter Design
5. RF Amplifier Design

Student Outcomes from Criterion 3 covered by this Course

Student outcome	E	b	c	d	e	f	g	h	i	j	k
	X	X	X								
Mapping of instructional objectives with student outcome	1-5	1,2	2								

List of Topics Covered

UNIT 1 MICROWAVE AMPLIFIERS AND OSCILLATORS (9 hours)

Introduction to Microwave transmission- Applications and Limitations- Klystron Amplifiers-Reflex Klystron Oscillators-Magnetron Oscillators-TWT Amplifiers.

UNIT 2 MICROWAVE COMPONENTS (9 hours)

Directional Coupler-E&H plane Tee- Magic Tee- Circulators- Isolators-Attenuators and Phase Shifters- Impedance Matching Techniques.

UNIT 3 MICROWAVE DEVICES AND MEASUREMENTS (9 hours)

Principles of Microwave transistor and FET- Gunn Oscillators- IMPATT, TRAPATT and BARITT devices- PIN diode and TUNNEL Diode.

Microwave Measurements: Power, Frequency, Impedance, VSWR.

UNIT 4 DESIGN OF RF FILTERS (9 hours)

Introduction to RF Concepts-Basic Filter Configurations – LPF, HPF, BPF, BSF –Filter Design

UNIT 5 RF AMPLIFIER DESIGN & BASIC OSCILLATOR, MIXERMODEL (9 hours)

Characteristics of Amplifier – Types – Amplifier Power Relations – Power Gain Definitions –Basic Oscillator & Mixer Model.

Course Number and Title

EC0304 OPTICAL COMMUNICATION AND NETWORKS

Credits / Contact Hours

Instructor Name

Dr.Shanti Prince.

Textbooks, References

- **Gerd Keiser, "*Optical Fiber Communication*" McGraw –Hill International, Singapore, 3rd edition, 2000**
- **Rajiv Ramaswami, Kumar N. Sivaranjan, "*Optical Networks A practical perspective*", 2nd edition, Elsevier, 2004**
- **Djafar K. Mynbaev, Lowell L. Scheiner, "*Fiber-Optic Communications Technology*", 1st edition, Pearson Education, 2001.**
- **John Powers, "*An Introduction to Fiber optic Systems*", 2nd edition, Irwin-McGraw Hill, 1999.**
- **J.Gowar, "*Optical Communication System*", 2nd edition, Prentice Hall of India, 2001.**

Purpose

To introduce the students to various optical fiber modes, configurations and various signal degradation factors associated with optical fiber and to study about various optical sources and optical detectors and their use in the optical communication system.

Prerequisites	Co-requisites
Nil	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To learn the basic elements of optical fiber transmission link, fiber modes configurations and structures.
2. To understand the different kind of losses, signal distortion in optical wave guides and other signal degradation factors
3. To learn the various optical source materials, LED structures, quantum efficiency, Laser diodes.
4. To learn the fiber optical receivers such as PIN APD diodes, noise performance in photo detector, receiver operation and configuration.
5. To learn the fiber optical network components, variety of networking aspects, FDDI, SONET/SDH and operational principles WDM.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X								
Mapping of instructional objectives with student outcome	1-5	1-3	1-3								

List of Topics Covered

UNIT 1 INTRODUCTION OF OPTICAL FIBERS (9 hours)
Basic principles of optical fiber communications – Step Index and Graded Index fiber structure – Fiber Modes and Configurations – Mode theory for circular waveguides – Linearly Polarized modes – Single mode fibers.

UNIT 2 OPTICAL SOURCES AND RECEIVERS (9hours)

Optical Sources: - Light source materials – LED –Structure – Quantum efficiency – Modulation. Laser Diode – Modes and threshold condition – Structures and Radiation Pattern – Modulation.Optical detectors: – Physical principles – PIN and APD diodes – Photo detector noise – SNR – Detector response time.

UNIT 3 OPTICAL COMMUNICATION SYSTEMS AND DESIGN (9 hours)
Transmitter module: Signal formats – Electronic driving circuit – Modulation circuit.
Receiver Module: Optical front end – Quantizer – Decision circuit.
Optical Link Design: Point- to- point links – System considerations – Link Power budget – Rise time budget.

UNIT 4 NETWORK COMPONENTS (9 hours)
Principle and Operation of couplers, Isolators, Circulators, Fabry Perot Filters, Mach-Zehnder Interferometer, EDFA, Semiconductor Optical Amplifier and Transceivers.

UNIT 5 OPTICAL NETWORKS (9 hours)
Network Topologies - FDDI Networks: – Frame and Token formats – Network operation. SONET/SDH: – Optical specifications – SONET frame structure – SONET layers -SONET/SDH networks. Operational principles of WDM – Broadcast and Select WDM networks – Single hop networks – Wavelength routed networks – Optical CDMA.

Course Number and Title

EC0306 VLSI DEVICES AND DESIGN

Credits / Contact Hours

3 / 45

Instructor Name

Mrs. A. Maria Jossy.

Textbooks, References

- Douglas A. Pucknell, "*Basic VLSI Systems and Circuits*",3rd edition, Prentice Hall of India, 1993
- Samir Palnitkar, "*Verilog HDL – Guide to Digital Design and Synthesis*", 3rd Edition, Pearson Education, 2003
- J. Bhaskar, "*VHDL Primer*", 1st edition, BSP, 2002
- Weste & Eshraghian, "*Principles of CMOS VLSI Design*", 2nd edition, Addison Wesley, 1993.
- E. Fabricious, "*Introduction to VLSI Design*", 1st edition, McGraw Hill, 1990.
- C. Roth, "*Digital Systems Design using VHDL*", Thomson Learning, 2000

Purpose

To introduce the technology, design concepts, electrical Properties and modeling of Very Large Scale Integrated Circuits.

Prerequisites	Co-requisites
EC0203, EC0205	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To learn the basic MOS Circuits.
2. To learn the MOS Process Technology
3. To learn the concepts of modeling a digital system using Hardware Description Language.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
			X		X						X
Mapping of instructional objectives with student outcome			1,3		1-3						2,3

List of Topics Covered

UNIT 1 INTRODUCTION TO MOS TECHNOLOGY (9 hours)
An overview of Silicon Semiconductor technology- NMOS fabrication. **CMOS fabrication**: n-well, p-well - Twin tub and SOI Process - Interconnects. **Circuit elements:** Resistors- Capacitors- Bipolar transistors.
Latch up and prevention.

UNIT 2 MOS CIRCUIT DESIGN PROCESS (9 hours)
Basic MOS transistors: symbols, Enhancement mode - Depletion mode transistor operation - Threshold voltage derivation - body effect - Drain current Vs voltage derivation - channel length modulation. NMOS and CMOS inverter - Determination of pull up to pull down ratio - Design of logic gates - Stick diagrams.

UNIT 3 PRINCIPLES OF VHDL (ELEMENTARY TREATMENT ONLY) (9 hours)
Introduction to VHDL. **Language elements:** Identifiers - Data objects - Data types – Operators.
Behavioral modeling - Dataflow modeling - Structural modeling – Examples - Sub programs and overloading - Package concepts.

UNIT 4 VERILOG HDL (ELEMENTARY TREATMENT ONLY) (9 hours)
Hierarchical modeling concepts- **Basic concepts**: Lexical conventions - Data types - Modules and ports.
Gate level modeling - Dataflow modeling - Behavioral modeling - Functions - UDP concepts

UNIT 5 CMOS SUBSYSTEM DESIGN (9 hours)
Introduction - Design of Adders: carry look ahead - carry select - carry save. Parity generators.
Design of multipliers: Array - Braun array – Baugh - Wooley Array - Wallace tree multiplier.

Course Number and Title

EC0322 MICROWAVE AND OPTICAL COMMUNICATION LAB

Credits / Contact Hours

2 / 45

Instructor Name

Mrs.S.Vasanthadev Suryakala.

Textbooks, References

- **LABORATORY MANUAL**

Purpose

To know and understand how communication is being established at microwave frequencies and using fiber in optical communication.

Prerequisites	Co-requisites
EC0221	EC0302

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To have a detailed practical study on microwave equipments
2. To study the optical devices and to use in the appropriate application

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X	X		X					X
Mapping of instructional objectives with student outcome		1-2	1-2	1-2		1-2					1-2

List of Topics Covered

LIST OF EXPERIMENTS (45 hours)

MICROWAVE EXPERIMENTS

7. Characteristics of Reflex Klystron
8. Study of power distribution in Directional coupler, E & H plane and Magic tee.
9. Wavelength and Frequency measurement.
10. Impedance measurement by slotted line method.
11. Gain and Radiation pattern of Horn antenna.
12. Design of Micro strip antenna.

OPTICAL COMMUNICATION EXPERIMENTS

5. D. C. Characteristics of LED and PIN photo diode.
6. D. C. Characteristics of Laser diode.
7. Measurement of Numerical aperture, Propagation and Bending Loss in fiber.
8. Fiber Optic Analog Link.

9. Fiber Optic Digital Link.

SPICE SIMULATION

4. Frequency response of RF amplifier.
5. Frequency response of IF amplifier.
6. Amplitude modulation

Course Number and Title

EC0324 VLSI DESIGN LAB

Credits / Contact Hours

2 / 45

Instructor Name

Dr.J.Selvakumar

Textbooks, References

- Lab Manual

Purpose

To know and understand VHDL and design circuits using it.

Prerequisites	Co-requisites
EC0223	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To design and simulate the various digital circuits in VHDL
2. To design and simulate the various digital circuits in VERILOG

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X	X		X					X
Mapping of instructional objectives with student outcome		1-2	1-2	1-2		1-2					1-2

List of Topics Covered

LIST OF EXPERIMENTS (45 hours)

1. Design of logic gates
2. Design of 4 bit Adders cum subtractors
3. Design of 8x1 Multiplexer using 4x1 and 2x1 MUX
4. Design of 4x2 priority encoder using behavioral model
5. Design of flip flop
6. Design of SISO and PIPO using behavioral and structural model

7. Design of up down counter and decade counter
8. Design of brawn array multiplier using structural model
9. Design of ALU using behavioral model
10. Design of 4 bit adder cum subtractor
11. Design of FSM

Course Number and Title

EC0326 COMPREHENSION – II

Credits / Contact Hours

1 / 30

Instructor Name

Mrs.K.Ferents Koni Jiavana

Textbooks, References

Purpose

To provide a review of Electronics and Communication engineering topics covered up to VI semester, so that a comprehensive understanding is achieved. It will also help students to face job interviews and competitive examinations.

Prerequisites	Co-requisites
EC0226	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To provide overview of all Electronics & Communication engineering topics covered up to VI semester.
2. To assess the overall knowledge level in the following topics of Electronics & Communication.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X	X	X						
Mapping of instructional objectives with student outcome	1-2	1-2	1-2	1-2	1-2						

List of Topics Covered

A. Review of the following topics

1. Review of the subjects listed in comprehension I.
2. Basics of various measurement techniques and measuring instruments.
3. Analysis of Linear control systems.

4. Basics of antennas and various types of antenna arrays.
5. Overview of Digital communication systems.
6. Architecture and programming of microprocessor & microcontroller.
7. Overview of Microwave and RF design.
8. Overview of Optical communication and Networks.
9. Basics of VLSI devices and design.

B. Seminar/group discussion

Students shall have seminar/group discussion sessions on the topics listed under A above under the guidance of staff.

Course Number and Title

EC0328 COMPUTER SKILLS

Credits / Contact Hours

2

Instructor Name

Mr.K.Ramesh and Mr.E.Elamaran

Textbooks, References

- Laboratory Manual

Purpose

To acquire extramural knowledge on the computer implementation of various engineering solutions.

Prerequisites	Co-requisites
Nil	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

LAB VIEW

1. Become familiar with the simulation software
2. Learn to use Lab view
3. Setup parameters, simulate and Generate block diagram & Front panel

Embedded C

1. Become familiar with Programming Microcontroller using C Language

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X	X							X
Mapping of instructional objectives with student outcome-Lab view	1-3	1-3	1-3	1-3							1-3
Mapping of instructional objectives with student outcome-Embedded C	1	1	1	1							1

List of Topics Covered

List of Experiments

LAB VIEW

1. Arithmetic operations
2. Logical operations
3. Half adder and full adder circuits using sub-vi
4. Temperature conversion
5. Display of Fibonacci series
6. Use of "for loop" in lab-view to display sum of 1st 5 even numbers
7. Case structures
8. Array operations
9. 7-segment display
10. Building signal processing systems
11. Amplitude modulation

Embedded C

1. Introduction to 8051 C Programming
2. Use Bit-Wise Operators
3. Led Blinking
4. Swapping Values Of Two Ports
5. Delay Using Timers
6. Serial Port Programming
7. Programming Interrupts
8. Serial Port Transmission Using Interrupts
9. Design of ATMEL AT89S Series Programmer Board
10. Study Project

Course Number and Title

EC0401 COMPUTER COMMUNICATION

Credits / Contact Hours

3 / 45

Instructor Name

Ms.T.Ramya.

Textbooks, References

- Behrouz A.Fehrouzan, "*Data communication & Networking*" Mc-Graw Hill, 3rd edition, 2004.
- Andrew S.Tanenbaum, "*Computer Networks", 4th* edition, Pearson education, 1999.
- W.Stallings, "*Data & computer communication*", 2nd Edition, NY Pearson, 1988.
- Rarnier Handel , N.Huber , Schroder "*ATM Networks Concepts ,Protocols Applications* '' , Addison Welsey 1999

Purpose

It is very much required for an ECE graduate to know use of computers in communication as well as in network formation. The syllabus focuses on mode of data transfer, layer and protocols related to networks.

Prerequisites	Co-requisites
Nil	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. Understand about the functions and services of all 7 layers of OSI model
2. Get an idea of various network standards.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
								X	X	X	
Mapping of instructional objectives with student outcome								1,2	1,2	2	

List of Topics Covered

UNIT 1 DATA COMMUNICATION & NETWORKING BASICS (9 hours)
Data transfer modes - Telephone system - Protocols & standards -Multiplexing-Circuit switching - Message & packet switching - Introduction to LAN, MAN & WAN - IEEE standards for LAN – Network topologies.

UNIT 2 OSI LOWER LAYERS (9 hours)
Network models – OSI layer architecture – Issues in data traffic over network – Physical layer standards – Data link control & protocol – ARQ schemes – HDLC protocol.

UNIT 3 NETWORK LAYER (9 hours)
Need for Internetworking – Addressing – Routing Issues – Internet protocol (IPV4/V6) – Congestion & flow control mechanism – TCP/IP model.

UNIT 4 OSI HIGHER LAYERS (9 hours)
Transport layer – TCP & UDP – Session layer issues – Presentation layer – Application layer.

UNIT 5 APPLICATION & INTRODUCTION TO ISDN (9 hours)
Application layer: Email – FTP – HTTP–Compression Techniques.
Introduction to ISDN – Broadband ISDN Features – ATM Concept.

Course Number and Title

EC0403 WIRELESS COMMUNICATION

Credits / Contact Hours

4 / 60

Instructor Name

Dr.K.Kalimuthu

Textbooks, References

- Rappaport T.S, "Wireless *Communications: Principles and Practice*", 2nd edition, Pearson education.
- William Stallings, " *Wireless Communication & Networking*", Pearson Education Asia, 2004
- Feher K. "Wireless *Digital Communications*", Pearson education.
- Lee W.C.Y, "Mobile *Communications Engineering: Theory & Applications*", McGraw Hill, New York 2nd Edition, 1998.
- Schiller, "Mobile *Communication*", Pearson Education Asia Ltd., 2000.

Purpose

To introduce the students to the concepts of wireless systems, mobile systems.

Prerequisites	Co-requisites
EC0307	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

To understand and gain complete knowledge about
1. Basic wireless , cellular concepts
2. Mobile Channels
3. Standards 1G,2G, 3GBasic system available

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X					X		X	X	X	
Mapping of instructional objectives with student outcome	1,2					2,3		1-3	1,3	2,3	

List of Topics Covered

UNIT 1 STANDARDS AND CELLULAR CONCEPT (12hours)
Introduction - **Standards:** AMPS, GSM, CDMA (IS-95). Cellular Concept and Frequency Reuse, Overview of Multiple Access Schemes, Channel Assignment and Hand off, Interference and system capacity, Trunking and Erlang capacity calculations.

UNIT 2 MOBILE RADIO PROPAGATION (12 hours)
Radio wave propagation issues in Personal wireless systems, Elementary treatment of Propagation Models, Multipath fading and base band impulse response models, Parameters of mobile multipath channels

UNIT 3 MODULATION AND SIGNAL PROCESSING (12 hours)
Digital modulation techniques for mobile communications: BPSK, DPSK - $\pi/4$ QPSK - OQPSK - GMSK. Equalization, Diversity -Rake receiver concepts–Speech coding (LPC, CELP).

UNIT 4 WIRELESS LAN STANDARD (12 hours)
IEEE 802.11 Architecture and Services - IEEE 802.11 Medium Access Control- IEEE 802.11 Physical layer

UNIT 5 BLUETOOTH (12 hours)
Bluetooth: Overview-Radio specifications-Base band specifications-Link Manager Specification-Logical Link Control and Adaptation Protocol.

Course Number and Title

EC0421 NETWORK SIMULATION LAB

Credits / Contact Hours

2 / 45

Instructor Name

Dr .V. Nithya.

Textbooks, References

- **LABORATORY MANUAL**

Purpose

To know and understand communication networks using NETSIM Software and LAN Trainer kit.

Prerequisites	Co-requisites
NIL	EC0401

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

1. To study the communication networks characteristics and to analyze various MAC and routing layer Protocols.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
			X	X		X		X		X	X
Mapping of instructional objectives with student outcome			1	1		1		1		1	1

List of Topics Covered

1. Ethernet LAN protocol. To create Scenario and study the performance of CSMA/CD protocol through simulation.
2. Token bus and Token Ring protocols. To create scenario and study the performance of token bus and token ring protocols through simulation.
3. Wireless LAN protocols. To create scenario and study the performance of network with CSMA/CA protocol and compare with CSMA/CD protocols.
4. Implementation and study of stop and wait protocol.
5. Implementation and study of Go back N and selective repeat protocols.
6. Implementation of distance vector routing algorithm.
7. Implementation of Link state routing algorithm.
8. Implementation of data encryption and decryption.
9. Transfer of files from PC to PC using windows/ UNIX socket processing.

Course Number and Title

EC0423 INDUSTRIAL TRAINING – II

Credits / Contact Hours

1

Instructor Name

Mr.E.Sivakumar

Textbooks, References

Purpose

To expose the students to the industrial working environment and make them industry ready.

Prerequisites	Co-requisites
Nil	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Required

Instructional Objectives

Students have to undergo two-week practical training in Electronics and Communication Engineering related project site or design / planning office of their choice but with the approval of the department. At the end of the training student will submit a report as per the prescribed format to the department.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
				X		X	X	X	X	X	X
Mapping of instructional objectives with student outcome				1		1	1	1	1	1	1

List of Topics Covered

A.2.5 Engineering Topic - III

Elective Courses

2007-08 Curriculum Course Code	Name of the Course
EC0010	TV and Video Systems
EC0012	Satellite Communication and Broadcasting
EC0013	Radar and Navigational Aids
EC0015	Mobile Computing
EC0016	Bluetooth Technology
EC0017	Spread Spectrum Techniques
EC0018	Communication Protocol
TE0202	Information Theory and Coding
TE0301	Communication Switching Techniques
EC0030	Biomedical Instrumentation
EC0031	Embedded Systems
EC0032	Introduction to MEMS
EC0033	ASIC Design
EC0034	Introduction to Nanotechnology
EC0035	Electromagnetic Interference and Electromagnetic Compatibility
EC0051	Data Structures and Algorithms
EC0052	Digital Image Processing
EC0053	Object Oriented Analysis and Design
EC0054	Neural Network and Fuzzy Logic
EC0055	Network Security
EC0056	Scripting Languages and Web Technology
MA0452	Operations Research

Course Number and Title

EC0010 TV AND VIDEO SYSTEMS

Credits / Contact Hours

3 / 45

Instructor Name

Mr.E.Sivakumar

Textbooks, References

- R.R.Gulati, " *Monochrome Television Practice, Principles, Technology and servicing* ", Second edition, New age International Publishes, 2004
- R.R.Gulati "*Monochrome and colour television* ", New age International Publisher, 2003
- A.M Dhake, "*Television and Video Engineering*", Second edition, TMH, 2003.
- S.P.Bali, "*Colour Television, Theory and Practice*", TMH, 1994

Purpose

Television Technology has now become a vital tool to the information revolution that is sweeping across the countries of the world. The syllabus aims at a comprehensive coverage of Television Systems with all the new developments in Television Engineering.

Prerequisites	Co-requisites
EC0210, EC0204	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Selected Elective

Instructional Objectives

1. To study the analysis and synthesis of TV Pictures, Composite Video Signal, Receiver Picture Tubes and Television Camera Tubes
2. To study the principles of Monochrome Television Transmitter and Receiver systems.
3. To study the various Color Television systems with a greater emphasis on PAL system.
4. To study the advanced topics in Television systems and Video Engineering

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X		X		X						
Mapping of instructional objectives with student outcome	1-4		1-4		1-4						

List of Topics Covered

UNIT 1 FUNDAMENTALS OF TELEVISION (9 hours)

Geometry form and Aspect Ratio - Image Continuity - Number of scanning lines - Interlaced scanning - Picture resolution - Camera tubes- Image orthicon – vidicon – plumbicon -silicon diode array vidicon -solid state image scanners- monochrome picture tubes- composite video signal-video signal dimension- horizontal sync. Composition-

vertical sync. Details – functions of vertical pulse train – scanning sequence details. Picture signal transmission – positive and negative modulation – VSB transmission sound signal transmission – standard channel bandwidth.

UNIT 2 MONOCHROME TELEVISION TRANSMITTER AND RECEIVER (9hours)

TV transmitter – TV signal propagation – Interference – TV transmission Antennas – Monochrome TV receiver – RF tuner – UHF, VHF tuner- Digital tuning techniques- AFT-IF subsystems - AGC – Noise cancellation- Video and sound inter carrier detection- vision IF subsystem- video amplifiers requirements and configurations - DC re-insertion - Video amplifier circuits- Sync separation – typical sync processing circuits- Deflection current waveform – Deflection Oscillators – Frame deflection circuits – requirements- Line Deflection circuits – EHT generation – Receiver Antennas.

UNIT 3 ESSENTIALS OF COLOUR TELEVISION (9 hours)

Compatibility – colour perception- Three colour theory- luminance, hue and saturation-colour television cameras-values of luminance and colour difference signals- colour television display tubes- delta – gun-precision – in-line and Trinitron colour picture tubes- purity and convergence- purity and static and dynamic convergence adjustments-pincushion correction techniques- automatic degaussing circuit- grey scale tracking – colour signal transmission-bandwidth- modulation of colour difference signals – weighting factors- Formation of chrominance signal.

UNIT 4 COLOUR TELEVISION SYSTEMS: (9 hours)

NTSC colour TV system- NTSC colour receiver- limitations of NTSC system – PAL colour TV system – cancellation of phase errors- PAL –D colour system- PAL coder – Pal-Decolour receiver- chromo signal amplifier- separation of U and V signals- colour burst separation – Burst phase Discriminator – ACC amplifier- Reference Oscillator- Ident and colour killer circuits- U and V demodulators- Colour signal matrixing – merits and demerits of the PAL system – SECAM system – merits and demerits of SECAM system.

UNIT 5 ADVANCED TELEVISION SYSTEMS (9 hours)

Satellite TV technology- Cable TV – VCR- Video Disc recording and playback- Tele Text broadcast receiver – digital television – Transmission and reception- projection Television – Flat panel display TV receiver – Stereo sound in TV – 3D TV – HDTV – Digital equipments for TV studios.

Course Number and Title

EC0012 SATELLITE COMMUNICATION & BROADCASTING

Credits / Contact Hours

3 / 45

Instructor Name

Mrs.K.suganthi

Textbooks, References

- Dennis Roddy, "*Satellite Communications*", McGraw Hill Publications, 3rd Edition 2001.
- M.Richaria, "*Satellite Communication Systems Design Principles*", Pearson Publications, 2nd Edition 1999.
  Wilbur L.Prichard, Henry G. Suyerhood, Ropert A. Nelson , "*Satellite Communication System Engineering"*, Pearson education ,2nd Edition,.
- Pratt, Timothy, Charles W. Bostian, "*Satellite Communication*", John Wiley and Sons, New York, 1986.

Purpose

The main objective of this course is to make the students understand the basic concept in the field of satellite communication. This subject gives the students an opportunity to know how to place a satellite in an orbit. The students are taught about the earth and space subsystems. The satellite services like broadcasting are dealt thoroughly. This will

help the student to understand and appreciate the subject.

Prerequisites	Co-requisites
EC0210	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

Instructional Objectives

At the end of this course students will gain knowledge in topics such as

1. Orbital aspects involved in satellite communication
2. Power budget calculation
3. Satellite system and services provided.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X		X					X	
Mapping of instructional objectives with student outcome	1,2	1,3	1,3		1,2					1,3	

List of Topics Covered

UNIT 1 SATELLITE ORBIT (9 hours)
Satellite orbits: Kepler's laws- Earth satellite orbiting satellite terms-Orbital elements – Orbital perturbations –Inclined Orbits- Sun synchronous orbit. **Constellation:** Geo stationary satellites- Non geostationary constellation- Launching of Geostationary satellites.

UNIT 2 LINK DESIGN (9 hours)
EIRP- Transmission Losses –Power Budget equation- System Noise Carrier to noise ratio –Uplink- Downlink –Effects of rain –Inter modulation Noise

UNIT 3 SPACE AND EARTH SEGMENT (9 hours)
Space Segment: Power Supply – Altitude control- Station keeping – Thermal Control- TT&C- Subsystems – Antenna subsystem –Transponders- Wideband Receiver.
Earth Segment: receive only home TV system- Community antenna TV system.

UNIT 4 SATELLITE ACCESS (9 hours)
Single Access- Pre assigned FDMA – Demand Assigned FDMA- SPADE system- TWT amplifier operation- Downlink analysis –TDMA- reference bursts-Preamble- Postamble- Carrier recovery-Network synchronization- Pre assigned TDMA –Assigned –CDMA introduction

UNIT 5 BROADCAST AND SERVICES (9 hours)
Broadcast: DBS - Orbital Spacings- Power ratings- Frequency and Polarization- Transponder Capacity- Bit rate- MPEG- Forward Error Correction. ODU-IDU-Downlink Analysis –Uplink –**Satellite Mobile services**: VSAT-GPS.

Course Number and Title

EC0013 RADAR AND NAVIGATIONAL AIDS

Credits / Contact Hours

3 / 45

Instructor Name

Mrs.S.Vasanthadev Suryakala.

Textbooks, References

- M.I. Skolnik, "*Introduction to RADAR systems*", 3rd edition, McGraw Hill.
- N.S. Nagaraja "Elements *of Electronic Navigation*", Tata McGraw Hill, 1993.
- Nadav Levanon, "*RADAR Principles"*, John Wiley and Sons, 1989.
- Brookner, " *RADAR Technology"*, Artech Hons, 1986

Purpose

Main objective of this course is to make the students understand the basic concept in the field of Radar and Navigational aids. Students are taught about different types of Radar Systems

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

Instructional Objectives

Students will gain knowledge in the topics such as

1. Fundamentals of Radar
2. Different types of Radar and their working
3. Radar signal Detection techniques
4. Radar Navigation Techniques

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X			X						
Mapping of instructional objectives with student outcome	1,2	3			1,4						

List of Topics Covered

UNIT 1 RADAR EQUATIONS (9 hours)
RADAR Block Diagram & operation- RADAR Frequencies- RADAR Equation- Detection of signals in Noise- RADAR cross section of targets- RADAR cross section fluctuations- transmitter power- pulse repetition frequency- system losses and propagation effects.

UNIT 2 MTI AND PULSE DOPPLER RADAR (9 hours)
Introduction to Doppler & MTI RADAR- Delay Line canceller- Moving Target Detector- Pulse Doppler RADAR-

Non-Coherent MTE- CW RADAR- FMCW RADAR- Tracking RADAR- Monopulse Tracking – Conical Scan and Sequential Lobing.

UNIT 3 RADAR SIGNAL DETECTION AND PROPAGATION ON WAVES (9 hours)
Detection criteria- automatic detection- constant false alarm rate receiver- information available from a RADAR- ambiguity diagram- pulse compression- introduction to clutter- surface clutter RADAR equation- anomalous propagation and diffraction.

UNIT 4 RADIO NAVIGATION (9 hours)
Adcock directional finder- automatic directional finder- hyperbolic Systems of Navigation- Loren and Decca Navigation System- Tactical Air Navigation.

UNIT 5 RADAR TRANSMITTER AND RECEIVER (9 hours)
Linear beam power tubes- Solid state RF power sources- solid state devices used in RADAR- Magnetron- crossed field amplifiers- other aspects of radar transmitter-
RADAR Receiver- Receiver noise figure- super heterodyne receiver- dynamic range- RADAR Displays.

Course Number and Title

EC0015 MOBILE COMPUTING

Credits / Contact Hours

3 / 45

Instructor Name

Mr. M. Aravindan

Textbooks, References

- Jochen Schiller, "*Mobile Communications*", Pearson Education, Second Edition 2002.
- William Stallings, "*Wireless Communications and Networks*", Pearson Education 2002.

Purpose

To understand the fundamentals and various computational processing of mobile networks.

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

Instructional Objectives

1. To study the specifications and functionalities of various protocols/standards of mobile networks.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X							X	X	X	
Mapping of instructional objectives with student outcome	1							1	1	1	

List of Topics Covered

UNIT-1 INTRODUCTION (9 hours)
Introduction to Mobile Computing-Wireless transmission: Propagation, Modulation, Multiplexing, switching, Spread Spectrum and Error control coding.

UNIT-2 WIRELESS LAN (9 hours)
Medium access Control and Physical layer specifications-IEEE 802.11- HIPERLAN-Bluetooth

UNIT-3 WIRELESS NETWORKING (9 hours)
Satellite systems-Cellular networks-Cordless systems-Wireless Local Loop-IEEE 802.16

UNIT-4 MOBILE TCP/IP AND WAP (9 hours)
TCP/IP protocol suite-Mobile IP-DHCP-Mobile transport layer-Wireless application protocol

UNIT-5 MOBILE ADHOC NETWORKS (9 hours)
Characteristics-Performance issues-Routing algorithms; Proactive and Reactive, DSDV, AODV, DSR and Hierarchial algorithms.

Course Number and Title

EC0016 BLUETOOTH TECHNOLOGY

Credits / Contact Hours

3 / 45

Instructor Name

Dr. V.Nithya

Textbooks, References

- Jennifer Bray and Charles F Sturman, "*Bluetooth: Connect Without Cables*", Pearson Education, 2002.
- Jennifer Bray, Brain Senese, Gordon McNutt, Bill Munday, "*Bluetooth Application Developer's Guide*", Syngress Media, 2001.
- Micheal Mille, "*Discovering Bluetooth*".
- C S R Prabhu, P A Reddi, "*Bluetooth Technology and its applications with JAVA and J2ME*", PHI, 2006

Purpose

To Study the concepts of Bluetooth Technology.

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

Instructional Objectives

1. T he students will learn how Bluetooth devices operate in the frequency band where other devices operate including wireless LAN, microwave ovens, cordless telephones, wireless video cameras, and others.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X		X					X	X	X	
Mapping of instructional objectives with student outcome	1		1					1	1	1	

List of Topics Covered

UNIT I THE BLUETOOTH MODULE (9 hours)
Introduction-overview - the Bluetooth module-antennas- base band - introduction-bluetooth device address –masters, slaves, and Pico nets-system timing-physical links-Bluetooth packet structure-logical channels-frequency hopping.

UNIT II THE LINK CONTROLLER (9 hours)
The link controller-link control protocol-link controller operation-Pico net, scatter net operation-master/slave role switching-base band/link controller architectural overview -link manager-the host controller interface.

UNIT III THE BLUE TOOTH HOST (9 hours)
The blue tooth host-logical link control and adaptation protocol –RFCOMM- the service discovery protocol – the wireless access protocol-OBEX and IrDA-telephony control protocol.

UNIT IV CROSS LAYER FUNCTIONS (9 hours)
Cross layer functions-Encryption and security-low power operations-controlling low power modes-hold mode-sniff mode-park mode-quality of service-managing Bluetooth devices.

UNIT V TEST AND QUALIFICATION (9 hours)
Test and qualification- test mode-qualification and type approval-implementation – related standards and technologies.

Course Number and Title

EC0017 SPREAD SPECTRUM TECHNIQUES

Credits / Contact Hours

3 / 45

Instructor Name

Dr.M.Sangeetha

Textbooks, References

- Bernard Sklar , '*Digital Communication – Fundamentals and Application*',Pearson Edition, 2001.
- M.K.Simon,J.K Scholtz and B.K Levitt, *'Spread Spectrum Communications Vol-1,Vol-2,Vol- 3',* Computer Science press inc, 1985.
- John G. Prokias , '*Digital Communications*', McGraw Hill Inc,2001
- Feher. K. *'Wireless Digital Communications'*, Pearson education.

Purpose

This course is intended to provide a comprehensive coverage of spread spectrum communication. The key feature of spread spectrum communication is that deals with discrete messages and the major purpose are to add organization and

structure to this field.

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

Instructional Objectives

To understand and gain complete knowledge about
1. Direct Sequence Spread Spectrum
2. Frequency hopped Spread Spectrum
3. Commercial applications of Spread Spectrum
4. Different types of Spread Spectrum.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X		X			X			
Mapping of instructional objectives with student outcome		1-4	3		3			1-4			

List of Topics Covered

UNIT 1 INTRODUCTION (9 hours)
Introduction-Application and advantages of spread spectrum (SS)-Classification of SS Pseudo noise sequences-Direct Sequence(DS) spread spectrum-Frequency hopping-Chirp-Hybrid Spectrum methods.

UNIT 2 SPREAD SPECTRUM TECHNIQUES-TYPES (9 hours)
Frequency hopped (FH) spread spectrum signals. Performance of FH Spread spectrum-Fast hopping versus slow hopping- DS versus FH. CDMA system based on FH spread spectrum signals-Other types of spread spectrum signals. Time hopping SS system.

UNIT 3 SPREAD SPECTRUM TECHNIQUES-ANALYSIS (9 hours)
Synchronization of SS systems - Acquisition. Tracking, Jamming consideration- Broad band –Partial- multiple tone-pulse-repeat band jamming blades system

UNIT 4 CRYPTOGRAPHY (9 hours)
Fundamental concepts of cryptosystems – authentication, digital signature. Key schedule – Encipherment , Decipherment , Stream cipher system. Public key –cryptosystem. Public key distribution system. RSA cryptosystem and authentication scheme. Protocols, Internetworking security mechanisms, Private and public key encryption.

UNIT 5 APPLICATIONS (9 hours)
Commercial application of SS – CDMA – Multi path channels – The FCC part 15 rules – Direct sequence CDMA – IS-95 CDMA digital cellular systems. SS applications in cellular. PCS and mobile communication

Course Number and Title

EC0018 COMMUNICATION PROTOCOLS

Credits / Contact Hours

3 / 45

Instructor Name

Mr.S.Manikandaswamy

Textbooks, References

- Douglas E. Comer, "*Internetworking with TCP/IP*", Principles, Protocols and Architectures, Vol. I, 4th edition, Pearson Education.
- Behrouz A. Forouzan, "TCP*/IP protocol suite"*, 3rd edition, Tata McGraw Hill.
- Peterson (David. M.)., *'TCP/IP Networking'*, Tata McGraw Hill, 1995.
- Douglas E. Comer., *'Computer Networks and Internet'*, Addison Wesley, 2000

Purpose

The course introduces the students to the emerging areas in Internetworking. This will enable the students to acquire a solid understanding of the different components involved in the seamless working of the Internet.

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

Instructional Objectives

At the end of the course, the students will know about

1. Network technologies
2. Internet Addressing and Routing
3. Socket interface and Internet security.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
			X						X		X
Mapping of instructional objectives with student outcome			1,2						1-3		2,3

List of Topics Covered

UNIT 1 REVIEW OF UNDERLYING NETWORK TECHNOLOGIES (9 hours)
Motivation for internetworking- Internet Services- Introduction to Wide Area and Local Area Networks- Ethernet Technology- FDDI- Arpanet technology- Internetworking concepts and Architecture model.

UNIT 2 INTERNET ADDRESSES (9 hours)
Classful Addressing- Subnetting and Supernetting- ARP- ARP Packet format, Encapsulation & operation- ARP over ATM- Proxy ARP- RARP-ICMP –ICMP message types

UNIT 3 ROUTING (9 hours)
IP data grams - Fragmentation – Packet format- Checksum- Intra and Interdomain Routing- Distance Vector Routing- Routing Information Protocol- Link state Routing- OSPF- Path vector Routing- Autonomous systems concepts-

Border Gateway Protocol.

UNIT 4 CLIENT SERVER MODEL AND SOCKET INTERFACE (9 hours)
The client server model- UDP echo server- Time and date service- RARP Server- Socket abstraction- Specifying local and destination addresses- Sending and Receiving data- Handling multiple services- Domain name system – Distribution of name space- DNS resolution – DNS messages and records.

UNIT 5 INTERNET SECURITY AND IPv6 (9 hours)
Protecting resources- Information policy- IPSec- Authentication Header- Transport layer and Application layer security- Firewalls- Packet filter firewall- Proxy firewall- IPv6-Features and packet format- Comparison between Ipv4 and Ipv6.

Course Number and Title

TE0202 INFORMATION THEORY AND CODING

Credits / Contact Hours

3 / 45

Instructor Name

Mrs.J.Subhashini

Textbooks, References

- Simon Haykin, "Communication *Systems* ", John Wiley & Sons, Inc, Newyork, 4th Edition, 2006.
- John G.Proakias ," *Digital Communication* "Mcgraw Hill,Singapore, 4th Edition,2001.
- Shu Lin & Daniel J. Costello, "*Error control coding Fundamentals and applications*", Prentice hall, 1983.
  S.P.Eugene Xavier, '' *Statistical Theory of Communication* '', 1997
- Hwei P Hsu, *'Theory of Analog & Digital Communication , Pearson / Prentice Hall, New Jersey.*

Purpose

The instructional objective of this subject is to introduce to the students the concept of source coding, the various coding techniques that are used for practical purposes. Fundamental concepts of coding theorem and the various types of error control codes and decoding techniques are also introduced.

Prerequisites	Co-requisites
MA0201	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

Instructional Objectives

At the end of this course, the students will be able to understand and apply

1. Several Source Coding Techniques
2. Channel Coding Theorem & Various codes
3. Block Codes
4. Error Control Coding

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X										
Mapping of instructional objectives with student outcome	1-4										

List of Topics Covered

UNIT 1 SOURCE CODING (9 hours)
Mathematical model for information source: - Mutual Information – Discrete Entropy-Definition and properties – Joint and conditional entropies – Entropy in the continuous case – Unique decipherability and instantaneous codes – Kraft inequality.

UNIT 2 NOISY CODING (9 hours)
Discrete memoryless channel – Classification of channels & channel capacity – Calculation of channel capacity – Decoding schemes – Fano's inequality – Shannon's fundamental theorem – Capacity of a band limited Gaussian channel.

UNIT 3 CHANNEL CODING (9 hours)
Channel models: Binary Symmetric channels – Information capacity theorem – Implication of the information capacity theorem – Information capacity of coloured noise channel – Rate distortion theory – Data compression.

UNIT 4 ERROR CONTROL CODING (9 hours)
Linear block codes: – Cyclic codes, BCH Codes, RS codes, Golay codes, Burst error correcting codes, Interleaved codes, **Convolutional codes :** Convolutional encoder, code tree, state diagram, trellis diagram – Turbo codes.

UNIT 5 DECODING OF CODES (9 hours)
Maximum likelihood decoding of convolutional codes - Sequential decoding of convolutional codes- Applications of Viterbi decoding.

Course Number and Title

TE0301 COMMUNICATION SWITCHING TECHNIQUES

Credits / Contact Hours

3 / 45

Instructor Name

Ms.T.Ramya

Textbooks, References

- J.E.Flood, "*Telecommunication Switching traffic and Network*", Pearson Education Limited, 2002
- Thiagarajan Viswanathan, "*Telecommunication Networks and Systems*", Prentice Hall of India Pvt Limited,2000
- Freeman C.Roger L., "*Fundamentals of Telecommunication*", Pearson, 2000.
- Marincole, "*Introduction to telecommunication*", Pearson Education Limited,2002

Purpose

This course gives a clear idea about the Switching techniques and network services.

Prerequisites	Co-requisites
EC0210	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

Instructional Objectives

1. To know about the basics of telephone system and data
2. Exposure to traffic and queuing systems theory
3. To learn about the switching networks and control of switching systems.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X		X		X						
Mapping of instructional objectives with student outcome	1,3		3		2,3						

List of Topics Covered

UNIT 1 EVOLUTION OF TELECOMMUNICATIONS (9 hours)
Telephone system-**Basics of switching systems:** Functions of switching systems- step by step and crossbar system – Network structures –Network services- regulations- standards

UNIT 2 SIGNALLING (9 hours)
Signals for telephone system: Customer line signaling – FDM carrier system- PCM signaling –Common Channel signaling – signaling system No. 7.

UNIT 3 TRAFFIC ANALYSIS (9 hours)
Traffic Concepts: Erlang- congestion- traffic measurement- lost call system- queuing system – grade of service.
Network organization: Network management- routing plan- Numbering plan- Charging plan

UNIT 4 SWITCHING NETWORKS (9 hours)
Types of Networks: Single stage and multistage networks- time division switching- TST switching–STS- switching

UNIT 5 CONTROL OF SWITCHING SYSTEMS (9 hours)
Practical Applications: Call processing functions- Common control switching systems- Stored programmed control - ISDN- Broadband ISDN

Course Number and Title

EC0030 BIO MEDICAL INSTRUMENTATION

Credits / Contact Hours

3 / 45

Instructor Name

Mrs.Sabitha Gauni

Textbooks, References

- Leslie Cromwell, Fred J. Weibell and Erich A. Pfeifer, "*Biomedical Instrumentation and Measurements*", 2nd Edition, Pearson Education, 2006
- M. Arumugam, "*Biomedical Instrumentation*", 2nd edition, Anuradha Agencies Publications, 1997

- R.S. Khandpur, "*Handbook of Biomedical Instrumentation*", 2nd edition, Tata McGraw Hill, 2006
- John G. Webster, "*Medical Instrumentation Application and Design*", 3rd edition, Wiley India, 2007.

Purpose

The purpose of this course is to introduce the students to the basics of Electro-physiology and its measurements, non-electrical parameters related to various systems of human body and their measurements, Electrodes and Transducers used in bio signal acquisition. Also student will get to know about various Medical Imaging techniques used for diagnosis along with other diagnostic and therapeutic devices.

Prerequisites	Co-requisites
EC0301	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

Instructional Objectives

The students will be able

1. To understand the Origin of Bioelectric potential and their measurements using appropriate electrodes and transducers.
2. To understand the Electro-physiology of various systems and recording of the bioelectric signals
3. To understand the working principles of various Imaging techniques
4. To understand the design aspects of various Assist and Therapeutic Devices.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X		X	X		X		X			
Mapping of instructional objectives with student outcome	1		1,4	2,3		2,4		4			

List of Topics Covered

UNIT 1 BIOELECTRIC POTENTIALS, ELECTRODES AND TRANSDUCERS (9 hours)
Sources of Bioelectric potentials - Resting and Action potential - Propagation of Action potential
Electrode theory- Equivalent Circuit- Types of electrodes.
Physiological Transducers: Inductive, Capacitive, Piezoelectric transducers and Thermistors. Biochemical Transducers- pH, pCo2 and pO2 electrodes.

UNIT 2 ELECTROPHYSIOLOGICAL MEASUREMENTS (9 hours)
Electrophysiology of Heart, Nervous System and Muscle Activity
Bio-signals: ECG - EEG, Evoked potential – EMG- ERG- Electrodes and Lead System, Typical waveforms and Signal characteristics
Signal Conditioning circuits: Design of low Noise Medical Amplifier, Isolation Amplifier, Protection Circuits and Electrical Safety.

UNIT 3 NON-ELECTRICAL PARAMETER MEASUREMENTS (9 hours)
Measurement of Blood Pressure, Blood Flow, Plethysmography, Cardiac Output, Heart Sounds- Lung Volumes and their measurements- Auto analyzer – Blood cell counters, Oxygen saturation of Blood

UNIT 4 MEDICAL IMAGING TECHNIQUES (9 hours)
X-ray machine – Computer Tomography – Angiography – Ultrasonography – Magnetic Resonance Imaging System – Nuclear Imaging Techniques – Thermography – Lasers in Medicine – Endoscopy

UNIT 5 TELEMETRY, ASSIST AND THERAPEUTIC DEVICES (9 hours)
Bio telemetry – Elements and Design of Bio telemetry system.

Assist and Therapeutic devices: Cardiac Pacemakers – Defibrillators – Artificial Heart Valves – Artificial Heart Lung machine – Artificial Kidney – Nerve and Muscle Stimulators – Respiratory therapy equipment – Patient Monitoring System.

Course Number and Title

EC0031 EMBEDDED SYSTEMS

Credits / Contact Hours

3 / 45

Instructor Name

Dr. .A .Ruhan Beevi.

Textbooks, References

- David E Simon, "*An Embedded Software Primer*", Pearson Education Asia, 2001.
- Glaf P.Feiffer, Andrew Ayre and Christian Keyold, "*Embedded networking with CAN and CAN open*", Embedded System Academy 2005.
- Burns, Alan and Wellings, Andy, "*Real-Time Systems and Programming Languages*", Harlow: Addision-Wesley-Longman
- Raymond J.A.Bhur and Donald L.Bialey, "*An Introduction to Real Time Systems: Design to Networking with C/C++*", Prentice Hall Inc, NewJersey.

Purpose

The purpose of this course is to expose the concepts of embedded system principles – Operating System – RTOS – Software Development Tools.

Prerequisites	Co-requisites
EC0205, EC0204	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

Instructional Objectives

At the end of the course, student will know about

1. Embedded Hardware
2. Real-Time Operating System
3. Software Architecture
4. Development Tools and Debugging Techniques.
5. Controller Area Network

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
		X	X	X							
Mapping of instructional objectives with student outcome		3-5	1,2,5	2,5							

List of Topics Covered

UNIT 1 INTRODUCTION: REVIEW OF EMBEDDED HARDWARE (9 hours)
Hardware Fundamentals: Terminology, Gates, Timing Diagram, Microprocessors, Buses - Direct Memory Access- Interrupts- Other Common Parts- Built-Ins on the Microprocessor- Conventions Used on Schematics - **Interrupts:** Microprocessor Architecture – Interrupts Basics- Shared-Data Problem- Interrupt Latency. Examples of Embedded System.

UNIT 2 REAL TIME OPERATING SYSTEMS (9 hours)
Introduction: Tasks and Task States, Task and Data, Semaphores and Shared Data - **More Operating System Services:** Message Queues- Mailboxes and Pipes – Timer Functions – Events – Memory Management – Interrupt Routines in an RTOS environment. Basic Design using a Real –Time Operating System.

UNIT 3 SOFTWARE ARCHITECTURES AND DEVELOPMENT TOOL (9 hours)
Software Architectures: Round-Robin, Round-Robin with Interrupts, Function-Queue-Scheduling -Real-Time Operating System Architecture. **- Development Tools:** Host and Target Machines, Linker/Locators for Embedded Software. Debugging Techniques.

UNIT-4 CAN NETWORK OVERVIEW (9 hours)
Controller Area Network – Underlying Technology CAN Overview – Selecting a CAN Controller – CAN development tools.

UNIT-5 CAN NETWORK IMPLEMENTATION (9 hours)
Implementing CAN open Communication layout and requirements – Comparison of implementation methods – Micro CAN open – CAN open source code – Conformance test – Entire design life cycle.

Course Number and Title

EC0032 INTRODUCTION TO MEMS

Credits / Contact Hours

3 / 45

Instructor Name

Dr.P.Eswaran

Textbooks, References

- Chang Liu, "*Foundations of MEMS*", Pearson International Edition, 2006.
- Gaberiel M.Rebiz, "*RF MEMS Theory,Design and Technology*", John Wiley & Sons,2003
- Charles P.Poole, Frank J.Owens, "*Introduction to nanotechnology*" John Wiley & sons, 2003.
- Julian W.Gardner, Vijay K Varadhan, "*Microsensors, MEMS and Smart devices*", John Wiley & sons, 2001.

Purpose

This course is offered to students to gain basic knowledge on overview of MEMS (Micro electro Mechanical System) and various fabrication techniques. This enables them to design, analysis, fabrication and testing the MEMS based components.

Prerequisites	Co-requisites
PH0101, CY0101, PH0102, GE0101, GE0106	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

Instructional Objectives

1. Introduction to MEMS and micro fabrication
2. To study the essential material properties
3. To study various sensing and transduction technique
4. To know various fabrication and machining process of MEMS
5. To know about the polymer and optical MEMS

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X		X						X	
Mapping of instructional objectives with student outcome	1-5	2,3		1-5						1-5	

List of Topics Covered

UNIT-1INTRODUCTION TO MEMS AND MICROFABRICATION (9 hours)
History of MEMS Development, Characteristics of MEMS-miniaturization - micro electronics integration - Mass fabrication with precision.
Micro fabrication - microelectronics fabrication process- silicon based MEMS processes- new material and fabrication processing- points of consideration for processing.

UNIT-2ELECTRICAL AND MECHANICAL PROPERTIES OF MEMS MATERIALS (9 hours)
Conductivity of semiconductors, crystal plane and orientation, stress and stain – definition – relationship between tensile stress and stain- mechanical properties of silicon and thin films, Flexural beam bending analysis under single loading condition- Types of beam- deflection of beam-longitudinal stain under pure bending- spring constant, torsional deflection, intrinsic stress, resonance and quality factor.

UNIT-3 SENSING AND ACTUATION (9 hours)
Electrostatic sensing and actuation-parallel plate capacitor – Application-Inertial, pressure and tactile sensor- parallel plate actuator- comb drive. Thermal sensing and Actuations-thermal sensors-Actuators- Applications- Inertial, Flow and Infrared sensors. Piezoresistive sensors- piezoresistive sensor material- stress in flexural cantilever and membrane-Application-Inertial, pressure, flow and tactile sensor. Piezoelectric sensing and actuation- piezoelectric material properties-quartz-PZT-PVDF –ZnO- Application-Inertial, Acoustic, tactile, flow-surface elastic waves. Magnetic actuation- Micro magnetic actuation principle- deposition of magnetic materials-Design and fabrication of magnetic coil.

UNIT-4 BULK AND SURFACE MICROMACHINING (9 hours)
Anisotropic wet etching, Dry etching of silicon, Deep reactive ion etching (DRIE), Isotropic wet etching, Basic surface micromachining process- structural and sacrificial material, stiction and antistiction methods, Foundry process.

UNIT-5 POLYMER AND OPTICAL MEMS (9 hours)
Polymers in MEMS- polymide-SU-8 liquid crystal polymer(LCP)-PDMS-PMMA-Parylene- Flurocorbon, Application-Acceleration, pressure, flow and tactile sensors. Optical MEMS-passive MEMS optical components-lenses-mirrors-Actuation for active optical MEMS.

Course Number and Title

EC0033 ASIC DESIGN

Credits / Contact Hours

3 / 45

Instructor Name

Dr.J.Manjula

Textbooks, References

- M.J.S.Smith, "*Application Specific Integrated Circuits*", Addison Wesley Longman Inc. 1996. (Pearson Education Reprint 2006).
- M. Sarafzadeh, C.K. Wong, "*An Introduction to VLSI Physical Design*", McGraw Hill International Edition, 1995.
- Wolf Wayne, "*FPGA based system design*", Pearson Education, 2005.
- Design manuals of Altera, Xilinx and Actel
- Jan M. Rabaey. Anantha Chandrakasan. Borivoje Nikolic, "*Digital Integrated Circuits*", Second Edition

Purpose

The purpose of this course is to introduce the students the basics of designing and using ASIC's. The operation of tools used in the design is also explained.

Prerequisites	Co-requisites
EC0306, EC0204	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

Instructional Objectives

1. To give basic knowledge of ASIC internals.
2. To impart knowledge on ASIC types and tools used in the design.
3. To give basic understanding of tools used.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X		X	X					X	X	
Mapping of instructional objectives with student outcome	1,2		2,3	1,3					2,3	1,2	

List of Topics Covered

UNIT 1 INTRODUCTION TO ASICs (9 hours)
Introduction to ASICs – CMOS logic – ASIC library design.

UNIT 2 PROGRAMMABLE ASICs (9 hours)
Programmable ASICs - Logic cells – I/O cells – Interconnects – Low level design entry: Schematic entry.

UNIT 3 SIMULATION AND SYNTHESIS (9 hours)

Logic synthesis: A comparator MUX, Inside a logic synthesizer, VHDL and logic synthesis, FSM synthesis, memory synthesis - Simulation: Types of simulation – logic systems – how logic simulation works.

UNIT 4 ASIC TESTING (9 hours)
Boundary scan test – Faults – Fault simulation – Automatic test pattern generation – Built in self test.

UNIT 5 ASIC CONSTURCTION (9 hours)
System partitioning – power dissipation – partitioning methods – floor planning and placement: Floor planning, placement – Routing: Global routing, detailed routing, special routing.

Course Number and Title

EC0034 INTRODUCTION TO NANOTECHNOLOGY

Credits / Contact Hours

3 / 45

Instructor Name

Mr.A.V.M.Manikandan.

Textbooks, References

- Rainer Waser (Ed.), "*Nano electronics and information technology*", Wiley- VCH., Edition II, 2005.
- Thomas Heinzel , "*A Microscopic Electronics in Solid State Nanostructure*" , Wiley- VCH.
- Mick Wilson, Kamali Kannangara, Geoff Smith , Michelle Simmons, Burkhard Raguse "*Nanotechnology – (Basic Science and Emerging Technologies*)", Overseas Press.
- Mark Ratner, Daniel Ratner , " *Nanotechnology : A Gentle introduction to the Next Big idea*", Pearson education., 2003.

Purpose

To introduce to the students, the various opportunities in the emerging field of nano electronics and nano technologies.

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

Instructional Objectives

1. The objective of this course is to make students familiar with the important concepts applicable to small electronic devices, their fabrication, characterization and application.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X									
Mapping of instructional objectives with student outcome	1	1									

List of Topics Covered

UNIT 1 LIMITATIONS OF CMOS (9 hours)
Fundamentals of MOSFET devices - Scaling of CMOS – Limitations – Alternative concepts in materials – **Structures of MOS devices:** SOI MOSFET, FINFETS, Dual Gate MOSFET, Ferro electric FETs.

UNIT 2 MICRO AND NANO FABRICATION (9 hours)
Optical Lithography – Electron beam Lithography – Atomic Lithography – Molecular beam epitaxy - Nano lithography.

UNIT 3 CHARACTERIZATION EQUIPMENTS (9 hours)
Principles of Electron Microscopes – Scanning Electron Microscope – Transmission Electron Microscope - Atomic Force Microscope – Scanning Tunneling Microscope.

UNIT 4 NANO DEVICES – I (9 hours)
Resonant tunneling diodes – Single electron devices – Josephson junction – Single Flux Quantum logic – Molecular electronics.

UNIT 5 NANO DEVICES – II (9 hours)
Quantum computing: principles – Qrbits – Carbon nanotubes (CNT) : Characteristics, CNTFET, Application of CNT - Spintronics: Principle, Spin valves, Magnetic Tunnel Junctions, SpinFETs, MRAM.

Course Number and Title

EC0035 ELECTROMAGNETIC INTERFERENCE AND ELECTROMAGNETIC COMPATIBILITY

Credits / Contact Hours

3 / 45

Instructor Name

Dr.P.Eswaran

Textbooks, References

- Prasad Kodali – *"Engineering Electromagnetic Compatibility –Principles, Measurements, and Technologies"*, IEEE press.
- Henry W. Ott – "*Noise Reduction Techniques in Electronic Systems*"- 2nd Edition-John Wiley & Sons.
- Bernharo Q'Keiser, '*Principles of Electromagnetic Compatibility'*, Artech house, 3rd edition, 1986

Purpose

The purpose of this course is to expose the students to the basics and fundamentals of Electromagnetic Interference and Compatibility in System Design.

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

Instructional Objectives

At the end of the course, the students will know about

1. EMI Environment
2. EMI Coupling and Measurements
3. EMI control techniques and standards

Student outcome	a	b	c	d	e	f	g	h	i	j	k
					X			X			
Mapping of instructional objectives with student outcome					1-3			1,2			

List of Topics Covered

UNIT 1 EMI environment (9 hours)
Concepts of EMI and EMC and Definitions, Sources of EMI – Celestial Electromagnetic noise- Lightning Discharge- Electrostatic Discharge- Electromagnetic Pulse-Electromagnetic emissions-Noise from relays and Switches- Nonlinearities in Circuits

UNIT 2 EMI COUPLING PRINCIPLES (9 hours)
Capacitive coupling - Inductive coupling- Common Impedance Ground Coupling- Ground Loop coupling-Transients in power supply lines- Radiation coupling-Conduction coupling-Common – mode and Differential-mode interferences- Conducted EM noise on power supply lines

UNIT 3 EMI MEASUREMENTS (9 hours)
Open Area test site measurements-Measurement precautions – Open -Area test site- Anechoic Chamber-TEM-Reverberating TEM-GTEM cell – Comparisons

UNIT 4 EMI CONTROL TECHNIQUES (9 hours)
EMC Technology- Grounding-Shielding-Electrical Bonding-Power line filter-CM filter – DM filter- EMI suppression Cables- EMC Connectors -Isolation transformer

UNIT 5 EMI / EMC STANDARDS (9 hours)
Introduction- Standards for EMI/EMC- MIL-STD-461/462-IEEE/ANSI standard-CISPR/IEC standard- FCC regulations-British standards-VDE standards-Euro norms-Performance standards-some comparisons.

Course Number and Title

EC0051 DATA STRUCTURES AND ALGORITHMS

Credits / Contact Hours

3 / 45

Instructor Name

Ms.G.Sivagami

Textbooks, References

- Aho, Hopcroft, Ullman, **"***Data Structures and algorithms*", Pearson Education, 1983
- E.Horowitz, Sahni & Sanguthevar Rajasekaran, "*Fundamentals of Computer Algorithms*", Galgotia Publications, 1985.
- Seymour Lipschutz, "*Theory and Problems of Data Structures*", 1986.
- S.E.Goodman , S.T.Hedetniemi , "*Introduction to the Design and Analysis of Algorithms*", McGraw Hill.
- Sara Baase , "*Computer Algorithms - Introduction to design and analysis*", Addison wesley , 1991.

Purpose

The purpose of this course is to impart knowledge on various data structure concepts and algorithm principles

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

Instructional Objectives

At the end of the course, student should be able to understand

1. Several data structure concepts like stacks, queues, linked list, trees and graphs
2. Various sorting methods
3. Algorithm principles like Dynamic programming, Divide & conquer and Back tracking

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X										**X**
Mapping of instructional objectives with student outcome	1-3										1-3

List of Topics Covered

UNIT 1 STACKS, QUEUES & LINKED LIST (9 hours)
Stacks: Array representation of stacks – Arithmetic expressions- Quick sort using stack- Towers of Hanoi problem- Queues: : Array representation of Queues- Deque, Priority Queue, Circular Queue – List: Representation of Linked List- Traversing a Linked List- Insertion- Deletion- Doubly Linked List- Circular Linked List

UNIT 2 TREES & GRAPHS (9 hours)
Binary tree- Representation – Traversing – Threaded Binary tree- Binary Search tree- Insertion deletion into a binary search tree- Heap sort- Huffman's Algorithm- General Trees - Graph- Representation of Graph- Shortest path – Operation on Graphs- Traversing a Graph

UNIT 3 SORTING (9 hours)
Sorting - Insertion sort – Selection sort- Bubble sort - Quick sort - Merge sort - Heap sort - Sorting on several keys - External sorting.

UNIT 4 ANALYSIS OF ALGORITHM; DIVIDE & CONQUER (9 hours)
Introduction- Algorithms and Complexity – Asymptotic Notation- Orders-Analyzing Control Structures- Average Case Analysis – Worst Case Analysis- Binary Search – Finding Maximum and Minimum – Merge Sort – Quick Sort Greedy Method – General Method – Knapsack Problem – Minimum Spanning Tree Algorithm – Single Source Shortest Path Algorithm.

UNIT 5 DYNAMIC PROGRAMMING & BACKTRACKING (9 hours)
General Method–Multistage Graph – All Pairs Shortest Path Algorithm – 0/1 Knapsack Problem – Traveling Salesman Problem - Basic search techniques and traversal techniques –bi-connected components – Depth First Search – Breadth First Search.8-Queens Problem- Sum of Subsets – Graph Coloring- Hamiltonian Cycle-Knapsack Problem – Branch and Bound Method – 0/1 Knapsack Problems – Traveling Salesman Problem

Course Number and Title

EC0052 DIGITAL IMAGE PROCESSING

Credits / Contact Hours

3 / 45

Instructor Name

Dr.Diwakar R Marur

Textbooks, References

- Rafael C Gonzalez, Richard E Woods, "*Digital Image Processing*"- 2nd Edition, Pearson Education 2003.
- A.K. Jain, "*Fundamentals of Digital Image Processing"*. Pearson education.
- William K Pratt, "*Digital Image Processing*", John Willey (2001).
- Millman Sonka, Vaclav hlavac, Roger Boyle, Broos/colic, "*Image Processing Analysis and Machine Vision*" – Thompson learning, 1999.
- S. Chanda, Dutta Magumdar – "*Digital Image Processing and Applications*", Prentice Hall of India, 2000.

Purpose

The purpose of this course is to introduce the basic concept and methodologies for digital image processing.

Prerequisites	Co-requisites
EC0212	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

Instructional Objectives

The students undergoing this course will be able to know

1. The fundamental of image processing.
2. Various transforms used in image processing.
3. About the various techniques of image enhancement, reconstruction, compression and segmentation.

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X		X	X						
Mapping of instructional objectives with student outcome	1,2	1		2	1-3						

List of Topics Covered

UNIT 1 DIGITAL IMAGE FUNDAMENTALS (9 hours)
Introduction-Elements of Digital Image Processing system- Visual perception and properties of human eye-image representation-A simple image model-Some basic relationship between pixels-Image geometry.

UNIT 2 IMAGE TRANSFORMS (9 hours)
Introduction to Fourier Transform and DFT – Properties of 2D Fourier Transform–FFT– Separable Image Transforms - Walsh – Hadamard – Discrete Cosine Transform, Haar, –KL transforms.

UNIT 3 IMAGE ENHANCEMENT (9 hours)
Image Enhancement b-Histogram Modeling-equalization and modification. Image smoothing-Image Sharpening-Spatial Filtering-Homomorphic Filtering for image enhancement.

UNIT 4 IMAGE RESTORATION (9 hours)
Model of Image Degradation/restoration process –Inverse filtering -Least mean square(wiener) filtering – Constrained least mean square restoration – Singular value decomposition-Recursive filtering.

UNIT 5 IMAGE COMPRESSION AND SEGMENTATION (9 hours)
Fundamentals -Image compression models- Lossless compression: Variable length coding-LZW coding. Lossy Compression: Transform coding-Wavelet coding.
Image Segmentation: Detection of discontinuities-Edge linking and boundary detection-thresholding-Region oriented segmentation and Texture.

Course Number and Title

EC0053 OBJECT ORIENTED ANALYSIS AND DESIGN

Credits / Contact Hours

3 / 45

Instructor Name

Ms.A.Jackulin Mahariba

Textbooks, References

- "*The Unified Modeling Language User Guide*", Grady Booch, James Rumbaugh, Ivar Jacobson, Addison - Wesley Long man, 1999.
- Ali Bahrami, "*Object Oriented System Development*", McGraw Hill International Edition, 1999.
- Craig Larman, , "*Applying UML and patterns*" , Addison Wesley, 2000.
- Fowler, "*Analysis Patterns*", Addison Wesley, 1996.
- Erich Gamma, "Design *Patterns*", Addison Wesley, 1994

Purpose

This course separates and makes explicit the decisions that make up an object oriented analysis and design. We show how to use the UML notations most effectively both to discuss designs with colleagues, and in documents.

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

Instructional Objectives

To provide the students with sufficient knowledge for

1. Understanding Object Basics, Classes and Objects, Inheritance
2. Gaining enough competence in object-oriented analysis and design (OOAD) to tackle a complete object oriented project
3. Using UML, a common language for requirements, designs, and component interfaces
4. Using different approaches for identifying classes, design process

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X										X
Mapping of instructional objectives with student outcome	1-4										1-4

List of Topics Covered

UNIT 1 OBJECT ORIENTED DESIGN FUNDAMENTALS (9 hours)
The object model - Classes and Objects - Complexity - Classification - Notation - Process - Pragmatics - Binary and entity relationship - Object types - Object state - OOSD life cycle.

UNIT 2 OBJECT ORIENTED ANALYSIS (9 hours)
Overview of object oriented analysis - Shaler/Mellor, Coad/Yourdon, Rumbagh, Booch - UML – Use case - Conceptual model - Behaviour - Class - Analysis patterns - Overview - Diagrams – Aggregation

UNIT 3 OBJECT ORIENTED DESIGN METHODS (9 hours)
UML - Diagrams - Collaboration - Sequence - Class - Design patterns and frameworks - Comparison with other design methods

UNIT 4 MANAGING OBJECT ORIENTED DEVELOPMENT (9 hours)
Managing analysis and design - Evaluation testing - Coding - Maintenance – Metrics

UNIT 5 CASE STUDIES IN OBJECT ORIENTED DEVELOPMENT (9 hours)
Design of foundation class libraries - Object Oriented databases - Client/Server computing - Middleware

Course Number and Title

EC0054 NEURAL NETWORK AND FUZZY LOGIC

Credits / Contact Hours

3 / 45

Instructor Name

Mr.B.Srinath.

Textbooks, References

1. Freeman J.A. and Skapura B.M., "*Neural Networks, Algorithms Applications and Programming Techniques*", Addison-Wesely, 1990.
2. George J Klir and Tina A Folger, " *Fuzzy sets, uncertainty and information*", Prentice Hall of India
1. Laurene Fausett, "*Fundamentals of Neural Networks: Architecture, Algorithms and Applications*", Pearson Education, 1994.
2. H.J. Zimmerman, "*Fuzzy set theory and its Applications*", Allied Publishers Ltd.

Purpose

This course provides a way to study the Artificial Neural Networks and Fuzzy Logic concepts

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

Instructional Objectives

1. To learn the various architectures of building an ANN and its applications
2. Advanced methods of representing information in ANN like self organizing networks , associative and competitive learning
3. Fundamentals of Crisp sets , Fuzzy sets and Fuzzy Relations

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X				X						
Mapping of instructional objectives with student outcome	1-3				1-3						

List of Topics Covered

UNIT 1 INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS (9 hours)

Neuro-physiology - General Processing Element - ADALINE - LMS learning rule – MADALINE – XOR Problem – MLP - Back Propagation Network - updation of output and hidden layer weights - application of BPN .

UNIT 2 ASSOCIATIVE MEMORY & CPN (9 hours)

Associative memory - Bi-directional Associative Memory – Hopfield memory - traveling sales man problem Annealing, Boltzmann machine - learning – application - Counter Propagation network –architecture – training – Applications.

UNIT 3 SELF ORGANIZING MAP & ART (9 hours)

Self-organizing map - learning algorithm - feature map classifier – applications - architecture of Adaptive Resonance Theory - pattern matching in ART network.

UNIT 4 CRISP SETS AND FUZZY SETS (9 hours)

Introduction – crisp sets an overview – the notion of fuzzy sets –Basic concepts of fuzzy sets – classical logic an overview – Fuzzy logic- Operations on fuzzy sets - fuzzy complement – fuzzy union – fuzzy intersection – combinations of operations – general aggregation operations

UNIT 5 FUZZY RELATIONS (9 hours)

Crisp and fuzzy relations – binary relations – binary relations on a single set– equivalence and similarity relations – Compatibility or tolerance relations– orderings – morphisms-fuzzy relation equations.

Course Number and Title

EC0055 NETWORK SECURITY

Credits / Contact Hours

3 / 45

Instructor Name

Ms. T. Ramya.

Textbooks, References

- William Stallings, "*Cryptography and Network Security*", 3rd Edition, Pearson Education, New Delhi, 2003.
- Charlie Kaufman,Radio Perlman and Mike Speciner, " *Network Security*", 2nd Edition, Prentice Hall of India, New Delhi, 2003.
- Othmar Kyas, "*Internet Security*", International Thomson Publishing Inc.1997

Purpose

To study various aspects of Network Security, Attacks, Services and Mechanisms.

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

Instructional Objectives

1. To make the students understand the basic concepts related to applied cryptography, including plaintext, cipher text, symmetric and asymmetric cryptography.
2. To know the theory behind the Encryption, Authentication and Digital signature algorithms
3. To get a complete knowledge of general purpose and application specific security protocols and techniques.
4. To understand the requirements and mechanisms for identification and authentication and to identify the possible threats to each mechanism and ways to protect against these threats

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
	X	X	X					X			
Mapping of instructional objectives with student outcome	1	3	2					1-4			

List of Topics Covered

UNIT-1 INTRODUCTION (9 hours)
Security Services, Mechanisms and attacks – Network Security Model-Classical Encryption Techniques-Steganography – Data Encryption Standard (DES)

UNIT-2 ADVANCED BLOCK CIPHERS (9 hours)
Block cipher modes operation-IDEA, BlowFish, RC5, CAST-128-Characteristics of advanced symmetric Block ciphers-Key Distribution.

UNIT-3 PUBLIC KEY CRYPTOSYSTEMS & MESSAGE AUTHENTICATION (9 hours)
Principle-RSA algorithm-Diffie Hellmen Key Exchange-Message Authentication codes-MAC-HASH function-Principle of MD5, SHA-1 and HMAC algorithms-Digital Signature algorithm

UNIT-4 NETWORK SECURITY (9 hours)
Kerbros-X.509 Public key certificate format-PGP-IPSec-SSL-SET

UNIT-5 SYSTEM SECURITY (9 hours)
Intrusion Detection-Password management-Malicious software-Viruses and countermeasures-Firewall Types and Configurations

Course Number and Title
EC0056 SCRIPTING LANGUAGES AND WEB TECHNOLOGY
Credits / Contact Hours
3 / 45
Instructor Name
Mr.S.Nirmal Sam
Textbooks, References
This course introduces the students to 1. Basic web concept and Internet protocols. 2. CGI Concepts & CGI Programming 3. Networking principles & RMI 4. Study of DHTML, XML 5. Study of On-Line web application & Internet Concepts
Purpose
Uses of web sites and portals have become common for knowledge sharing and business. The course focuses on the fundamentals of CGI, Networking, Web Applications

Prerequisites	**Co-requisites**
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

Instructional Objectives

This course introduces the students to

1. Basic web concept and Internet protocols.
2. CGI Concepts & CGI Programming
3. Networking principles & RMI
4. Study of DHTML, XML
5. Study of On-Line web application & Internet Concepts

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
									X	X	X
Mapping of instructional objectives with student outcome									1,3,4,5	1,3,5	2,4,5

List of Topics Covered

UNIT 1 INTRODUCTION (9 hours)
Internet Principles - Basic Web Concepts - Client/Server model - Retrieving data from Internet - HTML and Scripting Languages - Standard Generalized Markup Language - Next Generation Internet - Protocols and applications.

UNIT 2 COMMON GATEWAY INTERFACE PROGRAMMING (9 hours)
HTML forms - CGI Concepts - HTML tags Emulation - Server-Browser communication - E-mail generation - CGI Client side Applets - CGI Server Side Applets - Authorization and security.

UNIT 3 SOCKET PROGRAMMING (9 hours)
Streaming - Networking principles - sockets - protocol handlers - content handlers - multicasting – Remote Method Invocation - activation - Serialization - Marshal streams.

UNIT 4 SERVER SIDE PROGRAMMING (9 hours)
Dynamic web content - cascading style sheets - XML - Structuring Data - VRML - Server side includes - communication - Active and Java Server Pages - Firewalls - proxy servers

UNIT 5 ON-LINE APPLICATIONS (9 hours)
XML with HTML- Simple applications - On-line databases - monitoring user events - plug-ins - database connectivity – Internet Information Systems - EDI application in business - Internet commerce - Customization of Internet commerce.

Course Number and Title

MA0452 OPERATIONS RESEARCH

Credits / Contact Hours

3 / 45

Instructor Name

Dr.K.Ganesan

Textbooks, References

- Kanti Swarup, Gupta P.K., and Man Mohan, "O*perations Research*" Sultan Chand & Sons, 1994.
- Gupta P.K., and Hira D.S., "*Operations Research*", S.Chand & Sons, 2000.
- Sundaresan.V, Ganapathy Subramanian.K.S. and Ganesan.K, "*Resource Management Techniques*", A.R. Publications,2002
- Taha H.A., "*Operations Research – An introduction*", 7th edition, PHI, 2002.

- Sharma S.D., "*Operations Research*", Kedarnath Ramnath & Co., Meerut,1994.
- Billy B. Gillet, *"Introduction to Operations Research "*– TMH Publishing Co.
- Gupta P.K., and Manmohan, "*Operations Research and Quantitative Analysis"* – S.Chand & Co., New Delhi.
- Hamblin S., and Stevens Jr., "*Operations Research*", Mc Graw Hill Co.
- Taha H.A., "*Operations Research – An introduction*", 8th edition, Taha H.A., "*Operations Research – An introduction*", 7th edition, PHI, 2002.

Purpose

To introduce managerial skill for budding engineers.

Prerequisites	Co-requisites
NIL	NIL

Required, Elective or Selected Elective (as per Table 5.1b)

Selected Electives

Instructional Objectives

1. To equip the students with scheduling and network analysis
2. To make the students aware of replacement policy and game theory
3. To introduce the topic of inventory control
4. To make students aware of the problems of linear programming

Student Outcomes from Criterion 3 covered by this Course

Student outcome	a	b	c	d	e	f	g	h	i	j	k
						X		X	X	X	
Mapping of instructional objectives with student outcome						1-4		1-3	2,3	1-4	

List of Topics Covered

UNIT 1 RESOURCE SCHEDULING AND NETWORK ANALYSIS (9 hours)
Problem of sequencing – Sequencing n jobs through 2 machines and 3 machines, 2 jobs through m machines.
PERT and CPM –Critical path calculation – Probability and cost consideration.

UNIT 2 REPLACEMENT AND GAME THEORY (9 hours)
Replacement Models – Replacement of items that deteriorate with time – Equipment that fails suddenly. Two person zero sum games – Pure strategies and saddle point – Mixed strategies – 2 x n and m x 2 games – Method of dominance – Numerical and graphical solutions.

UNIT 3 INVENTORY CONTROL (9 hours)
Inventory models – Deterministic models – Economic ordering quantity, Reorder level, optimum cost – Instantaneous and Non-instantaneous receipt of goods with or without shortages.

UNIT 4 LINEAR PROGRAMMING (9 hours)
Introduction to Linear Programming – Formulation of the problem – Graphical method – Simplex method – Artificial variable techniques - Primal-dual problems – Dual Simplex method.

UNIT 5 ADVANCED LINEAR PROGRAMMING PROBLEMS (9 hours)
Integer programming problem - Cutting plane algorithm – Transportation models - Vogel's Approximation method – MODI method – Unbalanced transportation problem – Degeneracy in transportation models – Assignment models – Traveling salesman problem-Dynamic Programming problem.