BACHELOR OF ARCHITECTURE

New Course Curriculum
(Under Credit Scheme)

For all batches from 2015 batch onwards
(Except 2011-16 batch)

Objectives
Examination Scheme
Syllabus

DEPARTMENT OF ARCHITECTURE
National Institute of Technology,
Hamirpur (HP) - 177 005

DEPARTMENT OF ARCHITECTURE
National Institute of Technology, Hamirpur (HP) - 177 005

OBJECTIVE OF B. ARCH. FIVE YEAR PROGRAM

The Bachelor of Architecture (Five year Degree Program) has a broad scope, not only of self-employment but creating job opportunities for a large number of people who will be working with the Architects. There are ample opportunities for employment in Central, State & Private Sector Organization, where the positions of Architects & Town Planners remain vacant for lack of qualified persons. Program is intended to prepare students for professional practice in the field of Architecture. There is an increasing recognition today of Architecture as an intellectual discipline, both as an Art and as a Profession. In India, where we have further complexities of different social, cultural and geographical, economical and technical domains, which are unique and typical of every region of our country, architects make a vital contribution in the shaping of our environment and society.

This program has started with an idea to provide qualified professionals, in the field of Architecture, to the country and to the Himachal region in particular. The emphasis will be on the development personality of students with the aid of both the objective information and subjective attitude, based on reasons.

An Architect supposed to act as a team leader and coordinator of the inputs of the various specific disciplines. The need to possess a sound knowledge of all aspects of modem building, technology, technological and Engineering aspects have been remarkably incorporated in the curriculum to make the student able to keep pace with fast changing world of technology, where the meaning of a house has been changed from

'A shelter to protect us from extreme weather' to 'A machine to live in'. The program aims at attaining a high level of excellence in Architectural Education. However, the program is intended to reinforce intellectual capabilities and develop proficiency in professional scheme to enable graduates to completely pursue alternative career with in the broad spectrum of Architecture.

COURSE STRUCTURE

The course consists of five years out of which 41/2 years will be of formal contact instructions 'and six months will be devoted to professional training in a recognized professional office/ industry. Basic course areas are scheduled as:

1. Architectural Design
2. Building Construction & Materials
3. Building, Structures- Analysis & Designs

In addition to these the other courses such as Building Sciences, Services, Architectural Drawing and Presentation, Computers, Humanities, History & Management have been suitably incorporated in the curriculum. Some elective courses have been introduced to impart specialized training for some of the subjects in 4 th year teaching scheme.
Workshop exercises are the backbone of practical knowledge and exposure.

National Institute of Technology Hamirpur
Department of Architecture

FIRST YEAR																
First Semester								**Second Semester**								
S. No.	**Code**	**Subject**	**L**	**T**	**P/ D**	**Type of Course**	**Credits**	**To be taught by Deptt. of**	**S. No.**	**Code**	**Subject**	**L**	**T**	**P/D**	**Credits**	**Type of Course**	**To be taught by Deptt. of**
1	ARD- 111	Basic & Visual Design	2	0	4	Lab	4	Architecture	1	ARD- 121	Architectural Design-II	2	0	6	5	Lab	Architecture
2	ARD- 112	Bldg. Const. & Mat.-I	2	0	4	Lab	4	Architecture	2	ARD-122	Bldg. Const. & Mat.-II	2	0	4	4	Lab	Architecture
3	ARD- 113	History of Arch-I	2	1	0	Theory	3	Architecture	3	ARD-123	History of Arch-II	2	1	0	3	Theory	Architecture
4	ARD- 114	Architectural Drawing & Graphics -I	2	0	4	Lab	4	Architecture	4	ARD-124	Architectural Drawing & Graphics -II	2	0	4	4	Lab	Architecture
5	ARS- 115	Architecture Mathematics	3	1	0	Theory	3	Mathematics	5	ARD- 125	Mechanics of Structures	2	1	0	3	Theory	Civil Engg
6	ARH- 116	Communication Skills	2	1	0	Theory	3	Humanities	6	ARW-126	Workshop Practice	1	0	3	2	Lab	Institute Workshop
7	ARH- 117	Communication Skills Lab	0	0	2	Lab	1	Humanities									
			H = 30				22					H = 30			21		

Note:-

a) Workshop practice will include Machine shop, Welding, and Sheet metal shops only.
b) Site Visits/Tours may be conducted within the semester as per requirement of the subject.
c) **Laboratory Courses**:
   i. The viva voce of 30% component of continuous assessment is to be conducted by subject incharge.
   ii. The viva voce of 20% component of End term is to be conducted jointly by the subject incharge and one expert to be appointed from within the department.
   iii. The end semester examination will be conducted for 20% weightage of end semester evaluation (as per UG manual) for **ARD-111, ARD-112, ARD-114 ARD- 121, ARD-122, ARD-124**

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Department of Architecture

SECOND YEAR																	
Third Semester									**Fourth Semester**								
S. No.	**Code**	**Subject**	**L**	**T**	**P/ D**	**Credits**	**Type of Course**	**To be taught by Deptt. of**	**S. No.**	**Code**	**Subject**	**L**	**T**	**P/D**	**Credits**	**Type of Course**	**To be taught by Deptt. of**
1	ARD- 211	Architectural Design-III	2	0	8	6	Lab	Architecture	1	ARD- 221	Architectural Design-IV	2	0	8	6	Lab	Architecture
2	ARD- 212	Bldg. Const. & Mat.-III	2	0	4	4	Lab	Architecture	2	ARD-222	Bldg. Const. & Mat.-IV	2	0	4	4	Lab	Architecture
3	ARD- 213	History of Arch-III	2	1	0	3	Theory	Architecture	3	ARD-223	Theory of Design-1	2	1	0	3	Theory	Architecture
4	ARD- 214	Architectural Drawing & Graphics -III	2	0	4	4	Lab	Architecture	4	ARD- 224	Building Services-I	2	1	0	3	Theory	Architecture
5	ARD- 215	Analysis of Structures	2	1	0	3	Theory	Civil Engg	5	ARD-225	Design of RCC Structures	2	1	0	3	Theory	Civil Engg
6	ARD- 216	Climate and Built Environment	2	1	0	3	Theory	Architecture	6	ARD-226	Computer Applications in Architecture	2	0	4	4	Lab	Architecture
7	ARD-217	Geomatics and Measure Drawing	2	0	2	3	Theory	Architecture	7	ARD-227	Disaster Management	2	1	0	3	Theory	Architecture
			H = 35			26						H = 34			26		

Note:-

a) Measured Drawing tour to be conducted at the end of fourth semester during Summer Vacations.
b) Site Visits/Tours may be conducted within the semester as per requirement of the subject.
c) **Laboratory Courses**:
   i. The viva voce of 30% component of continuous assessment is to be conducted by subject incharge.
   ii. The viva voce of 20% component of End term is to be conducted jointly by the subject incharge and one expert to be appointed from within the department.
   iii. The end semester examination will be conducted for 20% weightage of end semester evaluation (as per UG manual) for **ARD-211, ARD-212, ARD-214 ARD- 221, ARD-222.**

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THIRD YEAR																	
Fifth Semester								**Sixth Semester**									
S. No.	**Code**	**Subject**	**L**	**T**	**P/D**	**Credits**	**Type of Course**	**To be taught by Deptt. of**	S. No.	**Code**	**Subject**	**L**	**T**	**P/D**	**Credits**	**Type of Course**	**To be taught by Deptt. of**
1	ARD- 311	Architectural Design-V	2	0	10	7	Lab	Architecture	1	ARD- 321	Architectural Design-VI	2	0	10	7	Lab	Architecture
2	ARD- 312	Bldg. Const. & Mat.-V	2	0	4	4	Lab	Architecture	2	ARD-322	Bldg. Const. & Mat.-VI	2	0	4	4	Lab	Architecture
3	ARD- 313	Theory of Design-II	2	1	0	3	Theory	Architecture	3	ARD-323	Ekistics	2	1	0	3	Theory	Architecture
4	ARD - 314	Building Services-II	2	1	0	3	Theory	Architecture	4	ARD-324	Building Services-III	2	1	0	3	Theory	Architecture
5	ARD- 315	Design of Steel Structures	2	1	0	3	Theory	Civil Engg	5	ARD- 325	Hill Architecture	2	1	0	3	Theory	Architecture
6	ARD- 316	Building Estimation, Costing & Specification	2	1	0	3	Theory	Architecture	6	ARD-326	Building Economics and Sociology	2	1	0	3	Theory	Architecture
7	**	Institute Elective	2	2	0	3	Theory	Other Department	7	ARD-327	Earthquake Resistant Building Design	2	1	0	3	Theory	Architecture
8	ARO-317	Auto CAD	1	0	3	3	Lab	Architecture									
			H = 34			26						H = 33			26		

Note:-

a) ARD-417 Professional Training: The students will undergo 06 – 08 weeks training with CoA registered/Affiliated Architect during Summer Vacations.
b) Site Visits/Tours may be conducted within the semester as per requirement of the subject.
d) **Laboratory Courses**:
   i. The viva voce of 30% component of continuous assessment is to be conducted by subject incharge.
   ii. The viva voce of 20% component of End term is to be conducted jointly by the subject incharge and one expert to be appointed from within the department.
   iii. The end semester examination will be conducted for 20% weightage of end semester evaluation (Laboratory courses as per UG manual) for **ARD-311, ARD-312, ARO-317 ARD- 321, ARD-322.**

National Institute of Technology Hamirpur
Department of Architecture

FOURTH YEAR																	
Seventh Semester								**Eighth Semester**									
S. No.	**Code**	**Subject**	**L**	**T**	**P/D**	**Credits**	**Type of Course**	**To be taught by Deptt. of**	**S. No.**	**Code**	**Subject**	**L**	**T**	**P/D**	**Credits**	**Type of Course**	**To be taught by Deptt. of**
1	ARD- 411	Architectural Design-VII	2	0	10	7	Lab	Architecture	1	ARD- 421	Architectural Design-VIII	2	0	10	7	Lab	Architecture
2	ARD- 412	Advanced Construction Techniques	2	0	4	4	Lab	Architecture	2	ARD-422	Interior Design	2	0	4	4	Lab	Architecture
3	ARD- 413	Landscape Design	2	1	0	3	Theory	Architecture	3	ARD-423	Research Methodology	2	1	0	3	Theory	Architecture
4	ARD- 414	Low Cost Building	2	1	0	3	Theory	Architecture	4	ARD- 424	Urban Design	2	1	0	3	Theory	Architecture
5	ARD- 415	Energy Efficient Architecture	2	1	0	3	Theory	Architecture	5	ARD-425	Project Management	2	1	0	3	Theory	Architecture
6	ARD-416	Elective- I	2	1	0	3	Theory	Architecture	6	ARD-426	Elective- II	2	1	0	3	Theory	Architecture
7	ARD-417	Professional Training	-	-	-	2		Architecture	7	ARD-427	Dissertation	2	0	0	2	Lab	Architecture
			H=30			25						H=32			25		

Note:-

a) ARD-417 Professional Training will be evaluated as per UG Manual Clause 6.3 (B)
b) ARD-416 List of Elective-I: (i) Art and Architecture (ii) Architectural Photography & Journalism (iii) Futuristic Architecture
c) ARD-426 List of Elective-II: (i) Architectural Conservation (ii) Housing (iii) Building Maintenance
d) Site Visits/Tours may be conducted within the semester as per requirement of the subject.
e) **Laboratory Courses**:
   i. The viva voce of 30% component of continuous assessment is to be conducted by subject incharge.
   ii. The viva voce of 20% component of End term is to be conducted jointly by the subject incharge and one expert to be appointed from within the department.
   iii. The end semester examination will be conducted for 20% weightage of end semester evaluation (Laboratory courses as per UG manual) for **ARD-411, ARD-412, ARD- 421, ARD-422.**

National Institute of Technology, Hamirpur
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FIFTH YEAR																	
Ninth Semester									**Tenth Semester**								
S. No.	**Code**	**Subject**	**L**	**T**	**P/ D**	Credits	Type of Course	To be taught by Deptt. of	S. No.	**Code**	**Subject**	**L**	**T**	**P/D**	Credits	Type of Course	To be taught by Deptt. of
1	ARD- 511	Architecture Design Thesis	0	0	20	10	Major Project	Architecture	1	ARD- 521	Office Training	-	-	-	10	Lab	Industry
2	ARD-512	Professional Practice & Ethics	2	1	0	3	Theory	Architecture									
3	ARD-513	Building Bye-Laws Regulations	2	1	0	3	Theory	Architecture									
			H=26			16									10		

Note:-

a) The student will undergo Office Training with CoA Registered/Affiliated Architect.
b) Site Visits/Case studies may be conducted within the semester by individual student as per the advice of concerned guide.

ARD – 111 BASIC AND VISUAL DESIGN – I

B.Arch. 1st year (1st Semester)

Contact Hours per Week		Continuous Assessment 60%		End Term (Lab Final) : 40%		Exam Duration	Credit
L T P D	Total	Record Mark: Assignment/ Quizzes /Projects/Attendance	Viva Voce	Final Exam	Viva Voce	4 Hours	04
2 - - 4	06	30%	30%	20%	20%		

OBJECTIVE

To Train the students in visual compositions by using various elements of Design and to make them familiar with the meaning and purpose of Architectural design.

CONTENTS

UNIT I (Time- three weeks)

- Study of distinctive aspects of Architecture, inter-linkages between Architecture, Nature and Culture, unique aspects of Architectural profession, Requirements and qualities of a student of architecture.

UNIT II (Time-five weeks)

- Introduction to the Concept of design in everyday life, Objectives of design, Elements of design such as point- Line- Form- Space- Texture- Colour etc. Detailed study of color theory and its applications through geometric compositions.
- Principles of design such as Scale- Balance- Proportion- Rhythm- Harmony- Contrast- etc. Application of the same through exercises in two and three dimensional compositions; using single and multiple types of elements.

UNIT III (Time- four weeks)

- Introduction to Anthropology, Anthropometric data for adults& children: Standing position front & side- Arms extended- various seating positions-various working positions.

UNIT IV (Time- four weeks)

- Designing of Habitable space for the units; Living Room, Dining Room, Bedroom, Kitchen &Toilet with furniture layout.

NOTE:

- The time mentioned at the end of each of the above units indicates the tentative time taken to complete each.

REFERENCE:

- "Design through Discovery", M.E. Bevlin, Holt, Rinehart, and Winston, 1984.
- "Drawing and Perceiving", Douglas Cooper, John Wiley & Sons, 2007.
- "Principles of Design in Architecture", K.W. Smithies, Van Nostrand Reinhold, 1981.
- "Architectural Drawing Masterclass", Tom Porter, Charles Scribner's, 1993.
- "Time-saver Standards for Architectural Design Data: The Reference of Architectural Fundamentals", Donald Watson, McGraw-Hill, 1997.
- "Time Saver Standards for Building Types", John Hancock Callender, Joseph De Chiara, McGraw-Hill, New York, 1983.
- "Architectural Graphic Standards", Charles George Ramsey, Harold Reeve Sleeper, Bruce Bassler John Wiley & Sons, 2008.
- "Form Space & Order", 4th Ed., Francis DK Ching, John Wiley & Sons, New Jersey, 2015.

ARD – 112 BUILDING CONSTRUCTION & MATERIALS – I B.Arch. 1st year (1st Semester)

Contact Hours per Week		Continuous Assessment 60%		End Term (Lab Final) : 40%		Exam Duration	Credit
L T P D	Total	Record Mark: Assignment/ Quizzes /Projects/Attendance	Viva Voce	Final Exam	Viva Voce	4 Hours	04
2 - - 4	06	30%	30%	20%	20%		

OBJECTIVE
To familiarize the students with basic building materials and their construction details.
CONTENTS

UNIT I (Time-Four weeks)
- Basic building materials- brick, stone, lime, cement, sand: Application, properties and defects.
- Building components- wall, floor, roof and foundation; construction terminology through typical section.

UNIT II (Time-Four weeks)
- Process of rock formation. Various kinds of stones used for Building Construction, their properties, applications etc.
- Bricks – Constituents and properties of soil, Manufacturing, Types, Sizes, Properties and Uses.

UNIT III (Time-Eight weeks)
- Brick Masonry, Various types of bonding in walls such as Stretcher bond-English bond-Single & Double Flemish bond etc. These bonds are to be explained with respect to varying wall thickness such as ½ brick-1 brick- 1½ brick etc. and various types of junctions such as L junction- T junction- Cross junction etc.
- Stone masonry of various types such as Rubble walling, Polygonal walling, Flint walling, Ashlars walling, Masonry joints, Maintenance etc.

NOTE:
- Site Visits to ongoing related construction projects.

REFERENCE BOOKS

- "Building Construction", Sushil Kumar, Standard Publishers Distributors, New Delhi, 2006.
- "Building Construction Metric" Vol. 1-2, W.B.Mckay, Orient Longman Private Limited, Mumbai, 2006.
- "Building Construction Illustrated", Francis D.K. Ching, John Wiley & Sons, 2007, 2011.
- "Construction Technology", Vol. 1,Roy Chudley, Roger Greeno,Prentice Hall (UK), 2005.
- "Appropriate building Materials", Roland Stulz, Kiran Mukerji, SKAT, 1993.
- "A Textbook of Building Construction", S.P. Arora and S.P.Bindra, 4thEdition, Dhanpat Rai, Delhi, 1996.

ARD – 113 HISTORY OF ARCHITECTURE – I

B.Arch. 1st year (1st Semester)

Contact Hours per Week		Continuous Assessment Examination: 40%			End Semester Exam	Exam Duration	Credit
L T P D	Total	Mid Term	Class Test	Assignment/Quizzes /Projects/Attendance etc:		3 hours	03
2 1 - -	3	20%	10%	10%	60%		

OBJECTIVE

To understand evolution and development of architectural and urban built environment in context to geophysical, social and technological factors.

CONTENTS

UNIT I (Time-three weeks)

- Introduction to Indus Valley civilization. Study of architectural characteristics.
- Introduction to the Vedic village. Study of its building typology and construction.

UNIT II (Time-three weeks)

- Introduction to Buddhist settlement in India.
- Detailed studies of Architectural characteristics of various building types such as Stupas, Chaityas and Viharas through suitable examples from each geographical context to Illustrate differences in Form, Construction methods and Ornamentation.

UNIT III (Time-five weeks)

- Study of evolution of Hindu architecture, Rock-cut and structural forms and comparison of Temple forms in various regions of India.
- Study of various styles of temples such as Dravidian, Indo-Aryan Orissan, Jain with respect to functional components, architectural Form, construction and ornamentation.

UNIT IV (Time-five weeks)

- Delhi or Imperial Style :Slave, Khilji, Tughlaq, Sayyed, Lodhi
- Provincial Style Bengal , Jaunpur, Deccan, Malwa, Bijapur
- Moghul Architecture in North India under : Humayun, Jehangir, Akbar, Shahjehan

NOTE:

- Analysis of architectural style/building typology must include functional, constructional and Architectural, ornamental aspects.

REFERENCE BOOKS

- "Architecture in India", Marilia Albanese, Sandeep Prakashan, 2001.
- "Hindu India", Henri Stierlin, Taschen, 1998.
- "Ancient Indian Architecture", Sanjeev Maheshwari and Rajeev Garg, CBS Publishers & Distributors, 2001.
- "The Hindu Temple", R. Champakalakshmi and Usha Kris, Roli Books, 2000.
- "The Architecture of India: Buddhist and Hindu, Volume 2", Satish Grover, Vikas, 1980.
- "Islamic Architecture in India", Satish Grover, Galgotia Publishing Company, 1996.

ARD – 114 ARCHITECTURAL DRAWING & GRAPHICS – I B.Arch. 1st year (1st Semester)

Contact Hours per Week		Continuous Assessment 60%		End Term (Lab Final) : 40%		Exam Duration	Credit
L T P D	Total	Record Mark: Assignment/ Quizzes /Projects/Attendance	Viva Voce	Final Exam	Viva Voce	4 Hours	04
2 - - 4	06	30%	30%	20%	20%		

OBJECTIVE

To familiarize the student with basic knowledge of drafting, lettering techniques and visualization of geometric forms.

CONTENTS

UNIT I (Time-three week) : Introduction

- Significance and Scope, Usage of Drawing Instruments, Dimensions, Scales, Free hand Lettering, Line types such as Elevation lines- Construction lines – Section lines – Hidden lines – Centre lines
- Introduction to pencils with different grades such as F, H, HB, 2B, 4B and 6B. Representation of the different lines created by the different pencils by varying thick-Ness and pressure. Representation of various textures with thick, thin and flat pencils Strokes. Illustrative examples to be followed explaining the various techniques.

UNIT II (Time-nine weeks): Projections

- Introduction to Orthographic projections, First angle projection
- Projection of line parallel to both reference planes / parallel to one and inclined to other reference plane / inclined to both the reference planes followed by illustrative examples in each case
- Projection of plane parallel to VP / parallel to HP / perpendicular to VP and inclined to HP / perpendicular to HP and inclined to VP / inclined to both HP and VP followed by illustrative examples in each case.
- Introduction to solids bounded by plane surfaces such as prisms / pyramids and solids of revolution such as cylinders / cones, Projection of solids having axis perpendicular to one of the reference planes / axis parallel to either of the reference plane and incline to other reference plane / axis inclined to both the reference planes followed by illustrative examples in each case.

UNIT III Sciography:- (Time-four weeks)

- Introduction and Importance, Method of drawing, Sciography of points, lines, planes and solids followed by illustrative example in each case.

REFERENCE BOOKS

- "A Textbook of Engineering Drawing", Prof. P.J. Shah, S. Chand Publishing, 2008.
- "Engineering Drawing with an Introduction to AutoCAD", Dhananjay A. Jolhe, Tata McGraw Hill, 2007.
- "Architectural Graphics", Francis D. K. Ching, Wiley; 5th Edition, 2009.
- "Architectural Shades and Shadows", Henry McGoodwin, Nabu Press, 2010.
- "Rendering with Pen and Ink", Robert W. Gill, Thames & Hudson Ltd., 1984.
- "Architectural Drawing", Tom Porter, Hamlyn, 1990.

ARS – 115 ARCHITECTURE MATHEMATICS

B.Arch. 1st year (1st Semester)

Contact Hours per Week		Continuous Assessment Examination: 40%			End Semester Exam	Exam Duration	Credit
L T P D	Total	Mid Term	Class Test	Assignment/Quizzes /Projects/Attendance etc:		3 hours	03
2 1 - -	4	20%	10%	10%	60%		

CONTENTS

1. MATRICES

Matrices, Related matrices, Complex matrices (Hermitian and skew-Hermitian matrices, Unitary matrix), Solution of linear system of equations, Rank of a matrix, Gauss-Jordan method, Normal form of a matrix, Vectors, Linear dependence, Consistency of a linear system of equations, Rouche's theorem, System of linear homogeneous equations, Linear and orthogonal transformations, Characteristic equation, Eigen values, Eigen vectors, Properties of eigen values, Cayley-Hamilton theorem.

2. DIFFERENTIAL CALCULUS

Indeterminate forms, Partial Differentiation and its geometrical interpretation, Homogeneous functions, Euler's theorem and its extension, Total differentials, Composite function, Jacobian, Errors and increments, Maxima and minima of functions of two variables, Method of undetermined multipliers, Curvature, radius of curvature, Centre & Circle of curvature.

3. CURVE TRACING

Asymptotes**,** Curves in Cartesian and Polar form, Standard curves- Cartesian & Polar curves, Parametric curves, standard Parametric curves.

4. THREE DIMENSIONAL GEOMETRY

Review: Line, plane, sphere, vectors.

Tangent plane to sphere, cone, cylinder, Quadric surfaces-(Ellipsoids, Hyperboloid of one and two sheets, cone, elliptic paraboloid, hyperbolic paraboloid, cylinder) , surface of revolution, some standard surfaces of revolution.

5. SPHERICAL TRIGONOMETRY

Sections of spheres, great circles, spherical triangle and its properties, relations in angles and sides of spherical triangle, spherical right triangle.

6. INTEGRAL CALCULUS

Quadrature, Rectification, Surface and Volume of revolution for simple curves, Double integrals and their applications, Change of order of integration, Change of variables, Triple integrals and their applications, Change of variables. Numerical Integration-(Simpson's and Trapezoidal rule)

7. VECTOR CALCULUS

Differentiation of vectors, Curves in space, Velocity and acceleration, Relative velocity and acceleration, Scalar and vector point functions, Vector operator del, gradient, divergence and curl with their physical interpretations, Formulae involving gradient, divergence and curl. Line, surface and volume integrals, Theorems of Green, Stokes and Gauss (without proofs) and their verifications and applications,

Text BOOKS

1. Advanced Engineering Mathematics: by Erwin Kreyszig, John Wiley and Sons, NC, New York.
2. Advanced Engineering Mathematics: by R. K. Jain & S. R. K Iyengar, Narosa Pub. House.
3. Spherical Trigonometry: Kishana Publications, Meerut.

REFERENCE BOOKS

1. Advanced Engineering Mathematics: by C. R. Wylie & L. C. Barrett, McGraw Hill
2. Differential & Integral Calculus: by N. Piskunov, MIR Publications.

ARH – 116 COMMUNICATION SKILLS

B.Arch. 1st year (1st Semester)

Contact Hours per Week		Continuous Assessment Examination: 40%			End Semester Exam	Exam Duration	Credit
L T P D	Total	Mid Term	Class Test	Assignment/Quizzes /Projects/Attendance etc:		3 hours	03
2 1 2 -	5	20%	10%	10%	60%		

CONTENTS

Unit 1- The Process of communication
Introduction, What is ”Communication” Barriers to Communication, Different Types of Communication Writer vs Oral Communication. Different Types of Face to Face Interaction, Characteristics and Conventions of Conversation, Conversational Problems of Second, Foreign Language Users, Difference Between Conversation and Other Speech Events.

Unit 2- Telephone Techniques
Speaking and Listening Commonly Used Phrases in Telephone Conversation, Reading: Conference Calls, Vocabulary, Writing and Listening, Leaving a Message, Grammar and Usage: The Perfect Tenses, Pronunciation: Contracted Forms.

Unit 3- Job Applications and Interviews
Reading, Vocabulary, Apply for a job, Curriculum Vitae, Language Focus, Some Useful Words, Study Skills: Preparing for an Interview, Listening, Speaking, Writing.

Unit 4- Group Discussions
Reading. Writing Skills, Listening: How to be Successful in a Group Discussion, Study Skills, Language Focus, Vocabulary, Speaking, Grammar, Connectives, and Pronunciation

Unit 5: Managing Organizational Structure
Warm up, values to Influence and lead, Reading: The Role of a Manager, Vocabulary, Leadership, Speaking and listing language focus Degree of Probability Grammar: Modals, Writing, Reports. Pronunciation.

Unit 6: Meetings
Reading, Successful Meeting, Speaking, One to One Meetings, Language Focus: Opening, Middle and Close, Study Skills, Editing. Listening Criteria for Successful Meetings, Vocabulary, Grammar: Reporting Verbs. Writing: Memos, Pronunciation: Stress According to part of Speech.

Unit 7: Taking Notes and Preparing Minutes
Taking Notes. The note-taking Skill: the Essential Components, The Note-taking Skill: An Example Preparing Minutes. Format of Minutes. Language and Style of Minutes, Grammar: Using the Passive Voice.

Unit 8: Presentation Skills-I
Reading Presentation Skills. Grammar: Verbs often required in Presentations. Language Focus, Listening: Importance of body Language in Presentation. Speaking: Preparing an Outline of a Presentation, Pronunciation.

Unit 9: Presentation Skills-II
Reading Structure of Presentation. Study Skills: Visual Aids, Ending the Presentation, Language Focus: taking about Increase and Decrease. Grammar: Prepositions. Listening: Podium Panic, Speaking, Pronunciation: Emphasizing the important Words in Context.

Unit 10: Negotiation Skills
Language Focus Idiomatic Expressions. Study Skills: Process of Negotiations. Grammar: Phrasal Verbs. Listening: Effective Negotiation, Speaking Writing

REFERENCE BOOKS

1. Effective technical Communication by M. Ashraf Rizvi Pub: Tata McGrrow Hill (2009)
2. Developing Communication Skills by Krishna Mohan Pub: Mac Millan India Limited (2009)
3. An approach to Communication Skills by Indrajit Bhattacharya Pub: Dhanpat Rai Co.Pvt.Lt New Delhi(2007)
4. Handbook of practical Comm. Skills by Wright, Chrissie, Pub: Jaico Publishing house. Mumbai (2007)
5. the skill of Communicating by Bill Scott. Jaico Publishing House, Mumbai (2009).

ARD – 121 ARCHITECTURAL DESIGN – II

B.Arch. 1st year (2nd Semester)

Contact Hours per Week		Continuous Assessment 60%		End Term (Lab Final) : 40%		Exam Duration	Credit
L T P D	Total	Record Mark: Assignment/ Quizzes /Projects/Attendance	Viva Voce	Final Exam	Viva Voce	4 Hours	05
2 - - 6	08	30%	30%	20%	20%		

OBJECTIVE

To train the students in understanding the interdependence of form, function and structure in the process of Architectural design.

CONTENTS

UNIT I (Time-sixteen weeks)

- Design of a Single storied load bearing structure such as Check Post, Post-Office, Crèche, Dispensary etc. The student should be guided to achieve necessary relationship between indoor and outdoor spaces and to understand the role of elements of structure in a built form.

- Summer Vacation Assignment: To study the local architecture of their respective native places and detail study of any important building/ architectural monument of study area.

NOTE

Two design problems and one time problem of 01 week is to be completed in the semester. The concerned faculty is required to frame a detailed program for each of the above design problems and time problem with reference to the above contents.

REFERENCE BOOKS

- "Building drawing with an integrated approach to Built Environment", M. G. Shah, C. M. Kale, S. Y. Patki, Tata McGraw-Hill Education, 2002.
- "Site Design Graphics", Micheal S. Kendall, Van Nostrand Reinhold, 1989.
- "Architectural Graphics", 6th Ed., Francis D. K. Ching, John Wiley & Sons, 2015.
- "Time-saver Standards for Architectural Design Data: The Reference of Architectural Fundamentals", Donald Watson, McGraw-Hill, 1997.
- "Time Saver Standards for Building Types", John Hancock Callender, Joseph De Chiara, McGraw-Hill, New York, 1983.
- "Architectural Graphic Standards", Charles George Ramsey, Harold Reeve Sleeper, John Wiley & Sons, 13-Jan-2011.

ARD – 122 BUILDING CONSTRUCTION & MATERIALS – II B.Arch. 1st year (2nd Semester)

Contact Hours per Week		Continuous Assessment 60%		End Term (Lab Final) : 40%		Exam Duration	Credit
L T P D	Total	Record Mark: Assignment/ Quizzes /Projects/Attendance	Viva Voce	Final Exam	Viva Voce	4 Hours	04
2 - - 4	06	30%	30%	20%	20%		

OBJECTIVE

To familiarize the students with use of timber in building construction.

CONTENTS

UNIT I (Time- three weeks)

- Timber: Variety of Indian timbers, characteristics and suitability for different uses, defects and decay, seasoning and preservation; manufactured timber products and their applications.

UNIT II (Time-five weeks)

- Introduction to joinery in timber.
- Detailed drawings and construction details of Battened-Ledged-Braced doors, Battened-Braced-Framed doors, Flush doors etc.
- Introduction to various types of windows in Timber. Detailed drawings and construction details of Casement windows and Bay windows in Timber.
- Workshop practice for carpentry joints used in “2” and “3”.

UNIT III (Time- three weeks)

- Introduction to the nature and characteristics of wood floors at ground and first floor level, its advantages & Limitations.

UNIT IV (Time- five weeks)

- Introduction to the nature and characteristics of wood construction-roofs, its advantages and Limitations.
- Detailed drawings and construction details of flat roof batten & tile and various types of sloping roofs in timber such as Lean to roofs, King Post truss and Queen Post truss using AC/CGI, Mangalore tiles & slates roof coverings.

NOTE

- **Site Visits** to ongoing related construction projects.

REFERENCE BOOKS

- “The Construction of Buildings”, Vol. 1-2, R Barry, Wiley, 2001.
- “Building Construction Metric” Vol. 3, W.B.Mckay, Orient Longman Private Limited, Mumbai, 2006.
- “Building Construction Illustrated”, Francis D.K. Ching, John Wiley & Sons, 2011.
- “Construction Technology” Vol. 1-4,Roy Chudley, Roger Greeno,Prentice Hall (UK), 2005.
- “Workshop Practice” 2nd Ed., H.S.Bawa, Tata McGraw-Hill Education, 2009.
- “Carpentry and Joinery”, George Mitchell, Cengage Learning EMEA, 1995.
- “Arco's complete woodworking handbook”, Jeannette T. Adams, Arco Pub., 1981.

ARD – 123 HISTORY OF ARCHITECTURE – II

B.Arch. 1st year (2nd Semester)

Contact Hours per Week		Continuous Assessment Examination: 40%			End Semester Exam	Exam Duration	Credit
L T P D	Total	Mid Term	Class Test	Assignment/Quizzes /Projects/Attendance etc:		3 hours	03
2 1 - -	3	20%	10%	10%	60%		

OBJECTIVE

To understand evolution and development of architectural and urban built environment in context to geophysical, social and technological factors.

CONTENTS

UNIT-I (Time five weeks)

- Introduction to examples of early shelter, Stone Age as an expression of man's physical and spiritual needs.
- Introduction to Egyptian civilization. Study of local context and architectural characteristics of public buildings such as mastabas, pyramids and temples to be explained with examples.

UNIT-II (Time five weeks)

- Introduction to Mesopotamian civilization. Study of urban context and architecture of Public buildings such as Ziggurat of Ur city and Palace of Khorsabad.
- Introduction to Greek civilization. Architectural characteristics of typical civic spaces such as Agora, Acropolis, theatres.
- Systems of proportioning, Greek orders, optical corrections etc. through illustrative examples such as Parthenon etc.

UNIT-III (Time six weeks)

- Study of Roman town with respect to location, Architectural characteristics of typical civic spaces such as Forum, theatres etc.
- Detailed studies of monuments/temples of Roman period with reference to materials, construction systems, Roman orders through illustrative examples.

NOTE

- In each period given below, the architectural characteristics and minimum one example may be highlighted.
- The time mentioned at the end of each of the above units indicates the tentative time taken to complete each. The marks for sessional work may be divided accordingly.
- Analysis of architectural style/building typology must include functional, constructional/structural and ornamental aspects.

REFERENCE BOOKS

- "The World of Architecture", Paul Holberton, Chancellor Press, 1997.
- "A History of Architecture", Sir Banister Fletcher, CBS Publisher, 1999.
- "A History of Architecture", Spiro Kostof, Oxford University Press, 1995.
- "Encyclopedia of World Architecture", James Ferguson.
- "A Global History of Architecture", Mark M. Jarzombek, Vikramaditya Prakash and Francis D. K. Ching, John Wiley & Sons; 2nd Edition, 2011.

ARD – 124 ARCHITECTURAL DRAWING & GRAPHICS – II

B.Arch. 1st year (2nd Semester)

Contact Hours per Week		Continuous Assessment 60%		End Term (Lab Final) : 40%		Exam Duration	Credit
L T P D	Total	Record Mark: Assignment/ Quizzes /Projects/Attendance	Viva Voce	Final Exam	Viva Voce	4 Hours	04
2 - - 4	06	30%	30%	20%	20%		

OBJECTIVE To enable the students to have a better visualization/understanding of a three dimensional entity through Drawings: Sections- Metric views-Sciography and Sketching: Indoor-Outdoor

CONTENTS

UNIT I (Time-three weeks): Sections of Solids

- Introduction and Importance of Sections, Method of drawing Sections in which Section plane parallel to VP and perpendicular to HP / parallel to HP and perpendicular to VP / perpendicular to VP and inclined to HP / perpendicular to HP and inclined to VP / inclined to both HP and VP followed by illustrative examples in each case, True shape of section / Virtual sections / Auxiliary inclined view followed by illustrative examples.

UNIT II (Time-three weeks): Intersection of Solids

- Introduction to Lines of intersection / Curves of intersection, Method of drawing intersection of prisms /pyramids / cylinders followed by illustrative examples, making presentation drawings of these intersecting solids through Sciography.

UNIT III (Time-three weeks): Development of Surfaces

- Introduction and Importance of Surface development, Method of drawing surface development for Tetrahedron / Cube / Octahedron / Dodecahedron / Icosahedrons / Truncated Tetrahedron / Truncated Cube followed by model making of each of these examples.

UNIT IV (Time-two weeks): Metric Projections

- Introduction and Importance of Metric projections, Method of drawing Isometric projection / Axonometric projection / Elevation oblique projections followed by illustrative examples, Uses of these Metric Projections

UNIT V (Time- five weeks): Sketching

- Introduction to Object drawing / Indoor sketching and its importance, Method of sketching simple objects / composition of objects freehand in proportion using pencils of different grades / water colors showing light / shade / shadow followed by situational exercises.
- Introduction to outdoor sketching through basic exercises like sketching of trees and shrubs, sketching of simple buildings with special emphasis on background and foreground and sketching of human figures using pencil of different grades/ water colors showing light / shade / shadow followed by situational exercises.

REFERENCE BOOKS

- "A Textbook of Engineering Drawing", Prof. P.J. Shah, S. Chand Publishing, 2008.
- "Engineering Drawing", Dhananjay A. Jolhe,Tata McGraw Hill, 2007.
- "Architectural Shades and Shadows", Henry McGoodwin, Nabu Press, 2010.
- "Rendering with Pen and Ink", Robert W. Gill, Thames & Hudson Ltd., 1984.
- "Architectural Drawing", Tom Porter, Hamlyn, 1990.
- "Sketching the Concept", Harold Linton and Scott Sutton, Design Press, 1993.
- "Drawing the Landscape", Chip Sullivan, John Wiley & Sons; 4th Edition, 2014.

ARD – 125 MECHANICS OF STRUCTURES

B.Arch. 1st year (2nd Semester)

Contact Hours per Week		Continuous Assessment Examination: 40%			End Semester Exam	Exam Duration	Credit
L T P D	Total	Mid Term	Class Test	Assignment/Quizzes /Projects/Attendance etc.:		3 hours	03
2 1 - -	3	20%	10%	10%	60%		

OBJECTIVE

To understand the basic principles of Structural Mechanics, so that it forms the basis for study of Structural Design

CONTENTS

UNIT I (Time- five weeks)

- Study of Force-definition, cause, effect and units. Understanding Force through vector
- Study of Coplanar, Concurrent, Non-concurrent forces, Triangle of forces, Parallelogram of forces and Conditions of Equilibrium – analytical methods.
- Study of Moments, Moment of forces, Moment of couples and Static equilibrium of rigid bodies.

UNIT II (Time-six weeks)

- Introduction to types of loads and supports.
- Study of Structural system design such as Fundamental characteristics, Strength, Stability, Ability, Rigidity, Economy and Aesthetics.
- Determination of Center of gravity, Moment of Inertia of square, rectangle, and I shaped cross-sections.

UNIT III (Time- five weeks)

- Stress, strain, Hooke's Law, stress-strain curve, stressed streams in simple and composite sections, temperature stresses, Poisson's ratio, state of simple shear, shear strain.
- Basic concepts of Bending moment and shear force , bending moment and shear force diagram for simple beams and frames for various types of loadings and support conditions

NOTE:

The time mentioned at the end of each of the above units indicates the tentative time taken to complete each. The marks for sessional work may be divided accordingly.

REFERENCE BOOKS

- "Basic Structural Analysis (SI Units)", C.S. Reddy, Tata McGraw-Hill, 1981.
- "Analysis of Structures", V.N.Vazirani, M.M.Ratwani and S.K.Duggal, Khanna Publishers, 2003.
- "A Textbook of Engineering Mechanics", R.S.Khurmi, S. Chand Publishing, 2011.
- "Mechanics of Structure", S.B. Junnarkar, Charotar Publishing House Pvt. Ltd., 2011.

ARW – 126 WORKSHOP PRACTICE B.Arch. 1st year (2nd Semester)

Contact Hours per Week		Continuous Assessment 60%		End Term (Lab Final) : 40%	Exam Duration	Credit
L T P D	Total	Record Mark: Assignment/ Quizzes /Projects/Attendance	Viva Voce	Viva Voce	-	02
1 - - 3	04	30%	30%			

OBJECTIVE

To introduce the students to basic fabrication processes

UNIT I (Eight Weeks)

- Welding-definition, industrial importance, application; welding vs. other fabrication processes. Classification of welding and allied processes. Hazards associated with gas and arc welding processes, protection against electric shock, flame/arc radiation, fumes and dust, compressed gasses, fire and explosions. Welding Joints & Symbols. Practice job on Arc welding preparation of various joints, practice job on Gas welding. Practice job on Soldering & brazing. Practice job on advance welding.

UNIT II (Eight Weeks)

- Introduction to various fasteners, industrial importance and application. Definition of nut & bolt and their types. Introduction and classification of tools and machines used in steel fabrication. Tapping & Dieing operations. Safety precautions. Operation practice like; filing, sawing, marking, drilling, tapping, dieing with conventional and power operated tools.
- Dress Code; khaki with close shoes.

REFERENCE BOOKS

- "Elements of Workshop Technology, Vol. I", Hajra Choudhury, Hazra Choudhary and Nirjhar Roy, Media promoters and Publishers Pvt. Ltd., 2007.
- "Workshop Technology", W. A. J. Chapman,1st South Asian Edition, Viva Book Pvt Ltd., 1998.
- "Manufacturing Technology, Vol.1, 3rd Ed.", P.N. Rao,Tata McGraw Hill Publishing Company, 2009.

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ARD – 211 ARCHITECTURAL DESIGN – lll B.Arch. 2nd year (3rd Semester)

Contact Hours per Week		Continuous Assessment 60%		End Term (Lab Final) : 40%		Exam Duration	Credit
L T P D	Total	Record Mark: Assignment/ Quizzes /Projects/Attendance	Viva Voce	Final Exam	Viva Voce	6 Hours	06
2 - - 8	10	30%	30%	20%	20%		

OBJECTIVE

To train the students to understand the various issues which arise while designing a double storied RCC building.

CONTENTS

UNIT l (Time-one week)

- Summer Vacations Assignment report evaluation

UNIT ll (Time-Seven weeks)

- Design of a double storied structure such as Residence/Duplex House, Primary School etc.

UNIT lll (Time-Eight weeks)

- Design of a Primary Health center, Cyber Café, Restaurant, etc.

NOTE:

Two design problems and one time problem of 01 week is to be completed in this semester. The concerned faculty is required to frame a detailed program for each of the above design problems and time problem in context to the above contents.

REFERENCE BOOKS

- "Building drawing with an integrated approach to Built Environment", M. G. Shah, C. M. Kale, S. Y. Patki, Tata McGraw-Hill Education, 2002.
- "Site Design Graphics", Micheal S. Kendall, Van Nostrand Reinhold, 1989.
- "Architectural Graphics", 6th Ed., Francis D. K. Ching, John Wiley & Sons, 2015.
- "Time-saver Standards for Architectural Design Data: The Reference of Architectural Fundamentals", Donald Watson, McGraw-Hill, 1997.
- "Time Saver Standards for Building Types", John Hancock Callender, Joseph De Chiara, McGraw-Hill, New York, 1983.
- "Architectural Graphic Standards", Charles George Ramsey, Harold Reeve Sleeper, Bruce Bassler John Wiley & Sons, 2008.

ARD – 212 BUILDING CONSTRUCTION & MATERIALS – III B.Arch. 2nd year (3rd Semester)

Contact Hours per Week		Continuous Assessment 60%		End Term (Lab Final) : 40%		Exam Duration	Credit
L T P D	Total	Record Mark: Assignment/ Quizzes /Projects/Attendance	Viva Voce	Final Exam	Viva Voce	4 Hours	04
2 - - 4	06	30%	30%	20%	20%		

OBJECTIVE

To introduce construction details of various elements of single storied building of load-bearing masonry and foundations.

CONTENTS

UNIT I (Time-four weeks)

- Introduction to Mortars and plasters such as Cement and Lime, types of pointing.
- Detailed study of infill wall of bricks and various cement concrete products.

UNIT II (Time- three weeks)

- Introduction to paints and varnishes. Detailed studies such as manufacturing, types and application of the same. Introduction to popular brand names.

UNIT III (Time-five weeks)

- Foundation- Types- stepped, isolated and combined footing Construction of foundations in brick and stone masonry for load-bearing and toe walls.
- Introduction to Lintels- Arches- Window sills and their methods of construction.
- Introduction to various types of staircases with respect to material and shapes. Detailed Drawings and construction details to be made for Dog-leg staircase in timber.

UNIT III (Time-five weeks)

- Introduction to Damp-Proof course, detailing of Horizontal and Vertical DPC.
- Introduction to different types of floors; Construction of Plain Cement Concrete and Terrazzo floors.
- Introduction to various types of floor finishes such as P.V.C. sheets, Tiles, Carpets, Veneers etc. Detailed drawings of their fixing details.

NOTE:

- **Site Visits** to ongoing related construction projects.

REFERENCE BOOKS

- "The Construction of Buildings", Vol. 1-2-4, R Barry, Wiley, 2001.
- "Building Construction Metric" Vol. 3, W.B.Mckay, Orient Longman Private Limited, Mumbai, 2006.
- "Building Construction Illustrated", Francis D.K. Ching, John Wiley & Sons, 2011.
- "Construction Technology" Vol. 1-2-3,Roy Chudley, Roger Greeno,Prentice Hall (UK), 2005.
- "Architectural Graphic Standards", Charles George Ramsey, Harold Reeve Sleeper, Bruce Bassler John Wiley & Sons, 2008.
- "Building Construction", 10th Ed., B.C. Punmia, Ashok Kr. Jain, Arun Kr. Jain, Laxmi Publications Pvt Limited, 2008.

ARD – 213 HISTORY OF ARCHITECTURE– III B.Arch. 2nd year (3rd Semester)

Contact Hours per Week		Continuous Assessment Examination: 40%			End Semester Exam	Exam Duration	Credit
L T P D	Total	Mid Term	Class Test	Assignment/Quizzes /Projects/Attendance etc:		3 hours	03
2 1 - -	3	20%	10%	10%	60%		

OBJECTIVE

- To understand the role of geo-physical, societal, political and technological factors in the evolution of Architectural and to develop a holistic approach to Architecture as an integral component of the built environment.

CONTENTS

UNIT I (Time- four weeks)

- Study of Early Christian Architecture- evaluation of church architecture.
- Study of development of Church plans during the early Christian period with respect to architectural character.
- Study of Byzantine churches with respect to architectural forms, structural systems, techniques of construction etc- Hagia Sophia.
- Study of evolution of Romanesque architecture with respect to changes in church plans, Elevation features, techniques of construction and structural systems-Pisa cathedral complex.
- Study of architectural characteristics of Romanesque churches in Italy, France and Germany.

UNIT II (Time- four weeks)

- Detailed studies of Gothic Cathedral of Medieval European towns with reference to Architectural characteristics and their comparison to Romanesque period- Notre Dame.
- Comparison of Architectural characteristics of Gothic churches in France and England.

UNIT III (Time-four weeks)

- Introduction to the basis of Renaissance Movement and its effect on the built environment.
- Study of the works of Architects of Early Renaissance and High Renaissance.
- Study of Cathedral- St. Peter and St. Paul.

UNIT IV (Time-four weeks)

- Introduction to the basis of Baroque or Rococo Movement and its effect on the built environment.
- Detailed studies of Baroque Architecture such as its Development, Characteristics of Baroque Architecture-Piazza of St. Peter.
- Study of works Architects of Baroque period such as Bernini and Borromini.

NOTE

Analysis of architectural style/building typology must include functional, constructional /structural and ornamental aspects.

REFERENCE BOOKS

- "The World of Architecture", Paul Holberton, Chancellor Press, 1997.
- "Baroque India", Jose Pereira, Aryan Books International, New Delhi, 1990.
- "Renaissance Architecture", Jose Pereira,
- "A History of Architecture", Sir Banister Fletcher, CBS Publisher, 1999.
- "A History of Architecture", Spiro Kostof, Oxford University Press, 1995.
- "Encyclopedia of World Architecture", James Ferguson.

ARD – 214 ARCHITECTURAL DRAWING & GRAPHICS – III

B.Arch. 2nd year (3rd Semester)

Contact Hours per Week		Continuous Assessment 60%		End Term (Lab Final) : 40%		Exam Duration	Credit
L T P D	Total	Record Mark: Assignment/ Quizzes /Projects/Attendance	Viva Voce	Final Exam	Viva Voce	4 Hours	04
2 - - 4	06	30%	30%	20%	20%		

OBJECTIVE

To enable the students to have a better visualization/understanding of a three dimensional entity through Perspective Drawings

CONTENTS

UNIT I (Time-two weeks): Introduction to Perspective drawings

- Introduction, Concept, Terminologies: Cone of Vision – Centre line of Vision – Horizon line – Distortion - Station Point – Visual rays - Picture plane – Ground line – Height line – Vanishing Points , Types of Perspective projection: One Point Perspective – Two Point Perspective – Three Point Perspective – Box Method – Centre line Method

UNIT II (Time-two weeks): Setting up One Point Perspective Projection

- Detailed Method: Obtain the required dimensions through orthographic projection - Location of Station Point and Centre line of Vision – Checking Station Point with Cone of Vision – Location of Picture Plane – Location of Vanishing Point – Location of Horizon line – Location of Ground line – Location of True Elevation on the Picture Plane – Location of Perspective lines through points on the True Elevation – Location of Visual rays to locate the various faces of the object in perspective view , Illustrative practice examples.

UNIT III (Time-four weeks): Setting up Two Point Perspective Projection

- Detailed Method: Obtain the required dimensions through orthographic projection - Location of Station Point and Centre line of Vision – Alignment of Centre line of Vision - Checking Station Point with Cone of Vision - Location of Picture Plane - Location of Vanishing Points – Location of Height line – Location of Horizon line and transferring Vanishing points on them –Location of Ground line – Location of height of object on Height line and top and bottom lines of sides in perspective view – Location of Visual rays to locate end points of side of the object in perspective view – Using Visual rays and Perspective lines for plotting the perspective view of the object, Illustrative practice examples

UNIT IV (Time-four weeks): Setting up Three Point Perspective Projection

- Detailed Method: Obtain the required dimensions through orthographic projection- Location of Station Point and Centre line of Vision – Preparing elevation at right angles to Centre line of vision (plan position) – Location Profile view of the plan position – Modify the plan position w.r.t Profile view – Location of Picture plane in both Plan & Profile view – Location of Vanishing points in both Plan & Profile view – Locating the Horizon line & Ground line – Extending the Ground plane to meet the Ground line – Extending the plan of Centre line of Vision – Locate V.P.1, V.P.2 & V.P.3 in perspective view – Locate line at 450 from intersection of Ground line & Ground plane for transferring points from the profile view to intersect the points from plan projections through Visual rays – Using Visual rays, Vertical & Horizontal projections and Perspective lines complete the perspective view of the object, Illustrative practice examples.

UNIT V (Time-four weeks): Shadow projection in Perspective drawing

- Introduction, Location of Sun w.r.t. the spectator, Terminologies: Vanishing Point Plan – Vanishing Point Actual – Plan of light rays – Method of obtaining true inclination of light ray with ground plane
- Detailed method of constructing shadows in Two point Perspective projection: Location of Sight line - Plan location of Vanishing points – Locating Sight lines for obtaining true angle of inclination of the light ray – Locating vanishing point for the actual light rays – Locating shadow of the object through intersection of light rays joining the vanishing point for the plans of light rays to light rays joining the vanishing point for actual light rays, Illustrative practice examples.

REFERENCE BOOKS

- "Rendering with Pen and Ink", Robert W. Gill, Thames & Hudson Ltd., 1984.
- "Creative Perspective", Robert W. Gill, Thames & Hudson Ltd., 1975.

ARD – 215 ANALYSIS OF STRUCTURES

B.Arch. 2nd year (3rd Semester)

Contact Hours per Week		Continuous Assessment Examination: 40%			End Semester Exam	Exam Duration	Credit
L T P D	Total	Mid Term	Class Test	Assignment/Quizzes /Projects/Attendance etc:		3 hours	03
2 1 - -	3	20%	10%	10%	60%		

OBJECTIVE

To understand the principles of Structural Analysis, so that it forms the basis for Structural design.

CONTENTS

UNIT I (Time-four weeks)

- Bending Stress in Beams, Theory of simple bending, section modulus, design criterion, bending stresses in symmetrical and unsymmetrical sections, strength of sections.
- Shear Stress In Beams and Torsion, Shear stress in beams and torsion in symmetrical and unsymmetrical sections,

UNIT II (Time-four weeks)

- Fixed And Continuous Beams, Review of shear force and Bending Moment diagram for simply supported beam, Effect of continuity, its advantages and disadvantages.
- Analysis of Continuous beams for two to four spans, conceptual idea about full and partial loading and fixed end moment using moment distribution method and Theorem of three moments.

UNIT III (Time-six weeks)

- Trusses, Definition of Truss, Perfect Truss, Imperfect truss, Types of Trusses and Suitability, Analysis of simple Trusses by Analytical method.
- Arches, Types and behavior of arches with history. Introduction to three hinged arches.
- Frames, Indeterminacy of frames with different end conditions, Analysis of frame by portal & cantilever method.

UNIT III (Time-two weeks)

- Introduction of basic structural systems in architecture- Tensile structures, Compressive structures, Trusses, Shear structures, Bending structures

NOTE

The time mentioned at the end of each of the above unit indicates the tentative time taken to complete each. The marks for sessional works may be divided accordingly.

REFERENCE BOOKS

- "Strength of Materials", B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, 2011.
- "Theory of Structures SMTS - II: SI Units", B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, 2011.
- "Elements of Strength of Materials", Stephen P. Timoshenko and Donovan H. Young, East West, 2003.
- "Strength of Materials", Ramamrutham S., Dhanpat Rai Publications, 2011.
- Relevant Design Codes and Design Aids

ARD – 216 CLIMATE AND BUILT ENVIRONMENT

B.Arch. 2nd year (3rd Semester)

Contact Hours per Week		Continuous Assessment Examination: 40%			End Semester Exam	Exam Duration	Credit
L T P D	Total	Mid Term	Class Test	Assignment/Quizzes /Projects/Attendance etc:		3 hours	03
2 1 - -	3	20%	10%	10%	60%		

OBJECTIVES

- To acquaint students with the concept of climate as a significant determinant of built form.
- Familiarization with climate controlling devices.

CONTENTS

UNIT I (Time-four weeks)

- **Climatology:** Role of climate with respect to shelter and importance of Building climatology, Tropics, climatic zones, macro and micro-climate, Elements of climate and climatology data needed for planning of buildings, change of seasons, distribution of global pressure belts & wind movements..
- **Human Comfort:** Human heat balance and thermal comfort, Thermal stress index, effective temperature and bio climatic analysis, Interrelationship of climatic elements and psychometric chart

UNIT II (Time-six weeks)

- **Air Temperature:** Factors that influence air-temperature – latitude, altitude, seasons, water, trees, areas etc.; thermal conductivity and heat exchange between building and environment, thermal properties of material.
- **Solar Radiation:** Calculation of solar radiation on building surfaces, solar charts; Design and application of shading devices, sun machines and their uses; Opaque building elements and heat transfer through this elements, solar gain factor and sol-air temperature.
- **Wind:** study of diurnal and seasonal variations, heating and cooling, effect of topography: effect of wind on location of industrial areas, airports and other land-uses and road patterns, Air movement in and around buildings, wind eddies, size and position, effect of wind on design and siting of buildings.
- **Precipitation:** Water-vapor. Relative-humidity, condensation, rain, fog, snow and architectural responses.

UNIT III (Time-three weeks)

- **Day-light:** glare, amount of light, sky as a source of light and day-light factor, effect of size and shape of openings in different planes with and without obstructions.
- **Orientation and Application of Climatic Principles:** Siting of buildings with respect of sun, wind and view; Climatic design of indigenous shelters in response to different climatic zones in India; Use of landscape elements, evaporative cooling, ground cooling, cavity walls, topography; Ventilation of roof spaces and controlled ventilation.

UNIT IV (Time-three weeks)

- Example of climate-responsive building-projects from India and abroad.
- Introduction to climatic design analysis and building simulation software.

REFERENCE BOOKS

- "Manual of Tropical Housing and Building: Climate Design", O.H. Koenigsberger et.al., Madras: Orient Longman, 1984.
- "Environmental Design", Randall Thomas, Taylor & Francis; 3rd edition, 2006.
- "Microclimatic Landscape Design", Robert D. Brown and Terry J. Gillespie, John Wiley & Sons, 1995.
- "Energy-efficient Buildings in India", Mili Majumdar, TERI Press,
- "Sustainable Building-Design Manual- Volume I&II", TERI Press,
- "Thermal control in passive solar buildings", S.C. Kaushik, G.N. Tiwari and J.K. Nayak, IBT Publishers & Distributors, 1988.

ARD – 217 GEOMATICS AND MEASURE DRAWING B.Arch. 2nd year (3rd Semester)

Contact Hours per Week		Continuous Assessment Examination: 40%			End Semester Exam	Exam Duration	Credit
L T P D	Total	Mid Term	Class Test	Assignment/Quizzes /Projects/Attendance etc:		3 hours	03
2 - - 2	4	20%	10%	10%	60%		

OBJECTIVE
To bring about awareness of role of Geomatics in architectural and planning projects.

CONTENT

UNIT I (Time-three weeks)
- Importance of Geomatics, Data Collection techniques- Field surveying.
- Definition of surveying, Basic principles, Types of maps, their scales, and uses, Surveying equipment namely Levels, Compass, Theodolitee, Total Station and Laser based equipments.

UNIT II (Time-four weeks)
- Measurements of distance, Angles, Directions and Heights: Principles and components of Theodolites, Magnetic Compass, IOP Levels, Auto Levels, Total Station.
- Contouring: Technical terms used in contouring, Characteristics of contours, Methods of contouring, Tracing the contour, Gradient for alignment of a roads and paths, Uses of contours.

UNIT III (Time-three weeks)
- Plane table surveying: Plane table and its accessories, Setting and orienting the plane table, Methods of plane tabling, Advantages and disadvantages of Plane table survey.

UNIT IV (Time-six weeks)
- Measure drawing of any vernacular settlement.

NOTE
- Minimum one practical from each unit to be conducted.

REFERENCE BOOKS

- "Surveying- Vol.1", Dr. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi; Sixteenth edition, 2005.
- "Textbook of Surveying", C. Venkatramaiah, Orient Blackswan; Second edition, 2011.
- "A Textbook of Advanced Surveying", R. Agor, Khanna Publishsers, 2002.
- "Surveying and Levelling", S. C. Rangwala and P. S. Rangwala, Charotar Book Stall, 6th edition, 2011.
- "Advanced Surveying", P. B. Shahani, 2nd edition; Oxford & IBH Publishers Co., 1992.

ARD – 221 ARCHITECTURAL DESIGN – IV B.Arch. 2nd year (4th Semester)

Contact Hours per Week		Continuous Assessment 60%		End Term (Lab Final) : 40%		Exam Duration	Credit
L T P D	Total	Record Mark: Assignment/ Quizzes /Projects/Attendance	Viva Voce	Final Exam	Viva Voce	6 Hours	06
2 - - 8	10	30%	30%	20%	20%		

OBJECTIVE
To learn various aspects of design on hill terrains.

CONTENTS
UNIT I (Time-seven weeks)

- Design of a frame structure: Guest house, Hostel/ Old age home etc. with due emphasis to contextual issues such as climate, topography, local architectural character etc.

UNIT II (Time-eight weeks)

- Design of Tourist resort, Small Hotel/ Motel etc. Emphasis should be given on climatically and environmentally responsive architecture. Site may be chosen in different climatic conditions of India.

UNIT III (One week)

- Introduction to Measured Drawings

NOTE

- Two design problems and one time problem of 01 week is to be completed in this semester. The concerned faculty is required to frame a detailed program for each of the above design problems and time problem introduced with reference to the above contents.
- Measured Drawing tour to be conducted in summer Vacations

REFERENCE BOOKS

- "Building drawing with an integrated approach to Built Environment", M. G. Shah, C. M. Kale, S. Y. Patki, Tata McGraw-Hill Education, 2002.
- "Planning and Design of Library buildings", Godfrey Thompson, Butterworth Architecture, 1995.
- "Shopping centers", Nadine Beddington, Butterworth Architecture, 1991
- "School Buildings: Planning-Design-Management", A.K.Jain, Management Publishing Company, 1998.
- "Buildings for the Performing Arts: Design and Development guide", Ian Appleton, Routledge, 2012.
- "Time-saver Standards for Architectural Design Data: The Reference of Architectural Fundamentals", Donald Watson, McGraw-Hill, 1997.
- "Time Saver Standards for Building Types", John Hancock Callender, Joseph De Chiara, McGraw-Hill, New York, 1983.

ARD – 222 BUILDING CONSTRUCTION & MATERIALS – IV B.Arch. 2nd year (4th Semester)

Contact Hours per Week		Continuous Assessment 60%		End Term (Lab Final) : 40%		Exam Duration	Credit
L T P D	Total	Record Mark: Assignment/ Quizzes /Projects/Attendance	Viva Voce	Final Exam	Viva Voce	4 Hours	04
2 - - 4	06	30%	30%	20%	20%		

OBJECTIVES

To familiarize the students with methods of detailing different parts of building in RCC.

CONTENTS

UNIT I (Time-three weeks)

- Concrete- Composition, properties and uses; Water cement ratio; Grade of concrete; PCC, RCC, light weight concrete and autoclaved aerated concrete etc.

UNIT II (Time-nine weeks)

- Introduction to RCC framed structure.
- Type of RCC Foundations in framed structure – stepped, isolated, combined and cantilevered footing, RCC footing and raft, pile foundation; Selection foundation type; Safe bearing capacity of soils and methods of improvements; Depth and width of foundations; Causes and failure and remedies .
- Different type of RCC roofs such as Flat (one way, two way & continuous), conical & circular slabs.
- Introduction to various types of RCC staircases. Detailed Drawings and construction details to be made for any RCC Stairs.
- Introduction to formwork. Excavation and timbering of trenches with special references to loose soil and sub- soil water. Detailed studies of various types of formwork for concrete, Scaffolding and temporary supports and Shoring & Underpinning.

UNIT III (Time- four weeks)

- Introduction to Cladding materials of Interior and Exterior walls in various materials such as Brick tiles, Stones, Vitreous tiles, Paneling etc. Detailed drawings of their fixing details.
- Introduction to various materials like P.V.C. Fiber based product, etc. Detailed studies such as properties and application of the same in building industry.

NOTE:

- **Site Visits** to ongoing related construction projects.

REFERENCE BOOKS

- "Construction Technology" Vol. 1,Roy Chudley, Roger Greeno,Prentice Hall (UK), 2005.
- "The Construction of Buildings", Vol. 2, R Barry, Wiley, 2001.
- "Handbook of Architectural details for Commercial buildings", Joseph De Chiara, McGraw-Hill, 1979.
- "Time Saver Standards for Building Materials and systems", Donald Watson, McGraw-Hill, 2000.
- "Time Saver Standards for Interior Design and Space Planning", Joseph DeChiara, Julius Panero, Martin Zelnik, McGraw Hill Professional, 2001.
- "Building Design and Construction Handbook", Merrit, Ricketts, McGraw-Hill Prof Med/Tech, 2000.

ARD – 223 THEORY OF DESIGN – I B.Arch. 2nd year (4th Semester)

Contact Hours per Week		Continuous Assessment Examination: 40%			End Semester Exam	Exam Duration	Credit
L T P D	Total	Mid Term	Class Test	Assignment/Quizzes /Projects/Attendance etc.:		3 hours	03
2 1 - -	3	20%	10%	10%	60%		

OBJECTIVE
To understand the impact of industrial revolution and modern architectural works on architectural practice.

CONTENTS

UNIT I (Time- four weeks)
- Introduction to the beginning of modern architecture through Neoclassicism in the 18th century.
- Introduction to Industrial revolution and its impact on new towns.
- Study of Eclecticism and the architectural predicament in the 19th century.
- Introduction to Colonial architecture in India: New Delhi, Calcutta & Madras.
- Role of Louis Sullivan and Peter Behrene.

UNIT II (Time-four weeks)
- Emergence of different Architectural movement after industrial revolution such as Art Nouveau-reaction against Eclecticism, morphed form, Plastic treatment of plans and Chicago School-evolution of the high rise office buildings.

UNIT III (Time- four weeks)
- Study of the works of Master Architects to understand the trends in post modern Architecture.
- Study of Walter Gropius and Bauhaus, Frank Llyod Wright and Organic Architecture, Le Corbusier-The Domino System and point of new architecture, Mies Van der Rohe –Minimalism, long span and Tall buildingsin steel and Glass.

UNIT IV (Time- four weeks)
- Role of Adolf Loos-Internationalism, G.T.Reitveld-De Stijl Architecture andAlvarAalto-Scandinavian Regionalism.

NOTE
Analysis of architectural style/building typology must include functional, constructional Architectural/ Structural and ornamental aspects.

REFERENCE BOOKS

- "The World of Architecture", Paul Holberton, Chancellor Press, 1997.
- "A History of Architecture", Sir Banister Fletcher, CBS Publisher, 1999.
- "Documenting Chandigarh", Kiran Joshi, Mapin Publishing, 1999.
- "Modern Architecture: A Critical History", Kenneth Frampton, Thames & Hudson; 4thEdition, 2007.
- "The Details of Modern Architecture (Volume 1)", Edward R. Ford, The MIT Press, 2003.
- "Architecture of the 19th Century", Claude Mignot, Taschen GmbH, 1994.
- "Twentieth Century Architecture: A Visual History", Dennis Sharp, Images Publishing, 2006.
- "Architecture and Independence: The Search for Identity--India 1880 to 1980",Jon Lang, Madhavi Desai and Miki Desai, Oxford University Press, 1998.
- "After the Masters (Contemporary Indian Architecture)", Vikram Bhatt and Peter Scriver, Grantha Corporation, 1990.
- "Architecture in the Twentieth Century", Peter Gössel and Gabriele Leuthäuser, Taschen, 2001.
- "History of Architecture: From Classic to Contemporary", Barbara Borngasser, Parragon Inc; Reprint edition, 2010.

ARD – 224 BUILDING SERVICES – I

B. Arch. 2nd year (4th Semester)

Contact Hours per Week		Continuous Assessment Examination: 40%			End Semester Exam	Exam Duration	Credit
L T P D	Total	Mid Term	Class Test	Assignment/Quizzes /Projects/Attendance etc.:		3 hours	03
2 1 - -	3	20%	10%	10%	60%		

OBJECTIVE

To familiarize the students with fundamentals of water supply and drainage in building services & their integration with architectural design.

CONTENTS

UNIT I (Time-six weeks): Water Supply

- Detailed studies such as Sources and Treatment of water
- Water demand & calculations, Storage & conveyance of water at municipal level
- Water supply systems and various fittings,
- Hot and Cold water supply layouts
- Water supply design of a residence: Connection with water mains, design of Underground & Overhead water tanks, pump capacity, calculations for diameter of pipe
- Introduction to water supply in a multistoried building.

UNIT II (Time-six weeks): Wastewater

- Definition of Refuse, garbage, rubbish, sullage, sub soil water, storm water, night soil, sewage-sanitary, domestic & industrial, sewer, sewerage & waste water
- Various drainage & sanitary fixtures & fittings, traps - role of water seal, sizes, materials and their space requirements, Water efficient and waterless fixtures
- Types of pipes and drains in different materials and their usage, diameter of pipes, slope standards
- Inspection and Intercepting chambers, manholes etc.
- Sewage and Effluent treatment- Innovative and cost effective sanitation concepts e.g. EcoSAN
- Sewage systems for a small project, Wastewater recycling methods e.g. DEWATS etc.
- Introduction to STP's & ETP's, Design calculations of septic tank & soak pit
- Storm water design calculations for roof top & for surface drains, Rainwater Harvesting & Groundwater Recharge
- Exercise: Design a layout for a residence for water supply, drainage, sewage and storm water
- Zero discharge concepts

UNIT III (Time-four week): Solid Waste management:

- Waste production in India and Global,
- Waste management techniques

NOTE

The time mentioned at the end of each of the above units indicates the tentative time taken to complete each. The marks for sessional work may be divided accordingly.

REFERENCE BOOKS

- "Water Supply Engineering", Dr. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, 2003.
- "Design & Practical Handbook on Plumbing", Cr Mohan and Vivekanand, Standard Publishers Distributors, 2014.
- "Wastewater Engineering", Dr. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, 1998.
- "Environmental Education and Solid Waste Management", A. Nag and K. Vizayakumar, New Age International, 2005.
- "Water and Wastewater Calculations Manual", Shun Dar Lin and C. C. Lee, McGraw-Hill Professional; 2nd edition, 2007.
- "Advances in Water Supply Management: Proceedings of the CCWI '03 Conference, London, 15-17 September 2003",Cedo Maksimovic, David Butler and Fayaz Ali Memon, 2003.