UNIVERSITY OF KERALA

B. Tech Degree Course
In
Information Technology

Scheme and Syllabus
(2008 scheme)

UNIVERSITY OF KERALA

B.Tech Degree Course – 2008 Scheme

REGULATIONS

1. Conditions for Admission

Candidates for admission to the B.Tech degree course shall be required to have passed the Higher Secondary Examination, Kerala or 12th Standard V.H.S.E., C.B.S.E., I.S.C. or any examination accepted by the university as equivalent thereto obtaining not less than 50% in Mathematics and 50% in Mathematics, Physics and Chemistry/ Bio- technology/ Computer Science/ Biology put together, or a diploma in Engineering awarded by the Board of Technical Education, Kerala or an examination recognized as equivalent thereto after undergoing an institutional course of at least three years securing a minimum of 50 % marks in the final diploma examination subject to the usual concessions allowed for backward classes and other communities as specified from time to time.

2. Duration of the course

i) The course for the B.Tech Degree shall extend over a period of four academic years comprising of eight semesters. The first and second semester shall be combined and each semester from third semester onwards shall cover the groups of subjects as given in the curriculum and scheme of examination.

ii) Each semester shall ordinarily comprise of not less than 400 working periods each of 60 minutes duration.

iii) A candidate who could not complete the programme and pass all examinations within Ten (10) years since his first admission to the B.Tech programme will not be allowed to continue and he has to quit the Programme. However he can be readmitted to the first year of the programme if he/she satisfies the eligibility norms applicable to the regular candidates prevailing at the time of readmission.

3. Eligibility for the Degree

Candidates for admission to the degree of bachelor of technology shall be required to have undergone the prescribed course of study in an institution maintained by or affiliated to the University of Kerala for a period of not less than four academic years and to have passed all the examinations specified in the scheme of study

4. Subjects of Study

The subjects of study shall be in accordance with the scheme and syllabi prescribed

5. Evaluation

Candidates in each semester will be evaluated both by continuous assessment and end semester University examination. The individual maximum marks allotted for continuous assessment and University examination for each subject is as prescribed by the scheme of study.

5.1 Continuous Assessment (C.A)

The marks awarded for the continuous assessment will be on the basis of the day-to-day work, periodic tests (minimum two in a semester) and assignments (minimum of three – one each from each module). The faculty member concerned will do the continuous assessment for each semester. The C.A. marks for the individual subjects shall be computed by giving weight age to the following parameters.

Subject	**Attendance**	**Tests**	**Assignments/ Class Work**
Theory Subjects	20%	50%	30%
Drawing	20%	40%	40%
Practical	20%	40%	40%
Project Work	Work Assessed by Guide – 50% Assessed by a three member committee out of which one member is the guide – 50%		

The C.A. marks for the attendance (20%) for each theory, practical and drawing shall be awarded in full only if the candidate has secured 90% attendance or above in the subject. Proportionate reduction shall be made in the case of subjects in which he/she gets below 90% of the attendance for a subject. The CA marks obtained by the student for all subjects in a semester is to be published at least 5 days before the commencement of the University examinations. Anomalies if any may be scrutinized by the department committee and the final CA marks are forwarded to the university within the stipulated time.

5.2. End Semester University Examinations

i) There will be University examinations at the end of the first academic year and at the end of every semester from third semester onwards in subjects as prescribed under the respective scheme of examinations. Semester classes shall be completed at least 10 working days before the commencement of the University examination.

ii) The examination will be held twice in a year – April/May session (for even semester) and October/November session (for odd semester). The combined 1st and 2nd semester is reckoned as equivalent to an even semester for the purpose of conduct of examination and the University examination will be held during April/May. However VII and VIII Semester examination will be conducted in both the sessions. This schedule will not be changed.

iii) A student will be permitted to appear for the university examination only if he/she satisfies the following requirements

   a. He/she must secure not less than 75% attendance in the total number of working periods during the first year and in each semester thereafter and shall be physically present for a minimum of 60% of the total working periods. In addition, he/she also shall be physically present in at least 50% of total working periods for each subject
   b. He must earn a progress certificate from the head of the institution of having satisfactorily completed the course of study in the semester as prescribed by these regulations
   c. It shall be open to the Vice-Chancellor to grant condonation of shortage of attendance on the recommendation of the head of the institution in accordance with the following norms

d. The attendance shall not be less than 60% of the total working periods
e. He/she shall be physically present for a minimum of 50% of the total working periods
f. The shortage shall not be condoned more than twice during the entire course
g. The condonation shall be granted subject to the rules and procedures prescribed by the university from time to time.
h. The condonation for combined 1st and 2nd semesters will be reckoned as a single condonation for attendance purposes.

iv) A student who is not permitted to appear for the University examinations for a particular semester due to the shortage of attendance and not permitted by the authorities for condonation of shortage of attendance shall repeat the semester when it is offered again. This provision is allowed only once for a semester.

v) The university will conduct examinations for all subjects (Theory, Drawing & Practical)

vi) The scheme of valuation will be decided by the chief examiner for theory / drawing subjects

vii) For practical examinations, the examiners together will decide the marks to be awarded. The student shall produce the certified record of the work done in the laboratory during the examination. The evaluation of the candidate should be as per the guidelines given in the syllabus for the practical subject.

6. Letter Grades

For each subject in a semester, based on the total marks obtained by the student in the University examination and Continuous assessment put together a letter grade (S,A+, A, B+, B, C+, C, D, E and F) will be awarded. ***All letter grades except 'F' will be awarded if the marks for the University examination is 40 % or above and the total mark (C.A marks + University Exam mark) is 50 % or above***. No absolute mark will be indicated in the grade card. Letter grade corresponding to total marks (C.A marks+ University Exam mark) and the corresponding grade point in a ten-point scale is described below.

% of Total marks *(C.A marks + University Exam mark)*	**Letter Grade**	**Grade Point (G.P)**	**Remarks**
90 % and above	S	10	Excellent
85 % and above but less than 90%	A+	9	
80 % and above but less than 85%	A	8.5	
75 % and above but less than 80%	B+	8	
70 % and above but less than 75%	B	7.5	
65 % and above but less than 70%	C+	7	
60 % and above but less than 65%	C	6.5	
55 % and above but less than 60%	D	6	
50 % and above but less than 55%	E	5.5	
Below 50% (C.A + U.E) or below 40 % for U.E only	F	0	Failed

7. Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA)

Grade point average is the semester wise average points obtained by each student in a 10-point scale. GPA for a particular semester is calculated as per the calculation shown below.

$$GPA = \frac{\sum Credit \times \text{GP obtained for the subject}}{\sum \text{credit for subject}}$$

Cumulative Grade point Average (CGPA) is the average grade points obtained by the students till the end of any particular semester. CGPA is calculated in a 10-point scale as shown below.

$$\text{CGPA} = \frac{\sum \text{Credits for semester} \times \text{GPA obtained for the semester}}{\sum \text{credits for the semester}}$$

GPA and CGPA shall be rounded to two decimal points. The Grade card issued to the students shall contain subject number and subject name, credits for the subject, letter grades obtained, GPA for the semester and CGPA up to that particular semester. In addition to the grade cards for each semester all successful candidate shall also be issued a consolidated statement grades. On specific request from a candidate and after remitting the prescribed fees the University shall issue detailed mark to the individual candidate.

8. Minimum for a pass

a. A candidate shall be declared to have passed a semester examination in full in the first appearance if he/she secures not less than 5.5 GPA with a minimum of 'E' grade for the all individual subject in that semester.
b. A candidate shall be declared to have passed in an individual subject of a semester examination if he/she secures grade 'E' or above.
c. A candidate who does not secure a full pass in a semester examination as per clause (a) above will have to pass in all the subjects of the semester examination as per clause (b) above before he is declared to have passed in that semester examination in full.

9. Improvement of Grades

i) A candidate shall be allowed to re-appear for a maximum of two subjects of a semester examination in order to improve the marks and hence the grades already obtained subject to the following conditions

a. The candidate shall be permitted to improve the examination only along with next available chance.
b. The candidate shall not be allowed to appear for an improvement examination for the subjects of the VII & VIII semesters
c. The grades obtained by the candidate for each subject in the improvement chance he has appeared for or the already existing grades – whichever is better will be reckoned as the grades secured.
d. First & Second semester will be counted as a single chance and they can improve a maximum of three subjects

ii) A candidate shall be allowed to repeat the course work in one or more semesters in order to better the C.A. marks already obtained, subject to the following conditions

a. He/she shall repeat the course work in a particular semester only once and that too at the earliest opportunity offered to him/her.
b. He/she shall not combine this course work with his/her regular course work
c. He/she shall not be allowed to repeat the course work of any semester if he has already passed that semester examination in full
d. The C.A marks obtained by the repetition of the course work will be considered for all purposes

iii) A candidate shall be allowed to withdraw from the whole examination of a semester in accordance with the rules for cancellation of examination of the University of Kerala.

10. Classification of Successful candidates

i) A candidate who qualifies for the degree passing all the subjects of the eight semesters within five academic years (ten consecutive semesters after the commencement of his/her course of study) and secures not less than 8 CGPA up to and including eighth semester (overall CGPA) shall be declared to have passed the B.Tech degree examination in FIRST CLASS WITH DISTINCTION

ii) A candidate who qualifies for the degree passing all the subjects of the eight semesters within five academic years (ten consecutive semesters after the commencement of his/her course of study) and secures less than 8 CGPA but not less than 6.5 CGPA up to and including eighth semester shall be declared to have passed the B.Tech degree examination in FIRST CLASS.

iii) All other successful candidates shall be declared to have passed the B.Tech Degree examination in SECOND CLASS

iv) Successful candidates who complete the examination in four academic years (Eight consecutive semesters after the commencement of the course of study shall be ranked branch-wise on the basis of the CGPA in all eight semesters put together. In the case of a tie in the CGPA the total marks of the students who have got same CGPA shall be considered for finalizing the rank. Students who pass the examination in supplementary examination are also covered under this clause

11. Educational Tour

a. The students may undertake one educational tour preferably after fourth semester of the course and submit a tour report
b. The tour may be conducted during the vacation / holidays taking not more than 5 working days, combined with the vacation / holidays if required. Total number of Tour days shall not exceed 15 days.
c. The tour period shall be considered as part of the working periods of a semester

12. Revision of Regulations

The university may from time to time revise, amend or change the regulations, curriculum, scheme of examinations and syllabi. These changes unless specified otherwise, will have effect from the beginning of the academic year / semester following the notification of the University

INFORMATION TECHNOLOGY

SCHEME OF STUDIES AND EXAMINATION
FOR B. TECH DEGREE - 2008 ADMISSION

COMBINED I AND II SEMESTERS (*COMMON FOR ALL BRANCHES*)

Course Code	Subject	Hours / Week			Maximum Sessional Marks	University Exams		Credits
		L	T	D/P		Hours	Maximum Marks	
08.101	Engineering Mathematics	2	1	0	50	3	100	6
08.102	Engineering Physics	2	1	0	50	3	100	6
08.103	Engineering Chemistry	2	1	0	50	3	100	6
08.104	Engineering Graphics	1	0	2	50	3	100	6
08.105	Engineering Mechanics	2	1	0	50	3	100	6
08.106	Basic Civil Engineering	2	1	0	50	3	100	6
08.107	Basic Mechanical Engineering	2	1	0	50	3	100	6
08.108	Basic Electrical and Electronics Engineering	2	1	0	50	3	100	6
08.109	Basic Communication and Information Engineering	2	1	0	50	3	100	6
08.110	Engineering Workshops	0	0	2	50	3	100	4
Total		17	8	4	500		1000	58
Total Marks		**1500**						

The subject 08.109 shall be handled by the Department of Electronics and Communication Engineering,

SEMESTER III		Hours / Week			Maximum Sessional Marks	University Exams		Credits
Course Code	Subject	L	T	D/P		Hours	Maximum Marks	
08.301	Engineering Mathematics II (CMPUNERFTAHB)	3	1	0	50	3	100	4
08.302	Problem Solving and Programming in C(R F)	2	2	0	50	3	100	4
08.303	Discrete Structures(R F)	2	1	0	50	3	100	3
08.304	Electronic Circuits (R F)	2	1	0	50	3	100	3
08.305	Digital System Design (R F)	2	2	0	50	3	100	4
08.306	Computer Organization (R F)	2	1	0	50	3	100	3
08.307	Electronic Circuits Lab (R F)	0	0	4	50	3	100	4
08.308	Programming Lab (R F)	0	0	4	50	3	100	4
Total		**13**	**8**	**8**	**400**		**800**	**29**
Total Marks		**1200**						

SEMESTER IV		Hours / Week			Maximum Sessional Marks	University Exams		Credits
Course Code	Subject	L	T	D/P		Hours	Maximum Marks	
08.401	Engineering Mathematics III (CMPUNERFHB)	3	1	0	50	3	100	4
08.402	Humanities (CRFTAHB)	3	0	0	50	3	100	3
08.403	Microcontroller-based Design	3	1	0	50	3	100	4
08.404	Object Oriented Techniques (R F)	2	1	0	50	3	100	3
08.405	Data Structures and Algorithms (R F)	2	2	0	50	3	100	4
08.406	Database Design	3	0	0	50	3	100	3
08.407	Data Structures Lab (R F)	0	0	4	50	3	100	4
08.408	Object Oriented Programming Lab	0	0	4	50	3	100	4
Total		**16**	**5**	**8**	**400**		**800**	**29**
Total Marks		**1200**						

SEMESTER V		Hours / Week			Maximum Sessional Marks	University Exams		Credits
Course Code	Subject	L	T	D/P		Hours	Maximum Marks	
08.501	Engineering Mathematics IV (ERFBH)	3	1	0	50	3	100	4
08.502	Advanced Mathematics & Queueing Models (RF)	3	1	0	50	3	100	4
08.503	Theory of Computation	2	1	0	50	3	100	3
08.504	Systems Programming (RF)	2	1	0	50	3	100	3
08.505	Operating Systems	3	1	0	50	3	100	4
08.506	Data Communication	2	1	0	50	3	100	3
08.507	Digital Circuits Lab	0	0	4	50	3	100	4
08.508	Database Lab	0	0	4	50	3	100	4
Total		**15**	**6**	**8**	**400**		**800**	**29**
Total Marks		**1200**						

SEMESTER VI		Hours / Week			Maximum Sessional Marks	University Exams		Credits
Course Code	Subject	L	T	D/P		Hours	Maximum Marks	
08.601	Compiler Design (RF)	3	1	0	50	3	100	4
08.602	Computer Networks	2	1	0	50	3	100	3
08.603	Software Architecture	2	1	0	50	3	100	3
08.604	Internet Technology	3	1	0	50	3	100	4
08.605	Computer Graphics	2	1	0	50	3	100	3
08.606	Embedded Systems	3	1	0	50	3	100	4
08.607	Internet Lab	0	0	4	50	3	100	4
08.608	Computer Graphics Lab	0	0	4	50	3	100	4
Total		**15**	**6**	**8**	**400**		**800**	**29**
Total Marks		**1200**						

SEMESTER VII		Hours / Week			Maximum Sessional Marks	University Exams		Credits
Course Code	Subject	L	T	D/P		Hours	Maximum Marks	
08.701	Software Project Management	2	1	0	50	3	100	3
08.702	Internetworking	3	1	0	50	3	100	4
08.703	Cryptography	2	1	0	50	3	100	3
08.704	Web Applications Development	2	1	0	50	3	100	3
08.705	Elective I	3	1	0	50	3	100	4
08.706	Elective II	3	1	0	50	3	100	4
08.707	Computer Networks Lab	0	0	4	50	3	100	4
08.708	Seminar / Project Design	0	0	4	100	3		4
Total		**15**	**6**	**8**	**450**		**700**	**29**
Total Marks		**1150**						

SEMESTER VIII		Hours / Week			Maximum Sessional Marks	University Exams		Credits
Course Code	Subject	L	T	D/P		Hours	Maximum Marks	
08.801	Mobile Computing	3	1	0	50	3	100	4
08.802	E-Commerce	3	0	0	50	3	100	3
08.803	E-Security	2	1	0	50	3	100	3
08.804	Software Testing	2	1	0	50	3	100	3
08.805	Elective III	3	1	0	50	3	100	4
08.806	Elective IV	3	1	0	50	3	100	4
08.807	Web Applications Lab	0	0	4	50	3	100	4
08.808	Project & Viva Voce	0	0	4	100	3	100	4
Total		**16**	**5**	**8**	**450**		**800**	**29**
Total Marks		**1250**						

Elective I (08.705)	
A	Design and Analysis of Algorithms
B	Simulation and Modelling
C	Principles of Programming Languages
D	Communicative English & Technical Writing **(Common with 08.704(3) of CSE)**
Elective II (08.706)	
A	Computer Peripherals and Interfacing
B	Optimization Techniques
C	Data Mining Techniques **(Common with 08.705(4) of CSE)**
Elective III (08.805)	
A	Advanced Microprocessors
B	Network Programming
C	Graph Theory **(Common with 08.805(4) of CSE)**
Elective IV (08.806)	
A	Soft Computing
B	Distributed Systems
C	Web Services

08.101 ENGINEERING MATHEMATICS- I

L-T-P : 2-1-0 **Credits: 6**

MODULE- 1

Applications of differentiation:– Definition of Hyperbolic functions and their derivatives- Successive differentiation- Leibnitz' Theorem(without proof)- Curvature- Radius of curvature- centre of curvature- Evolute (Cartesian ,polar and parametric forms)

Partial differentiation and applications:- Partial derivatives- Euler's theorem on homogeneous functions- Total derivatives- Jacobians- Errors and approximations- Taylor's series (one and two variables) - Maxima and minima of functions of two variables - Lagrange's method- Leibnitz rule on differentiation under integral sign.

Vector differentiation and applications :- Scalar and vector functions- differentiation of vector functions-Velocity and acceleration- Scalar and vector fields- Operator ∇ - Gradient- Physical interpretation of gradient- Directional derivative- Divergence- Curl- Identities involving ∇ (no proof) - Irrotational and solenoidal fields – Scalar potential.

MODULE-II

Laplace transforms:- Transforms of elementary functions - shifting property- Inverse transforms- Transforms of derivatives and integrals- Transform functions multiplied by t and divided by t - Convolution theorem(without proof)-Transforms of unit step function, unit impulse function and periodic functions-second shifiting theorem- Solution of ordinary differential equations with constant coefficients using Laplace transforms.

Differential Equations and Applications:- Linear differential eqations with constant coefficients- Method of variation of parameters - Cauchy and Legendre equations – Simultaneous linear equations with constant coefficients- Application to orthogonal trajectories (cartisian form only).

MODULE-III

Matrices:-Rank of a matrix- Elementary transformations- Equivalent matrices- Inverse of a matrix by gauss-Jordan method- Echelon form and normal form- Linear dependence and independence of vectors- Consistency- Solution of a system linear equations-Non homogeneous and homogeneous equations- Eigen values and eigen vectors – Properties of eigen values and eigen vectors- Cayley Hamilton theorem(no proof)- Diagonalisation- Quadratic forms- Reduction to canonical forms-Nature of quadratic forms- Definiteness,rank,signature and index.

REFERENCES

1. Kreyszig; *Advanced Engineering Mathematics*, 8th edition, Wiley Eastern.
2. Peter O' Neil ; *Advanced Engineering Mathematics,* Thomson
3. B.S.Grewal ; *Higher Engineering Mathematics,* Khanna Publishers
4. B.V.Ramana*; Higher Engineering Mathematics,* Tata Mc Graw Hill, 2006
5. Michel D Greenberg; *Advanced Engineering Mathematics,*Pearson International
6. Sureshan J, Nazarudeen and Royson; *Engineering Mathematics I*, Zenith Publications

08.102 ENGINEERING PHYSICS

L-T-P : 2-1- 0 **Credits: 6**

MODULE-I

Oscillations and Waves : Basic ideas of harmonic oscillations – Differential equation of a SHM and its solution. Theory of damped harmonic oscillations. Quality factor. Theory of forced harmonic oscillations and resonance. Types of waves. One dimensional waves – Differential Equation. Harmonic waves. Three dimensional waves - Differential Equation and solution. Plane waves and spherical waves. Energy in wave motion. Velocity of transverse waves along a stretched string.

Electromagnetic Theory : Del operator – grad, div, curl and their physical significance. Concept of displacement current. Deduction of Maxwell's equations. Prediction of electromagnetic waves. Transverse nature of electromagnetic waves. **E** and **H** are at right angles. Poynting's theorem (qualitative only)

Physics of Solids: Space lattice. Unit cell and lattice parameters. Crystal systems. Co-ordination number and packing factor with reference to simple cubic, body centered cubic and face centered cubic crystals. Directions and planes. Miller indices. Interplanar spacing in terms of Miller indices. Super conductivity - Meissner effect. Type-I and Type-II superconductors. BCS theory (qualitative). High temperature superconductors. Applications of superconductors. Introduction to new materials (qualitative) -Metallic glasses, Nano materials, Shape memory alloys, Bio materials.

MODULE- II

Interference of Light: Concept of temporal and spatial coherence. Interference in thin films and wedge shaped films. Newton's rings. Michelson's interferometer. Determination of wave length and thickness. Interference filters. Antireflection coating.

Diffraction of Light : Fresnel and Fraunhofer diffraction. Fraunhofer diffraction at a single slit. Fraunhofer diffraction at a circular aperture (qualitative). Rayleigh's criterion for resolution. Resolving power of telescope and microscope. Plane transmission grating. Resolving power of grating. Grating equation. X-ray diffraction. Bragg's law.

Polarization of Light : Types of polarized light. Double refraction. Nicol Prism. Retardation plates. Theory of plane, circular and elliptically polarized light. Production and analysis of circularly and elliptically polarized light. Polaroids. Induced birefringence. Photo elasticity – isoclinic and isochromatic fringes – photo elastic bench

Special Theory of Relativity: Michelson-Morley experiment. Einstein's postulates. Lorentz transformation equations (no derivation). Simultaneity. Length contraction. Time dilation. Velocity addition. Relativistic mass. Mass energy relation. Mass less particle.

MODULE – III

Quantum Mechanics : Dual nature of matter. Wave function. Uncertainty principle. Energy and momentum operators. Eigen values and functions. Expectation values. Time Dependent and Time Independent Schrodinger equations. Particle in one dimensional box. Tunnelling (qualitative).

Statistical Mechanics :

Macrostates and Microstates. Phase space. Basic postulates of Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics. Distribution equations in the three cases (no derivation). Bosons and Fermions. Density of states. Derivation of Planck's formula. Free electrons in a metal as a Fermi gas. Fermi energy.

Laser: Einstein's coefficients. Population inversion and stimulated emission. Optical resonant cavity. Ruby Laser, Helium-Neon Laser, Carbon dioxide Laser (qualitative). Semiconductor Laser (qualitative). Holography. Fiber Optics - Numerical Aperture and acceptance angle. Types of optical fibers. Applications.

REFERENCE:

1. Sears & Zemansky ; *University Physics*. *XI Edn.,; Pearson*
2. Frank & Leno; *Introduction to Optics*. *III Edn., , Pearson*
3. J.C. Upadhyaya*; Mechanics., Ram Prasad & Sons*
4. David J Griffiths*; Introduction to Electrodynamics, III Edn, , Pearson*
5. M Ali Omar*; Elementary Solid State Physics., Pearson*
6. S O Pillai*; Solid State Physics., New Age International Publishers*
7. John R Taylor, Chris D Zafiratos & Michael A Dubson*; Modern Physics for Scientists and Engineers*. *II Edn, Prentice Hall of India*
8. Eugene Hecht*; Optics*. *IV Edn, Pearson*
9. Robert Resnick ; *Introduction to Special Relativity., John Willey and Sons*
10. Richard L Libboff*; Introduction to Quantum Mechanics*. *IV Edn, Pearson*
11. Donald A Mcquarrie*; Statistical Mechanics., Vivo Books*
12. Mark Ratner& Daniel Ratner*; Nanotechnology*.
13. T.A. Hassan et al; A Text Book of Engineering Physics*., Aswathy Publishers, Trivandrum*
14. B. Premlet*; Advanced Engineering Physics , Phasor Books, Kollam.*

LIST OF DEMONSTRATION EXPERIMENTS

1. Newton's Rings – Determination of wave length.
2. Air Wedge – Diameter of a thin wire
3. Spectrometer – Plane transmission grating – wavelength of light.
4. Spectrometer – Refractive indices of calcite for the ordinary and extraordinary rays.
5. Laser – Diffraction at a narrow slit.
6. Laser – Diffraction at a straight wire or circular aperture.
7. Michelson's interferometer – Wavelength of light.
8. Michelson's interferometer – Thickness of thin transparent film.
9. Polarization by reflection – Brewster's law.
10. Computer stimulation – superposition of waves.
11. Computer stimulation – study of **E** & **H**. (Gauss' law & Ampere's law)

Pattern of Question Paper

*University examination is for a maximum of **100 marks**, in **3 hour** duration. The syllabus is spread in 3 modules. The question paper will consist of two parts (A and B).*

***Part A** contains short answer questions for **40 marks**. This part contains 10 questions without any choice, **each of 4 marks** (uniformly taken from all modules).*

***Part B** contains long answer questions for **60 marks**. From each module, this part contains 3 questions out of which 2 are to be answered, **each of 10 marks.** Long answer questions from all the 3 modules will form 60 marks.*

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08.103 ENGINEERING CHEMISTRY

L-T-T : 2-1-0 **Credits: 6**

MODULE-1

Electrochemistry - Electrodes- Electrode potential- Origin of electrode potential- Helmotz double layer- Nernst equation and application- Reference electrodes- Standared hydrogen electrode- Saturated calomel electrode- Quinhydron electrode-Determination of P^H using these electrodes- Concentration cells- Fuel cells- Secondary cells- Lead acid cell- Nickel cadmium cell- Lithium-ion cell. - Coductometric and Potentiometric titrations (acid base, oxidation reduction and precipitation titrations). **(12hrs)**

Corrosion and its control- Theories of corrosion (chemical corrosion and electrochemical corrosion)- Galvanic series- Types of corrosion (Concentration cell corrosion, Stress corrosion, Galvanic corrosion) - Factors affecting corrosion (nature of metal and nature of environment) and different methods of corrosion control (corrosion inhibitors, cathodic protection). **(5hrs)**

Protective coatings- Metallic coatings- Chemical conversion coatings- paint **(4hrs)**

Nano materials- Introduction-Classification-preparation (laser abrasion technique and sputtering technique)- Chemical method (reduction)-Properties and Applications of nano materials-Nano tubes-Nano wires. **(4hrs)**

MODULE-II

Water treatment- Types of hardness- Degree of hardness- Related problems- Estimation of hardness- by EDTA method- Sludge and scales in boilers- Priming and foaming- Boiler corrosion-Water softening methods, Lime-soda process, Ion exchange methods-Internal treatments (colloidal, carbonate, phosphate and calgon conditioning)- Domestic water treatment- Methods of disinfection of water-Desalination process (Reverse osmosis, electro dialysis- Distillation). **(12hrs)**

Envirnmental damages and prevention- Air pollution- CFCs and ozone depletion-Alternative refrigerents-Green house effect-Water pollution- BOD and COD- Waste water treatment- Aerobic - Anaerobic and USAB processes. **(3hrs)**

Thermal methods of analysis-Basic principles involved in Thermo gravimetry, Differential thermal analysis and applications. **(2hrs)**

Spectroscopy- Molecular energy levels-Types of molecular spectra- Electronic spectra (Classification of electronic transitions- Beer Lamberts law, Vibrational spectra (mechanism of interaction and application), Rotational spectra (Determination of bond length and application). NMR spectra (Basic principle, chemical shift, spin-spin splitting) **(6hrs)**

Chromatography- General principles- High performance liquid chromatography- Gas chromatography. **(2hrs)**

MODULE-III

Polymers- Classifications- Mechanism of polymarisation (Addition, free radical, cationic, anionic and coordination polymarisation)- Thermoplastics and thermosetting plastics-Compounding of plastics-Moulding techniques of plastics (Compression, Injection, Transfer and Extrusion moulding)-Preparation, properties and uses of PVC, PVA, PMMA, Nylon, PET, Bakelite, Urea formaldehyde resin- Silicon polymers- Biodegradable plastics. Elastomers- structure of natural rubber- vulcanisation- synthetic rubbers (Buna-S, Butyl rubber and Neoprene) **(12hrs)**

Organo electronic compounds -Super conducting and conducting organic materials like Polyaniline, polyacetylene and [polypyrrol and its applications. **(2hrs)**

Fuels- Calorific value- HCV and LCV-Experimental determination of calorific value-Theoretical calculation of calorific value by Dulongs formula - Bio fuels -Bio hydrogen and Bio-diesel **(5hrs)**

Lubricants- Introduction-Mechanism of lubrication- solid and liquid lubricant- Properties of lubricants-Viscosity index- flash and fire point- cloud and pour point- aniline value. **(4hrs)**

Cement- Manufacture of Portland cement- Theory of setting and hardening of cement **(2hrs)**

LAB-EXPERIMENTS (DEMONSTRATION ONLY)

1. Estimation of total hardness in water using EDTA.
2. Estimation of chloride ions in domestic water.
3. Estimation of dissolved oxygen.
4. Estimation of COD in sewage water.
5. Estimation of available chlorine in bleaching powder.
6. Estimation of copper in brass.
7. Estimation of iron in a sample of heamatite.
8. Determination of flash and fire point of a lubricating oil by Pensky Marten's apparatus.
9. Potentiometric titrations.
10. Preparation of buffers and standardisation of P^H meter.
11. Determination of molarity of HCl solution P^H-metrically.
12. Determinations of PH using glass electrode and quinhydron electrode.

REFERENCES

1. H.A. Willard, L.L. Merrit and J.A. Dean ; *Instrumental methods of analysis*
2. A.K. De ; *Environmental Chemistry*
3. K.J.Klauhunde; *Nanoscale materials in chemistry*
4. B.R. Gowariker ; *Polymer science*
5. B.W.Gonser ; *Modern materials*
6. V.Raghavan; *Material Science and engineering. A first course*
7. L.H. Van Vlack ; *Elements of Material science and Engineering*
8. J.W.Goodby ; *Chemistry of liquid crystals*
9. S.Glasstone ; *A text book of physical chemistry*
10. P.C. Jain; *Engineering Chemistry*
11. Juhaina Ahad ; *Engineering Chemistry*
12. Shashi Chawla ; *A text book of Engineering Chemistry*
13. R. Gopalan, D.Venkappayya & S. Nagarajan ; *Engineering Chemistry*
14. J.C. Kuriakose and J. Rajaram ; *Chemistry of Engineering and Technology volume I & II*
15. R.N Goyal and Harmendra Goeal; *Engineering Chemistry*, Ane Students Edition, Thiruvananthapuram

08.104 ENGINEERING GRAPHICS

L- T-D : 1-0-2 **CREDITS: 6**

Introduction to technical drawing and its language. Lines, lettering, dimensioning, scaling of figures, symbols and drawing instruments. (1 sheet practice)

MODULE I

Plain Curves: Conic sections by eccentricity method. Construction of ellipse: (i) Arc of circles method (ii) Rectangle method (ii) Concentric circles method. Construction of parabola (i) Rectangle method (ii) Tangent method. Construction of hyperbola (i) Arc of circles method (ii) given ordinate, abscissa and the transverse axis (iii) given the asymptotes and a point on the curve. Construction of Tangent and Normal at any point on these curves

Miscellaneous Curves: Construction of Cycloid, Epicycloid and Hypocycloid, Involute of a circle. Archimedian spiral, Logarithmic spiral and Helix. Construction of Tangent and Normal at any point on these curves

Projection of Points and lines: Types of projections, Principles of Orthographic projection. Projections of points and lines. Determination of true length, inclination with planes of projection and traces of lines.

MODULE II

Projection of Solids: Projection of simple solids such as prisms, pyramids, cone, cylinder, tetrahedron, octahedron, sphere and their auxiliary projections.

Selection of Solids: Types of cutting planes, section of simple solids cut by parallel, perpendicular and inclined cutting planes. Their projections and true shape of cut sections.

Development of Surfaces: Development of surfaces of (i) simple solids like prisms, pyramids, cylinder and cone (ii) Cut regular solids.

MODULE III

Isometric Projection : Isometric scale, Isometric view and projections of simple solids like prisms, pyramids, cylinder, cone sphere, frustum of solids and also their combinations.

Intersection of Surfaces : Intersection of surfaces of two solids as given below.
(i) Cylinder and cylinder (ii) Prism and prism. (iii) Cone and Cylinder. (Only cases where the axes are perpendicular to each other and intersecting with or without offset.)

Perspective Projection : Principles of perspective projection, definition of perspective terminology. Perspective projection of simple solids like prisms and pyramids in simple positions.

CAD: Introduction to CAD systems, Benefits of CAD, Various Soft wares for CAD, Demonstration of any one CAD software.

General Note:
(i) First angle projection to be followed (ii) Question paper shall contain 3 questions from each module, except from CAD. Students are required to answer any two questions from each module. (iii) Distribution of marks - Module -I 2 x 16 = 32, Module -II 2 x 17 = 34 Module III 2 x 17 = 34 Total (32+34+34 =100)

REFERENCES

1. Luzadder and Duff ; *Fundamentals of Engineering Drawing*
2. N. D. Bhatt ; *Engineering Drawing*
3. K. Venugopal *; Engineering Drawing and Graphics*
4. P.S. Gill; *Engineering Graphics*
5. P.I. Varghese; *Engineering Graphics*
6. K.R. Gopalakrishnan*; Engineering Drawing*
7. Thamaraselvi; *Engineering Drawing*
8. K.C. John; *Engineering Graphics*
9. K.N. Anil Kumar; *Engineering Graphics*

08.105 ENGINEERING MECHANICS

L-T-P: 2 - 1 – 0 **Credits: 6**

MODULE I (20 HRS)

Idealizations of Mechanics- Elements of vector algebra

Statics of rigid bodies-Classification of force systems- principle of transmissibility of a force- composition and resolution- Resultant and Equilibrant of coplanar concurrent force systems-various analytical methods- - Lami's theorem, method of resolution- Conditions of equilibrium- Moment of a force, couple, properties of couple- Varignon's theorem- Resultant and equilibrant of coplanar non-concurrent force systems- Conditions of equilibrium. Equilibrium of rigid bodies-free body diagrams.(simple problems) Types of supports - types of beams - types of loading- Support reactions of simply supported and overhanging beams under different types of loading. Forces in space, equations of equilibrium, Vector approach. Friction-Laws of friction-angle of friction- cone of friction- ladder friction- wedge friction.

MODULE II (20 HRS)

Properties of surfaces- centroid of composite areas- Theorems of Pappus-Gouldinus-Moment of inertia of areas, Parallel and perpendicular axes theorems- Radius of Gyration-moment of inertia of composite areas. **Dynamics: Kinematics**-Combined motion of translation and rotation-instantaneous centre, motion of link, motion of connecting rod and piston, wheel rolling without slipping. Relative velocity - basic concepts-analysis of different types of problems **Kinetics**-Newton's laws of translatory motion- D'Alembert's principle- Motion of lift- Motion of connected bodies.

MODULE III (20 HRS)

Work, Power and Energy - Work-Energy principle-Impulse, Momentum. Collision of elastic bodies-Law of conservation of momentum-Direct and oblique impact between elastic bodies and impact with fixed plane. Curvilinear motion- D'Alembert's principle in curvilinear motion- Mass moment of inertia of rings, solid discs and solid spheres (no derivations required)Angular momentum-Angular impulse. Kinetics of rigid bodies under combined translatory and rotational motion – work – energy principle for rigid bodies. Centrifugal and centripetal forces – motion of vehicles on curved paths in horizontal and vertical planes – super elevation – stability of vehicles moving in curved paths (qualitative ideas only). Simple harmonic motion – vibration of mechanical systems - basic elements of a vibrating system – spring mass model – undamped free vibrations – angular free vibration – simple pendulum.

REFERENCES:

1. Beer & Johnston, "*Vector Mechanics for Engineers – Statics and Dynamics"*, Tata Mc-Graw Hill Publishing Company Limited, New Delhi, 2005.
2. Irving. H. Shames, "*Engineering Mechanics*", Prentice Hall Book Company, 1966.
3. Timoshenko S. & Young D. H., "*Engineering Mechanics*", Mc-Graw Hill –International Edition
4. Popov, "*Mechanics of Solids*", Pearson Education,2007
5. Kumar K.L., "*Engineering Mechanics*", Tata Mc-Graw Hill Publishing Company Limited, New Delhi, 1998.
6. Rajasekaran S. & Sankarasubramanian G., "*Engineering Mechanics*", Vikas Publishing House Private Limited, New Delhi, 2003.
7. Tayal A K, "*Engineering Mechanics- Statics and Dynamics*" , Umesh Publications, Delhi,2004
8. Benjamin J., "*Engineering Mechanics",* Pentex Book Publishers and Distributors, Kollam, 2008

Note: *Question For University Examination:- Part A – 8 compulsory questions covering entire syllabus, 5 marks each. (5 x 8 = 40) Part B – Three questions of 10 marks from each module, out of which two should be answered (10 x 2 x 3 = 60).*

08.106 BASIC CIVIL ENGINEERING

L-T-P: 2- 1 - 0 **Credits: 6**

MODULE I

Surveying*:* Object and Principles of Surveying.
Linear Measurements: Direct measurements - Tape & chain only - Ranging out survey lines- Taking measurements of sloping ground - Errors - Tape correction (problems).
Levelling: Levelling instruments - Level (Dumpy Level, Tilting Level) Levelling Staff. Measurements in levelling - Temporary adjustments of a level, holding the staff, reading the staff - Principles of leveling - recording measurements in the field book - reduction of level - height of collimation method only (simple examples).
Contour maps (Brief description only). Computation of areas - Mid ordinate rule, average ordinate rule, Trapezoidal rule, Simpson's rule (examples)- Introduction to Distomat, Total Station & GPS (Brief description only)

MODULE II

Building construction*:* Selection of site for buildings - types of buildings - Components of buildings.
Foundation: Different types - Spread footing, Isolated footing, Combined footing, Mat foundation¸ Pile foundation (description only).
Safe Bearing Capacity of Soil: Importance of determination of the Safe Bearing Capacity of Soil (brief description only).
Super structure: Masonry - stone masonry, brick masonry –Types- desirable qualities of stone and brick.
Partition: Materials used for making partition - plywood, particle boards & glass.
Doors, windows & ventilators : Types - materials used for the construction of doors and windows - wood, steel & Aluminium.
Plastering: Mortar – properties - Preparation of Cement mortar
Painting: Preparation of surfaces for painting - plastered, wood and steel surfaces- Types of paint - enamel, emulsion & distemper. Flooring: Types - mosaic tiles, ceramic tiles, marble, granite and synthetic materials. Roofing: Selection of type of roof -flat roof, sloping roof - Concrete roof, tiled roof. Selection of roof covering materials. GI Sheet , AC Sheet, PVC Sheet

MODULE III

Concrete: Ingredients- cement, aggregate, and water. Qualities of ingredients (brief description only).
Tests on Cement - consistency, initial and final setting times. Compressive strength -IS Specifications.
Aggregates – desirable qualities of fine and coarse aggregates
Plain Cement Concrete (PCC): preparation-proportioning-mixing of concrete.
Steel-common types used in construction- Mild Steel, HYSD Steel and their properties.
Reinforced Cement Concrete (RCC)-advantages of RCC over Plain Cement Concrete.
Elementary ideas on pre-cast and pre-stressed concrete constructions.
Building services – vertical transportation – stairs – types, escalators and elevators, ramps (brief description only). Plumbing services- brief description of water supply and sewage disposal arrangements for residential buildings.

REFERENCE:

1. Adler R., *Vertical Transportation for Buildings*, American Elsevier Publishing Company, New York.1970
2. B.C Punmia, "*Surveying & Leveling" Vol*. – I, Laxmi publications(P) Ltd,N.Delhi, 2004
3. Rangwala., *Building Materials,*Charotar publishing house, 2001
4. Rangwala, "*Building Construction*" , Charotar Publishing House., 2004
5. S.K. Roy, "*Fundamentals of Surveying*" Prentice-Hall of India, New Delhi.2004
6. Rangwala.,"*Water Supply and Sanitary Engineering*", Charotar Publishing House. 1990
7. Moorthy, "*Building Construction*", Modern Publishing House distributor., 1957
8. Jha and Sinha, "*Construction and Technology*"
9. Narayanan and Lalu Mangal ,"*Introduction to Civil Engineering*"Phasor Books,Kollam.
10. Santha Minu, "*Basic Civil Engineering*" Karunya Publications,Trivandrum

Note: *The question paper will consists of two parts. Part I and part II..*

Part I is Compulsory covering the entire syllabus, for 40 marks. It contains 8 questions of 5 marks each.
Part II is to cover 3 modules. There will be two questions (20 marks each) from each module out of which one from each module is to be answered. (20 X 3 = 60)

08.107 BASIC MECHANICAL ENGINEERING

L-T-P/D : 3-1-0 **Credits: 6**

MODULE I

Thermodynamics : Basic concepts and definitions of Zeroth law, First law, Second law of thermodynamics- concept of reversibility and entropy. p-v and T-s diagrams
Air cycles: Carnot, Otto and Diesel cycles-Air standard efficiency (simple problems)
IC Engines: Working and comparison of two stroke and four stroke petrol and diesel engines - general description of various systems using block diagrams – air system, fuel system, ignition system and governing system. A brief description of CRDI, MPFI, GDI and Hybrid Vehicles
Steam boilers: Classification – Cochran boiler, Babcock and Wilcox boiler, Benson boiler-fluidized bed combustion,

MODULE II

Principles and fields of application of - compressors - reciprocating and centrifugal, blower, pumps- reciprocating, centrifugal and jet pumps, steam and hydraulic turbines- impulse and reaction, gas turbine cycles- open and closed
Elementary ideas of hydro electric, thermal and nuclear power plants
Refrigeration & Air Conditioning: Refrigerants, CFC free refrigerants. Vapor compression refrigeration system, Comfort and Industrial air conditioning-typical window air conditioning unit (general description only).

MODULE III

Mechanical Power transmission systems: Belt, rope and gear drives-types, comparison and fields of application-velocity ratio-slip (simple problems) friction disc, single plate clutch, gear trains (no derivations).
Manufacturing processes: Elementary ideas of casting, forging, rolling, welding, soldering and brazing
Machining processes- turning, taper turning, thread cutting, shaping, drilling, grinding, milling (simple sketches and short notes).
Non conventional machining - Electro discharge machining (EDM) and Electro chemical machining (ECM)
Principle, application and advantages of C N C machine

REFERENCES

1. Spalding and Cole, "*Engineering Thermodynamics*"
2. Gill, Smith and Zuirys, "*Fundamentals of IC Engines*"
3. Amstead, Ostwald and Begeman, "*Manufacturing processes*"
4. Crouse, "*Automobile Engineering*"
5. Roy and Choudhary, "*Elements of Mechanical Engineering*"
6. Hajra Choudhary, "*Workshop Technology*"
7. R K Bensal, "*Fluid mechanics and machines*"
8. J Benjamin, "*Basic Mechanical Engineering*"

Note: Lectures are to be supplemented by demonstration in laboratories.
The question paper will consist of two parts.
Part I is to be compulsory for 40 marks. This may contain 10 questions of 4 marks each.
Part II is to cover 3 modules. There can be 3 questions from each module (10 marks each) out of which 2 are to be answered.

08.108 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

L-T-P : 2–1-0 **Credits 6**

MODULE – I

Elementary concepts - Kirchoffs laws - Magnetic Circuits - MMF, field strength, flux density, reluctance – problems in series magnetic circuits. Review of electromagnetic induction - Faradays laws, Lenz's law - statically induced and dynamically induced emf - self and mutual induction - inductance.

Alternating current fundamentals - generation of alternating currents – waveforms - frequency - period - average and rms values - form factor. Phasor representation of alternating quantities - rectangular polar and exponential forms.

Analysis of simple ac circuits – concept of impedance and admittance - phasor representation - *j* notation - power and power factor in ac circuits - active and reactive components. Solution of RL, RC and RLC series circuits.

Three phase systems - generation of three phase voltage - star and delta connection - relation between phase and line values of voltage and current - phasor representation - three wire and four wire systems.

Measurement of power in three phase circuits (two wattmeter method). Measurement of energy – working of 1-phase energy meter.

MODULE – II

Transformers - Principle of operation - EMF equation - constructional details of single phase and three phase transformers

Methods of bulk generation of electric power. Block schematic of layout of generating stations - hydroelectric, thermal and nuclear power plants. Renewable energy sources - solar, wind, tidal, wave and geothermal energy.

Bulk transmission of electric power - typical electrical power transmission scheme - need for high transmission voltage - substations - substation equipments. Primary and secondary transmission and distribution systems

Different methods of wiring for LT installations. Schematic layout of LT switchboards. Earthing of installations - necessity of earthing - plate and pipe earthing. Protective fuses, MCBs, ELCBs and switches.

Working of incandescent lamps, -fluorescent lamps, energy efficient lamps

MODULE – III

Diodes - PN junction diodes,. V-I characteristics, dynamic & static resistance, principle of working and V-I characteristics of Zener diode, principle of Photo diode, Solar cell, & LED.

Rectifiers & power supplies - block diagram description of a dc power supply, circuit diagram & working of half-wave & full wave rectifier, final equations of Vrms, Vdc, ripple factor and peak inverse voltage in each case, principle of working of series inductor and shunt capacitor filters. Working of simple zener voltage regulator.

Power devices – V – I characteristics and applications of SCR and Triac Working principle of UPS and SMPS

Transducers – Resistance strain guage, thermistor, LVDT

REFERENCES

1. V.N. Mitlle, "*Basic Electrical Engineering*", Tata McGraw Hill, 1990.
2. DP Kothari, LJ Nagrath, "*Theory and Problems of Basic Electrical Engineering*", Prentice Hall of India, 2000.
3. B.L. Thereja, "*A Text Book of Electrical Technology*", Volume I, S Chand & Co, New Delhi, 1992.
4. Francis M Fernandez, "*A Basic Course in Electrical Engineering*", Rajath Publishers, Ernakulam.
5. TP Imthias Ahmed, B. Premlet, "*Introduction to Electrical Engineering*", Phaser Books, Kollam
6. Gopakumar, "*Introduction To Electronics and Communications*", .Phasor Books, Kollam
7. Millman and Halkias, "*Integrated Electronics: Analog and digital circuits and systems*", McGraw-Hill Book Co
8. Edward Hughes, "*Electrical and Electronic Technology*", Pearson Education, 2002.
9. ML Soni, PU Guptha, US Bhatnagar and A Chakrabarthy, "*A Text Book on Power System Engineering*", Dhanpath Rai & Sons, New Delhi 1997
10. N.N.Bhargava, "*Basic Electronics and Linear Circuits*", Tata McGraw Hill
11. Rangan C.S., Sarma G.R., and Mani V.S.V., "*Instrumentation Devices and Systems*", Tata McGraw Hill, 1992.
12. Muhammad H. Rashid, "*Power Electronic Circuits, Devices and Applications*", Pearson education, Asia 2003.

Note : *The question paper will consist of two parts. Part – A is to be compulsory for 40 marks (10 questions of 4 marks each). Part-B is to cover 3 modules for 60 marks. (50% choice- One out of two or two out of four from each module).*

08.109 BASIC COMMUNICATION AND INFORMATION ENGINEERING

L – T – P: 2-1-0 **Credits: 6**

MODULE I (Qualitative Treatment)

(a) Bipolar junction transistors: NPN & PNP transistors, structure, typical doping, working of NPN transistor, concepts of common base, common emitter & common collector configurations, current gain of each, input & output characteristics of common emitter configuration, comparison of three configurations with reference to voltage & current gain, input & output resistances and applications. (6 hrs)
(b) Field effect Transistors : basic principles of JFET, MESFET and MOSFET, comparison with BJT. (3 hrs)
(c) Amplifiers & Oscillators: circuit diagram & working of common emitter amplifier, function of each component in the circuit, need of proper biasing, frequency response, voltage gain and 3dB bandwidth, concepts of class A, B, AB and Class C power amplifiers, circuit diagram & working of push pull amplifiers, concepts of feedback, working principles of oscillators, circuit diagram & working of RC phase shift oscillator (7 hrs)
(d) Integrated circuits: advantages of ICs, analog and digital ICs, functional block diagram of operational amplifier, ideal operational amplifier,use as inverting amplifier, non inverting amplifier, summing amplifier, integrator and comparator. (4 hrs)
(e) Digital ICs:logic gates, realization of logic functions, principle of combinational and sequential logic circuits, flip flop (JK), logic families: TTL and CMOS Logic (No internal diagram) (4 hrs)
(f) IC fabrication: purification of silicon, crystal growth, wafer preparation. unit process: oxidation, diffusion, ion implantation, epitaxy, deposition, photolithography. (4 hrs)

MODULE II(Qualitative Treatment)

(a) Measurements: principle and block diagram of analog and digital multimeter, working principle of CRT, block diagram of CRO, measurements using CRO, principle of digital storage oscilloscope, principle and block diagram of function generator. (5hrs)
(b) Radio communication: principle of AM & FM, wave forms, bandwidths, block diagrams of AM & FM transmitters, principle of AM &FM demodulation, comparison of AM & FM,principle &block diagram of super heterodyne receiver. (4 hrs)
(c) Color television: TV Standards,interlaced scanning, block diagram of PAL TV transmitter & receiver, basic principles of cableTV, CCTV system, basic principles of HDTV, basic principles of LCD & Plasma displays. (5 hrs)
(d) Radar and navigation: principle of radar and radar equation, block schematics of pulsed radar, factors affecting range, applications of radar in measurements and navigation. (4 hrs)
(e) Satellite communication: microwave frequency bands, concept of geo-stationary satellite, frequency bands used, satellite transponder, block diagram of earth station transmitter & receiver, advantages of satellite communication, principle of Global Positioning System (GPS). (3 hrs)
(f) Optical communication: block diagram of the optical communication system, principle of light transmission through fiber, concepts of Single Mode and Multi Mode optical fiber, working principle of source (semiconductor Laser) & detector (PIN,APD), advantages of optical communication. (5 hrs)

MODULE III (Qualitative Treatment)

(a) Computer Architecture: functional units: basic concept of ALU- data path and control, memory hierarchy, caches, main memory, virtual memory, operating systems, microprocessors - functional block diagram of 8085 (9 hrs)
(b) Data communication: overview, analog and digital data transmission, transmission media, digitization of wave forms, PCM , digital modulation techniques- ASK, PSK, FSK, basic concepts of error detection , parity checking. (6hrs)
(c) Mobile communication: basic principles of cellular communications, concepts of cells, frequency reuse, principle and block diagram of GSM,principle of CDMA, WLL & GPRS technologies. (4hrs)
(d) Internet Technology: concepts of networking: client - server computing, IP addresses, domain names, network interface unit - modem, switching technologies- circuit switching and packet switching, LAN,MAN,WAN &World wide web, network topologies, communication protocols- TCP/IP, Introduction to web languages-HTML ,XML, internetworking concepts, network devices- basic principles of router, bridge, switch, network security- Firewall. (7 hrs)

REFERENCES

1. Santiram Kal, *Basic Electronics – Devices, Circuits and IT fundamentals*, PHI
2. Louis.E.Frenzel, *Principles of Electronic Communication Systems*, TMH
3. William Stallings, *Wireless Communications and Networks*, Pearson Education.
4. M.Moris Mano, *Computer Architecture*, PHI
5. Neil H E Weste,Kamran Eshraghian, *Principles of CMOS VLSI design – A system perspective*, Pearson Education [Module 1(f)]
6. David A. Bell, *Electronic Instrumentation and Measurements*, PHI .[Module 2(a)]
7. N N Bhargava,D C Kulshreshtha,S C Gupta, *Basic Electronics & Linear Circuits*, TMH
8. ITL Education Solution Ltd., *Introduction to Information Technology*, Pearson Education, 5th edition, 2008
9. R.R. Gulati, *Monochrome and Colour Television*, New Age International [Module 2 (c)]
10. K Gopakumar, *Introduction to Electronics & Communication* , 3rd edition, 2008,Phasor Publisher's,Kollam

This subject shall be handled by faculty of Dept. of Electronics and Communication in the Colleges.

Question Paper

The question paper shall consist of two parts. Part I is to cover the entire syllabus, and carries 40 marks. This shall contain 10 compulsory questions of 4 marks each. Part II is to cover 3 modules, and carries 60 marks. There shall be 3 questions from each module (10 marks each) out of which 2 are to be answered.

08.110 ENGINEERING WORKSHOPS

L - T-P: 0-0-2 **CREDITS: 4**

A. Carpentry:

Study of tools and joints. Practice in planning, chiseling, marking and sawing. Joints – Cross joint, T joint, Dove tail joint.

B. Fitting:

Study of tools, Practice in filing, cutting, drilling and tapping. Male and female joints, Stepped joints.

C: Sheet Metal Work:

Study of tools. Selection of different gauge GI sheets for jobs. Practice on riveted joints. Preparing tube joints, frustums, trays and containers.

D. Plumbing:

Study of tools. Details of plumbing work in domestic and industrial applications. Study of pipe joints, cutting, threading and laying of pipes with different fittings using PVC pipes. Use of special tools in plumbing work.

E: Foundry:

Study of tools. Preparation of sand, moulding practice and demonstration of casting.

F. Welding:

Study of welding machines. Straight line practices, Making of Butt joint, T joint and Lap joint.

G: Smithy:

Study of tools. Demonstration on forging of square prism, hexagonal bolt, T bolt and Eye bolt.

H: Machine Tools:

Study and demonstration on working of machine tools. Lathe and Drilling machine.

NOTE: *For the university examination the student shall be examined in sections A, B, C, D and E only.*

Information Technology

Third Semester - Eighth Semester

University Examination Pattern
(for all theory subjects, unless otherwise specified)

PART A	***Short answer questions*** **All questions are compulsory. There should be at least three questions from each module.**	***10 x 4 marks=40 marks***
PART B	***Descriptive/Analytical/Problem solving questions*** **Candidates have to answer one question out of two or two questions out of four from each module.**	***3 x 20 marks=60 marks***
		Total Marks: 100

SEMESTER III

08.301 ENGINEERING MATHEMATICS II
(C M P U N E R F T A H B)

L-T-P : 3-1-0 **Credits: 4**

MODULE I (16 hours)

Multiple Integrals: Double Integrals (Cartesian only). Change of order of integration. Area enclosed by plane curves. Triple integrals. Volume of solids.
Vector Integration: Line and surface and volume integrals. Green's theorem in the plane. Stoke's theorem and Gauss' divergence theorem (no proof).

MODULE II (18 hours)

Fourier Series: Fourier series of periodic functions of period 2π and $2l$. Dirichlet's condition for convergence. Odd and even functions. Half range expansions.
Fourier Transforms: Fourier integral theorem (no proof) – Fourier transforms – Fourier sine and cosine transforms, inverse Fourier transforms, properties.

MODULE III (18 hours)

Partial differential equations: Formation of PDE. Solution of Lagranges linear equation. First order nonlinear equations – standard forms – Homogeneous PDE with constant coefficients.
Application of PDE: Derivation of one-dimensional Wave and Heat equations. Solution by separation of variables. Boundary value problems in one-dimensional Wave and Heat equations.

Reference Books

1. Advanced Engineering Mathematics, 8th Edn. – Kreyszig, Wiley Eastern.
2. Advanced Engineering Mathematics – Peter O Neil, Thomson Publications.
3. Higher Engineering Mathematics – B. S. Grewal, Khanna Publishers.
4. Higher Engineering Mathematics – B. V. Ramana, Tata Mc Graw Hill.
5. Advanced Engineering Mathematics – Michael D. Greenberg, Pearson Education

08.302 PROBLEM SOLVING AND PROGRAMMING IN C

L-T-P : 2-2-0 **Credits: 4**

MODULE I (15 hours)

Introduction to digital computer – Von Neumann concept – hypothetical decimal computer – functional units of a computer – storage – primary storage – secondary storage. Introduction to programming languages – types of programming languages – high level languages – assembly language – machine language. Problem solving concepts – flow charts and algorithms – problem definition phase – general problem solving strategies – top-down design – breaking a problem into sub problems – choice of a suitable data structure. Documentation of programs – debugging of programs.

MODULE II (20 hours)

Important C concepts. Preprocessor directives – header files – data types and qualifiers – operators and expressions – enumerations – data input and output – control statements – arrays and strings – structures and unions – working with bits in C – storage classes. Example programs including bubble sort, selection sort, and linear and binary search.

MODULE III (17 hours)

Pointers – arrays of pointers – structures and pointers. Memory allocation functions. Function – function definition – function prototypes – function call by value and call by reference – recursive functions. Data files – formatted, unformatted and text files. Low level programming in C. Command line arguments. Example programs.

Text Books:

1. Computer Programming in C – V. Rajaraman, PHI
2. Programming with C – B.S. Gottfried, Schaum's Series, TMH.
3. A structured Programming Approach Using C – B.A. Forouzan and R.F. Gilberg, Thomson Learning.
4. Problem Solving and Program Design in C – J.R. Hanly and E.B. Koffman, Pearson/Addison Wesley
5. Fundamentals of computers – V. Rajaraman, PHI

Reference Books:

1. The C Programming language – Keringhan B.W. and Ritche D.M., PHI 1990.
2. Programming with ANSI and Turbo C – Ashok N. Kamthane, Pearson Education India
3. Programming Techniques through C – M.G. Venkateshmurthy, Pearson Education India.
4. A Book on C – A. Kelly and I. Pohl, Pearson Education.

08.303 DISCRETE STRUCTURES (R F)

L-T-P: 2 – 1 – 0 **Credits: 3**

MODULE I (11 hours)

Statement calculus: Statements, connectives, statement formulas, truth tables, conditional, biconditional, well formed formulas, tautology, contradiction, equivalence of formulas, duality law, tautological implications, formulas with distinct truth tables, functionally complete set of connectives, two state devices and statement logic, Theory of inference for statement calculus, validity using truth tables, rules of inference, consistency of premises and indirect method of proof. *Predicate calculus:* predicates, statement functions, variables and quantifiers, predicate formulas, free and bound variables, universe of discourse, theory of inference for predicate calculus.

MODULE II (14 hours)

Set Theory: basic concepts of set theory. *Representation of discrete structures:* data structures, storage structures, sequential allocation, pointers and linked allocation. *Relations and ordering :* relations – properties of binary relations in a set, relation matrix and graph of a relation, Partition and covering of a set, equivalence relations, compatibility relations, composition of binary relations, Partial ordering, Partially ordered set -representation. *Functions :* one to one, onto, bijection, composition of functions, inverse functions, binary and n-ary operations, natural numbers – Peano Axioms and Mathematical induction, Pigeon hole principle. Cardinality – countable and uncountable sets, Cantor's theorem of power sets. Recursion – recursion in programming languages.

MODULE III (14 hours)

Algebraic structures : simple algebraic systems and general properties, morphism, congruence relation, subalgebra, product algebra and factor algebra, semigroups & monoids - morphism, cyclic semi groups and monoids, subsemigroups and submonoids, groups – abelian groups, permutation groups, cyclic groups, subgroups and homomorphism, cosets and Lagrange's theorem, normal subgroups. Algebraic systems with two binary operations – ring, integral domain, field, error detection and correction using group codes. Lattices as partially ordered sets, properties of lattices, lattices as algebraic systems, sub lattices, direct product and homomorphism, Boolean algebra, subalgebra, direct product and homomorphism, Boolean functions. Basic concepts of graph theory - basic definitions of graphs, paths, reachability and connectedness (No theorems and proofs).

Text Books:

1. Discrete mathematical structures with applications to computer science – J.P. Tremblay and R. Manohar, TMI
2. Discrete mathematical structures for computer science – Kolman B., Prentice Hall, 1988.
3. Discrete mathematics with applications – Koshy, Elsevier.
4. Discrete mathematical structures – J. Ganguly, Sanguine Technical Publishers

Reference Books:

1. Elements of discrete mathematics - C.L. Liu, TMH
2. Modern algebra – Herstein.
3. Algorithmic graph theory – Gibbons, Cambridge University Press.
4. Discrete mathematics and its applications with combinatorics and graph theory – K.H Rosen, McGraw-Hill
5. Discrete and combinatorial mathematics-an applied introduction – R.P. Grimaldi and B.V. Ramana, Pearson Education.

08.304 ELECTRONIC CIRCUITS (R F)

L-T-P: 2 – 1 – 0 **Credits: 3**

MODULE I (12 hours)

Design and analysis of Rectifiers, Filters, Clippers, Clampers, Regulators, Differentiators, Integrators- RC circuits-response of high pass / low pass RC to sine wave, pulse and square wave inputs- principle of operation of inverters, uninterrupted power supplies, switched mode power supplies

MODULE II (13 hours)

Transistor amplifiers- classification – small signal analysis – voltage divider bias – emitter follower configuration- feed back configurations- RC phase shift, wein bridge, Colpitts, Hartely oscillator(No derivations), Multivibrators- monostable, bistable and astable- 555 timer and applications (No derivations)

MODULE III (14 hours)

Operational Amplifiers, Block diagram, characteristic features of OP Amps, ideal OP Amps, common mode and difference mode- summing amplifier, differential amplifier, inverting, non inverting amplifiers. Active filters, Applications, Chebyshev and Butterworth filters, Low pass Butterworth Filter, High pass Butterworth Filter, Band Pass and Band rejection filters, Oscillators- Wein Bridge and Phase shift Oscillators

Text Books:

1. Electronic Devices and Circuits Theory – Boylestead and Nashelky, PHI
2. Op-amp and Linear Integrated Circuits – Gayakwad, 4th Edn., Pearson Education

Reference Books:

1. Electronic Circuits – R.D. Sudhaker Samuel and V Nattarsu, Sanguine Technical Publishers

08.305 DIGITAL SYSTEM DESIGN (R F)

L-T-P:2 – 2 – 0 **Credits: 4**

MODULE I (16 hours)

Number systems – Decimal, Binary, Octal and Hexadecimal – conversion from one system to another – representation of negative numbers – representation of BCD numbers – character representation – character coding schemes – ASCII – EBCDIC etc. Addition, subtraction, multiplication and division of binary numbers (no algorithms). Addition and subtraction of BCD, Octal and Hexadecimal numbers. Representation of floating point numbers – precision – addition, subtraction, multiplication and division of floating point numbers (no algorithms).

MODULE II (18 hours)

Postulates of Boolean algebra – logic functions – logic gates – methods of minimization of logic functions – Karnaugh map method and tabulation method – realization using logic gates. Design of combinational logic circuits – adder, subtractor, parallel adder, carry look ahead adder, multilevel carry look ahead adder, BCD adder, code converter, magnitude comparator, decoder, multiplexer, demultiplexer, parity generator – design examples.

MODULE III (18 hours)

Sequential logic circuits – flip flops – RS, JK, D and T type – master slave flip flop. Analysis and design of clocked sequential circuits – state diagram – state reduction and assignment – design with state equations – shift registers – universal shift registers – serial adder – design of synchronous and asynchronous counters – timing Sequences. Introduction to Programmable Logic Devices (PLDs). Basics of Hardware Description language (HDL).

Text Books:

1. Digital Design – M. Morris Mano, Pearson Education.
2. Digital Fundamentals – T.L. Floyd and R.P. Jain, Pearson Education.
3. Digital Electronics Principles and Applications – Tokheim, TMH.

Reference Books:

1. Digital Electronics-an Introduction to Theory and Practice – W.H. Gothman, PHI.
2. An Introduction to Digital Computer Design – V. Rajaraman and T. Radhakrishnan, 5th Edn., PHI.
3. Digital Logic Applications and Design – J.M. Yarbrough, Thomson Learning.
4. Digital Design and Computer Architecture – D.M. Harris and S.L. Harris, Morgan Kaufmann Publishers.

08.306 COMPUTER ORGANIZATION (R F)

L-T-P: 2 – 1 – 0 **Credits: 3**

MODULE I (10 hours)

Basic Structure of computers – functional units – basic operational concepts – bus structures – software. Memory locations and addresses – memory operations – instructions and instruction sequencing – addressing modes – assembly language – PDP-11 addressing modes and instructions – basic I/O operations – stacks and queues – subroutines.

MODULE II (14 hours)

Basic processing unit – fundamental concepts – execution of a complete instruction – multiple-bus organization – sequencing of control signals. I/O organization – accessing of I/O devices – interrupts – direct memory access – buses – interface circuits – standard I/O interfaces (PCI, SCSI, USB).

MODULE III (15 hours)

Memory system – basic concepts – semiconductor RAMs – memory system considerations – semiconductor ROMs – flash memory – cache memory – interleaving – basic concepts of virtual memory, segmentation and paging – associative memory. Computer peripherals – input devices – output devices. RAID.

Text Books:

1. Computer Organization – C. Hamacher, Z. Vranesic and S. Zaky, Mc Graw Hill Publishing Company.
2. Computer Organization and Design – D.A. Patterson and J.L Hennessey, Morgan Kauffmann Publishers.

Reference Books:

1. Computer Organization and Design – P. Chaudhuri, Prentice Hall of India Pvt. Ltd.
2. Computer Organization Programming – C.W. Gear, Mc Graw Hill International Student Edition.
3. Introduction to Computer Systems using PDP – 11 and Pascal – Glenn H. Mac Even, Mc Graw Hill.
4. Computer Organization – C. Hamacher, Z. Vranesic and S. Zaky, 2nd Edn. (for PDP-11addressing modes and instructions), Mc Graw Hill Publishing Company.
5. The indispensable PC Hardware Book – H.P. Messmer
6. Upgrading and Repairing PCs – Scottmuller, Pearson Education.

08.307 ELECTRONIC CIRCUITS LAB (R F)

L-T-P: 0 – 0 – 4 **Credits: 4**

1. Characteristics of diode, zener diode.
2. CE characteristics of BJT.
3. CS characteristics of FET.
4. Rectifier circuits with and without filters.
5. RC lowpass and highpass circuits.
6. Differentiating and Integrating circuits.
7. Clipping and Clamping circuits.
8. Simple zener diode regulator.
9. RC coupled amplifier using BJT.
10. RC phase shift oscillator using BJT.
11. Astable and Monostable multivibrators using 555 Timer IC.
12. Astable and Monostable multivibraors using 741 OPAMP.

03.308 PROGRAMMING LAB (R F)

L-T-P: 0 – 0 – 4 **Credits: 4**

Familiarization of operating systems like DOS and Windows. Programming exercises in C based on the course ***08.302 Problem Solving and Programming in C.***

The programming exercises include:

Decision making, branching and looping
- if, if … else statements
- switch, goto statements
- while, do, for statements

Arrays and strings
- one-dimensional, two-dimensional, multidimensional arrays
- reading/writing strings
- operations on strings
- string handling

Functions
- user defined functions
- function calls, arguments & return values
- nesting of functions
- recursive functions
- passing arrays and strings to functions

Structures and unions
- copying and comparing structure variables
- arrays of structures
- arrays within structures
- structures with in structures
- structures and functions
- unions

Pointers
- pointers and arrays
- pointers and character strings
- array of pointers
- pointers and functions
- pointers and structures

Files, memory allocation, bit-level programming
- files → defining, opening/closing, input-output operations
- command line arguments
- memory allocation functions
- bit-wise operators

SEMESTER IV

08.401 ENGINEERING MATHEMATICS III
(C M P U N E R F H B)

L-T-P: 3 – 1 – 0 **Credits: 4**

MODULE I (17 hours)

Complex Differentiation: Limits, continuity and differentiation of complex functions. Analytic functions – Cauchy Reimann equations in Cartesian form (proof of necessary part only). Properties of analytic functions – harmonic functions. Milne Thomson method.

Conformal mapping: the transformations $w = 1/z$, $w = z^2$, $w = z + 1/z$, , Bilinear transformation.

MODULE II (17 hours)

Complex Integration: Line integral – Cauchy's integral theorem – Cauchy's integral formula. Power series – radius of convergence – Taylors and Laurents series – zeros and singularities – residues and residue theorem. Evaluation of real definite integrals – with no poles of $f(z)$ on the real axis (proof of theorems not required).

MODULE III (18 hours)

Numerical Techniques: Errors in numerical computation – solution of algebraic and transcendental equations by bisection method, Regula false method, Newton-Raphson method. Solution of linear systems by Gauss elimination and Gauss-Seidal method. Newtons forward and backward interpolation formula. Lagranges interpolation formula. Numerical integration. Trapezoidal and Simpson's rule. Numerical solution of ODE Taylor series method, Euler's method, Runge Kutta methods (derivation of formulae not required for the above methods).

Reference Books

1. Advanced Engineering Mathematics – Peter O Neil, Thomson Publications.
2. Advanced Engineering Mathematics, 8th Edn. – Kreyszig, Wiley Eastern.
3. Advanced Engineering Mathematics – Michael D. Greenberg, Pearson Education
4. Higher Engineering Mathematics – B. S. Grewal, Khanna Publishers.
5. Higher Engineering Mathematics – B. V. Ramana, Tata Mc Graw Hill.
6. Numerical Methods with Programming – C.T. Veerarajan and T. Ramachandran
7. Introductory Methods of Numerical Analysis – S.S. Sastry

08.402 HUMANITIES
(C R F T A H B)

L-T-P: 3 – 0 – 0 **Credits:3**

Part I – Economics (2 Periods per week)

MODULE I(13 hours)

Definition of Economics – Basic Concepts Goods – Choice of techniques – Production possibility curve National Income concepts - GNP – GDP – NNP – Per Capita Income – Three Sectors of the Economy – Primary – Secondary, Tertiary Sector – Significance of Money.
Meaning of Demand and Supply – Types of demand – Determinants of Demand – Demand forecasting
Production function – Law of Variable proportion – Returns to scale - Least cost combination of inputs – Cost concepts – Cost output relationship.

MODULE II(13 hours)

Inflation – causes of inflation – measures to control inflation – Demand – Pull inflation – cost push inflation – effects of Inflation – effects of inflations comparison between inflation and deflation.
India's Economic crisis in 1991 – New economic policy – Global Financial meltdown in 2008 – Applicability of Keynesian Theory to UDC'S.
Stock Market and present scenario – Industrial sector past and present – Industry Analysis – Electronics – Chemical – Automobile – FMCG Industry.
Environment and Development – Basic Issues – Sustainable Development and Environmental Accounting – Population – Resources and the Environment – Poverty and the Environment – Growth versus the Environment – The Global Environment.

Part II – Accountancy (1 Period per week)

MODULE III(13 hours)

Book- Keeping and Accountancy -Elements of Double Entry -Book- Keeping-rules for journalising - Ledger accounts –Cash book-Banking transactions – Trial Balance- Method of Balancing accounts- the journal proper (simple problems).
Final accounts: Preparation of trading and profit and loss Account- Balance sheet (with simple problems) - Introduction to Accounting packages (Description only)

Reference Books:
Part I

1. Modern Economic theory – K.K Dewett
2. Economic Development – Michael Todaro, Addison Wesley Longman Ltd.
3. Business Environment in India – Mohinder Kumar Sharma.
4. Money, Banking, International Trade and Public Finance – D.M. Mithani, Himalaya Pub. House, New Delhi.
5. Indian Economy – Rudder Dutt and K.P.M Sundaran.
6. Intermediate Micro Economics – Hal R. Varian.
7. Micro Economics, 2nd Edition – Koutsiannis.

Part II

Internal Continuous Assessment *(Maximum Marks-50)*
Marks shall be awarded for Part I and Par II in the ratio 70:30, respectively

25 Marks - Tests (minimum 2)
15 Marks - Assignments (minimum 3) such as home work, problem solving, literature survey, seminar, term-project, programming exercises, etc.
10 Marks - Regularity in the class

University Examination Pattern

Part I and Part II to be answered in separate answer books.

Part – I	***Economics***	
PART A:	***Short answer questions***	*10 x 3 marks = 30 marks*
	All questions are compulsory. There should be at least four questions from each module and not more than six questions from any module.	
PART B:	***Descriptive/Analytical/Problem solving questions***	*2 x 20 marks = 40 marks*
	Candidates have to answer one question out of two or two questions out of four from each module.	
Part II	***Accountancy***	
	Descriptive/Analytical/Problem solving questions	*2 x 15 marks = 30 marks*
	Candidates have to answer two questions out of three questions.	
		Maximum Total Marks: 100