PROGRAMCURRICULUM

of

BachelorofArchitecture

ACADEMICSESSION2019-20

DEPARTMENTOFARCHITECTURE

VEERSURENDRASAIUNIVERSITYOF TECHNOLOGY,BURLA,

SAMBALPUR,ODISHA.

VISION

The Department envisions to achieve excellence in learning, research and innovation in the field of Architecture, and create an enabling environment of confidence and capability to take up academic and professional challenges by encompassing progressive technological know-how while being sensitive to the environmental and cultural ethics.

MISSION

1. To provide educational programs that promote knowledge building, skill development and scholarly enquiry to meet the professional challenges, international educational standards and needs of our diverse community.

2. To undertake applied research for creating cutting edge knowledge in areas related to human habitat and environment and develop centres of studies in allied fields.

3. To progress as a collaborative of profession and education and promote capacity building by undertaking advanced programs in emerging areas of architecture and planning, and establishing an integrated project consultancy cell.

4. To foster environmental values throughout the education program and provide resource and knowledge for promoting indigenous and innovative sustainable development principles and practices.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

1. To follow educational program, that has broad scope, and provides exposure to various areas of interests in the field of Architecture and Planning and enable students to discover their own directions for further development.
2. To recognise Architecture as an intellectual discipline, both in academics and profession, which would make a vital contribution in the shaping of our environment and society, in the sphere of design and technology for a diverse range of situations, in rural and urban contexts, and in complexities of different social, cultural, geographical, economic and technical nuances which are unique and typical of every region in the world.
3. To stimulate sensitivity, unveil creative talents and enhance innovative pursuit of the students.
4. To reinforce intellectual capabilities and develop proficiency in professional skills for enabling graduates to competently pursue alternative careers within the broad spectrum of architecture.
5. To infuse competency and generate interest in the students towards research and higher studies.

PEO-MISSION MATRIX

	M1	M2	M3	M4
PEO1	3	3	1	2
PEO2	2	3	3	3
PEO3	2	1	3	3
PEO4	3	2	2	1
PEO5	3	3	3	2

PROGRAMME OUTCOMES (POs)

PO1	Ability to acquire and apply knowledge of fundamentals of building engineering, building sciences, architectural principles and graphic techniques.
PO2	Ability to understand and create artistic manifestations
PO3	Attain competency in computer aided designing skills
PO4	Ability to conduct experiments and surveys using different technologies and methods, and observe and analyse on-site and offsite factors
PO5	Ability to comprehend physical, social and other environmental characteristics of places for planning and designing
PO6	Understand ecological and other inter-disciplinary domains for following sustainable development practices
PO7	Capability to create spaces and products for optimum performance
PO8	Ability to take up professional challenges as individuals and team leaders
PO9	Ability to develop entrepreneurship skills and motivation to emerge as entrepreneurs
PO10	Ability to understand social and professional ethics and learn to be committed to responsibilities
PO11	Understand the essence of continuous learning process and develop capacity to acquire higher learning
PO12	Capability and pursuit for innovation in Architecture and related discipline

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO 1	Ability to take up professional challenges in various capacities.
PSO 2	Develop knowledge and skill to acquire higher learning
PSO 3	Ability to develop entrepreneurship skills and motivation to emerge as entrepreneurs.

PROGRAMME OBJECTIVE

- To follow educational program, that has broad scope, and provides exposure to variousareasofinterestsinthefieldofArchitectureandPlanningandenablestudents todiscovertheirowndirectionsforfurtherdevelopment.
- To recognise Architecture as an intellectual discipline, both in academics and profession,whichwouldmakeavitalcontributionintheshapingofourenvironment andsociety,inthesphereofdesignandtechnologyforadiverserangeofsituations, in rural and urban contexts, and in complexities of different social, cultural, geographical, economic and technical nuances which are unique and typical of everyregionintheworld.
- Tostimulatesensitivity,unveilcreativetalentsandenhanceinnovativepursuitofthe students.
- Toreinforceintellectualcapabilitiesanddevelopproficiencyinprofessionalskillsfor enabling graduates to competently pursue alternative careers within the broad spectrum ofarchitecture.
- To infuse competency and generate interest in the students towards research and higherstudies.

PROCESSFORDESIGNINGTHESYLLABUS

- The proposed syllabus structure was framed after several iterative processes was undertaken toplan
  - Vertical progression andhorizontal
  - Integration ofsubjects,
  - Pedagogicalapproach(distributionofskill,knowledgeandvalue)
  - Credit basedsystem
  - Relationofcredittocontacthours
  - AdherencetoCouncilofArchitecture(COA)norms
- Several national and state architectural curriculums were referred to frame the syllabus.Internationalcourseswerereferredforpreparingthedetailcontentsofsome courses.

NORM OF THE SYLLABUS

- Keeping in view the COA Norms, and reference syllabus of School of Planning and Architecture,BhopalandVijayawada,IITKharagpur,BPUT,existingsyllabusofVSSUT, the**Credit/ContactHour**calculationshavebeenrevisedasfollows:
  - Lecture Hours –1:1
  - StudioHours–1:1
  - Tutorialhours-1:1
  - Workshop/LabHours-1:2

- Aftertherevisionasabove,theentire5yearsB.ArchProgrammewillbecoveredinten SemesterswithonesemesterProfessionalTraining
  - Total Credit =**273**
  - TotalContactHours=**267**excludingonesemesterofProfessionalTraining.

SALIENT FEATURES

- Greaterhorizontalandverticalsynergybetweentheoryandpractice–
  - todeveloptheknowledgeandskillsofthestudentsinaprogressivemannerby a careful integration of the courses both vertically within the semester and horizontallyacrossthesuccessiveacademicyear.
- Thetheorycoursesareorganizedsystematicallysoastoserveasastronginputof conceptualknowledge,understandingandforthesubsequentstudioandlabcourses.
  - Knowledgebasedtheorysubjectswhicharenamedaswidthanddepththeory subjects(basedontheirconnectionwiththestudiosubjects)
  - Studio subjects to develop attitude and help integrate knowledge and skills earned in pastsemesters.
- Thearchitecturaldesignsubjectsformthecentral-verticaloftheentirecurriculum along with another vertical comprising of building material, construction and techniques.
  - In design studios/construction studios/projects the students learn the processing,analysisandsolvingofproblemsofdirectprofessionalpractice.
- IneachSemesterthesyllabusoftheDesignStudiosisframedtofocusonspecificareas andiscarefullysequencedkeepinginviewthecoretheoreticallearningandtechnical skillsacquiredpriortohandlingtherespectivedesignexercises.
- Thestudiosequenceproceedsfromabroadunderstandingofdesignasintentional activitytoprogressivelycomplexexercisesinvolvingbiggerspatialscales.
- Severalnewersubjectshasbeenintroduced,keepinginmindchangingneedsofthe profession.Mostofthenewersubjectshavebeendesignedaselectives
- toaccordthestudentswithgreaterflexibilityandfreedomtospecializeintheirareas ofinterest.
- Updatingofthecoursecontentoftheexistingsubjects,soastoprovidethestudents with the up-to-dateknowledge.
- Thereisscopeforintroducingcreativeandalternativeteachingpedagogymethods, asModule-5isleftasaflexibleslotinthecontentofthesyllabusinfewsubjects.
- Along with basic theoretical understanding it is felt that practical and case studies exercisesisneededtobeincludedtobettercomprehendthetechnicalconcepts.
  - Presentation of case studies and assignments will be included in the theory subjectssothatstudentsgetopportunitiesinpublicspeakingandbecome morearticulateindirectpresentationoftheirideas.

- Syllabus of History of Architecture is framed according to time line which will be covered in foursemesters.
    - Architectureprinciples,stylesandsettlementpatternofdifferentgeographical regionsspanningaparticularperiodwillbetaughtineachsemester.
    - Differentstylesofdifferentregionsbelongingtothesameperiodcanbestudied incorrelation
    - Regional and periodic significance and relevance can be better understood andinterpreted.
- TheCurriculumhasincludedProfessionalTrainingintheNinthSemester.
    - Thiswillenablethestudentstogathermostoftheknowledgeandskillrequired, priortoundergoinginternshipinanarchitectureconsultingorganisation.
    - OncompletionofPre-thesisdissertationintheEightSemester,thethesistopicis tentatively finalised before the training. The student gets an opportunity to exploreonthethesistopicanddocasestudiesduringthetrainingperiod.

GUIDELINES

- Forallsessionalsubjects,progressivesubmissionsateachstagewillbeevaluatedto completeinternalevaluationof60%ofthetotalmarks.Evaluationofrest40%ofthe totalmarkswillbedonethroughexternalvivavoceandpresentations.
- ArchitecturalDesignStudiotohaveonemajorproblemasperthethematicoutline, levelofcomplexityandscaleofproject,onesmallscalepacesetterproblemandone timeproblem.
- Architectural Field Study to be made mandatory as part of Architectural Design curriculum in eachsemester.
    - ArchitecturalDesignStudioineachsemesterthroughouttheBArchProgramme willhaveoneweekofstudyvisitforfieldworkandcasestudy.
- As per the guidelines of COA, the Architectural Design will be evaluated through periodicassessmentandfinalevaluationtobedonebyajurycomprisingofexternal memberoutsidethedepartmentandinternalfaculty.
- ConstructionsitevisitstobedoneaspartofthecurriculumfortheBuildingConstruction course.Sitevisitsshouldbeinlinewiththeconcernedstudiowork.

DEPARTMENT OFARCHITECTURE
VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA

PROPOSEDSYLLABUSSTRUCTUREFORBACHELORDEGREEOFARCHITECTURE(B.ARCH)COURSETOBE EFFECTIVEFROMJULY/AUGUST2019

FIRST SEMESTER								
SL. NO.	**COURSE CODE**	**SUBJECTS**	**CONTACT HOURS (L-T-P)**	**CREDIT**	**SEMESTER EVALUATION (WE, IA, VV, TP)**			
THEORY SUBJECTS								
1.	BAR01001	Introduction to Architecture	3-0-0	3	WE			
2.	BAR01002	Building Material -I	2-1-0	3	WE			
3.	BMA01001	Applied Mathematics	3-0-0	3	WE			
4.	BAR01004	Ecology and Environment	3-0-0	3	WE			
SESSIONAL SUBJECTS								
1.	BAR01005	Basic Design -I	0-0-6	6		IA	VV	TP
2.	BAR01006	Architectural Graphics- I	0-0-4	2		IA		TP
3.	BAR01007	Building Construction -I	0-0-4	4		IA	VV	TP
4.	BAR01008	Architectural Workshop	0-0-4	2		IA	VV	
TOTAL			11-1-18 = 30	26				

SECOND SEMESTER								
SL. NO.	**COURSE CODE**	**SUBJECTS**	**CONTACT HOURS (L-T-P)**	**CREDIT**	**SEMESTER EVALUATION (WE, IA, VV, TP)**			
THEORY SUBJECTS								
1.	BAR02001	History of Architecture -I	3-0-0	3	WE			
2.	BAR02002	Advanced Building Materials and finishes	2-1-0	3	WE			
3.	BAR02003	Structural Mechanics	3-0-0	3	WE			
4.	BAR02004	Communication Skill	3-0-0	3	WE			
SESSIONAL SUBJECTS								
1.	BAR02005	Basic Design -II	0-0-6	6		IA	VV	TP
2.	BAR02006	Architectural Graphics - II	0-0-4	2		IA		TP
3.	BAR02007	Building Construction -II	0-0-4	4		IA	VV	TP
4.	BAR02008	Visual Art & Documentation	0-0-4	2		IA	VV	TP
TOTAL			**11-1-18 = 30**	**26**				

WE-WrittenExam IA-InternalAssessment VV-VivaVoce TP-TimeProblem

THIRD SEMESTER								
SL. NO.	**COURSE CODE**	**SUBJECTS**	**CONTACT HOURS (L-T-P)**	**CREDIT**	**SEMESTER EVALUATION (WE, IA, VV, TP)**			
THEORY SUBJECTS								
1.	BAR03001	History of Architecture -II	3-0-0	3	WE			
2.	BAR03002	Climatology	2-1-0	3	WE			
3.	BAR03003	Structural Analysis	3-0-0	3	WE			
4.	BAR03004	Water Supply and Sanitation	3-0-0	3	WE			
SESSIONAL SUBJECTS								
1.	BAR03005	Architectural Design - I	0-0-9	9		IA	VV	TP
2.	BAR03006	Surveying and Leveling	1-0-2	2		IA		TP
3.	BAR03007	Building Construction -III	0-0-4	4		IA	VV	TP
4.	BAR03008	Computer Applications - I	1-0-2	2		IA	VV	TP
TOTAL			**13-1-17 = 31**	**29**				

FOURTH SEMESTER								
SL. NO.	**COURSE CODE**	**SUBJECTS**	**CONTACT HOURS (L-T-P)**	**CREDIT**	**SEMESTER EVALUATION (WE, IA, VV, TP)**			
THEORY SUBJECTS								
1.	BAR04001	History of Architecture -III	3-0-0	3	WE			
2.	BAR04002	Design of RCC Structures	3-0-0	3	WE			
3.	BAR04003	Lighting and Electrical Services	2-1-0	3	WE			
4.		Professional Elective (PE) -I	3-0-0	3	WE			
SESSIONAL SUBJECTS								
1.	BAR04004	Architectural Design - II	0-0-9	9		IA	VV	TP
2.	BAR04005	Building Construction -IV	0-0-4	4		IA	VV	TP
3.	BAR04006	Computer Applications - II	1-0-2	2		IA	VV	TP
TOTAL			**12-1-15 = 28**	**27**				

WE-WrittenExam **IA-InternalAssessment** **VV-VivaVoce** **TP-TimeProblem**

FIFTH SEMESTER								
SL. NO.	**COURSE CODE**	**SUBJECTS**	**CONTACT HOURS (L-T-P)**	**CREDIT**	**SEMESTER EVALUATION (WE, IA, VV, TP)**			
THEORY SUBJECTS								
1.	BAR05001	History of Architecture -IV	3-0-0	3	WE			
2.	BAR05002	Landscape Architecture	2-1-0	3	WE			
3.	BAR05003	Design of Steel Structures	3-0-0	3	WE			
4.	BAR05004	Acoustics	2-1-0	3	WE			
5.	BAR05005	Environment and Behavior	3-0-0	3	WE			
SESSIONAL SUBJECTS								
1.	BAR05006	Architectural Design - III	0-0-9	9		IA	VV	TP
2.	BAR05007	Landscape Design Studio	0-0-2	1		IA	VV	
3.	BAR05008	Working Drawing and Detailing- I	0-0-4	4		IA	VV	
TOTAL			**13-2-15 = 30**	**29**				

SIXTH SEMESTER								
SL. NO.	**COURSE CODE**	**SUBJECTS**	**CONTACT HOURS (L-T-P)**	**CREDIT**	**SEMESTER EVALUATION (WE, IA, VV, TP)**			
THEORY SUBJECTS								
1.	BAR06001	Theory of Design	3-0-0	3	WE			
2.	BAR06002	Human Settlement Planning and Housing	3-0-0	3	WE			
3.	BAR06003	Estimation Valuation and Specification	3-0-0	3	WE			
4.	BAR06004	HVAC Systems	2-1-0	3	WE			
SESSIONAL SUBJECTS								
1.	BAR06005	Architectural Design - IV	0-0-9	9		IA	VV	TP
2.	BAR06006	Interior Design	1-0-4	3		IA	VV	TP
3.	BAR06007	Working Drawing and Detailing - II	0-0-4	4		IA	VV	
TOTAL			**11-1-17 = 29**	**28**				

WE-WrittenExam IA-InternalAssessment VV-VivaVoce TP-TimeProblem

SEVENTH SEMESTER								
SL. NO.	**COURSE CODE**	**SUBJECTS**	**CONTACT HOURS (L-T-P)**	**CREDIT**	**SEMESTER EVALUATION (WE, IA, VV, TP)**			
THEORY SUBJECTS								
1.	BAR07001	Introduction to Urban Design	3-0-0	3	WE			
2.	BAR07002	Advanced Building Systems and Services	2-1-0	3	WE			
3.		Professional Elective -II	3-0-0	3	WE			
4.		Open Elective -I	3-0-0	3				
SESSIONAL SUBJECTS								
1	BAR07003	Architectural Design - V	0-0-9	9		IA	VV	TP
2	BAR07004	Research Methods and Seminar	1-0-4	3		IA	VV	TP
3	BAR07005	Non-Conventional Building Technologies	0-0-4	4		IA	VV	TP
TOTAL			**12-1-17=30**	**28**				

EIGHT SEMESTER								
SL. NO.	**COURSE CODE**	**SUBJECTS**	**CONTACT HOURS (L-T-P)**	**CREDIT**	**SEMESTER EVALUATION (WE, IA, VV, TP)**			
THEORY SUBJECTS								
1.	BAR08001	Disaster Resilient Architecture	3-0-0	3	WE			
2.	BAR08002	Professional Practice	3-0-0	3	WE			
3.		Professional Elective -III	3-0-0	3	WE			
4.		Open Elective -II	3-0-0	3				
SESSIONAL SUBJECTS								
1.	BAR08003	Architectural Design - V	0-0-9	9		IA	VV	TP
2.	BAR08004	Pre-Thesis Dissertation	1-0-4	3		IA	VV	
3.	BAR08005	Advanced Building Technology	0-0-4	4		IA	VV	TP
TOTAL			**13-0-17 = 30**	**28**				

WE-WrittenExam IA-InternalAssessment VV-VivaVoce TP-TimeProblem

NINTH SEMESTER								
SL. NO.	**COURSE CODE**	**SUBJECTS**	**CONTACT HOURS (L-T-P)**	**CREDIT**	**SEMESTER EVALUATION (WE, IA, VV, TP)**			
SESSIONAL SUBJECTS								
1.	BAR09001	Professional Training	3-0-0	23			VV	
2.	BAR09002	Field Observation Studies	3-0-0	3			VV	
TOTAL				**26**				

TENTH SEMESTER								
SL. NO.	**COURSE CODE**	**SUBJECTS**	**CONTACT HOURS (L-T-P)**	**CREDIT**	**SEMESTER EVALUATION (WE, IA, VV, TP)**			
THEORY SUBJECTS								
1.	BAR10001	Building Economics and Project Management	3-0-0	3	WE			
SESSIONAL SUBJECTS								
1.	BAR10002	Architectural Design Thesis	0-0-18	18		IA	VV	
2.	BAR10003	Research in Thesis	1-1-6	5		IA	VV	
TOTAL			**4-1-24 = 29**	**26**				

WE-WrittenExam IA-InternalAssessment VV-VivaVoce TP-TimeProblem

PROFESSIONAL ELECTIVE -I					
SL.NO.	COURSE CODE	SUBJECTS	CONTACT HOURS (L-T-P)	CREDIT	SEMESTER EVALUATION
1.	BARPE401	Vernacular Architecture	3-0-0	3	WE
2.	BARPE402	Barrier Free Design	3-0-0	3	WE
3.	BARPE403	Graphic and Product Design	3-0-0	3	WE
PROFESSIONAL ELECTIVE -II					
1.	BARPE701	Green building and Infrastructure	3-0-0	3	WE
2.	BARPE702	Architecture and Urbanism in South Asia	3-0-0	3	WE
3.	BARPE703	Set Design for Events	3-0-0	3	WE
4.	BARPE704	Architectural Journalism	3-0-0	3	WE
PROFESSIONAL ELECTIVE - III					
SL.NO.	COURSE CODE	SUBJECTS	CONTACT HOURS (L-T-P)	CREDIT	SEMESTER EVALUATION
1.	BARPE801	ArchitecturalConservation	3-0-0	3	WE
2.	BARPE802	Transportation Planning	3-0-0	3	WE
3.	BARPE803	Environmental Impact Assessment	3-0-0	3	WE

OPEN ELECTIVE - I					
SL.NO.	COURSE CODE	SUBJECTS	CONTACT HOURS (L-T-P)	CREDIT	SEMESTER EVALUATION
1.	BAROE701	Furniture Design	3-0-0	3	WE
2.	BAROE702	Art Appreciation	3-0-0	3	WE
3.	BAROE703	Industrial Architecture	3-0-0	3	
OPEN ELECTIVE - II					
SL.NO.	**COURSE CODE**	SUBJECTS	CONTACT HOURS (L-T-P)	CREDIT	SEMESTER EVALUATION
1.	BAROE801	Application of GIS in Urban Planning	3-0-0	3	WE
2.	BAROE802	Real Estate Management	3-0-0	3	WE
3.	BAROE803	Building Repair and Restoration	3-0-0	3	WE

WE-WrittenExam IA-InternalAssessment VV-VivaVoce TP-TimeProblem

FIRST SEMESTER
BARCH PROGRAMME

FIRST SEMESTER								
SL. NO.	**COURSE CODE**	**SUBJECTS**	**CONTACT HOURS (L-T-P)**	**CREDIT**	**SEMESTER EVALUATION (WE, IA, VV, TP)**			
THEORY SUBJECTS								
1.	BAR01001	Introduction to Architecture	3-0-0	3	WE			
2.	BAR01002	Building Material -I	2-1-0	3	WE			
3.	BAR01003	Applied Mathematics	3-0-0	3	WE			
4.	BAR01004	Ecology and Environment	3-0-0	3	WE			
SESSIONAL SUBJECTS								
1.	BAR01005	Basic Design -I	0-0-6	6		IA	VV	TP
2.	BAR01006	Architectural Graphics- I	0-0-4	2		IA		TP
3.	BAR01007	Building Construction -I	0-0-4	4		IA	VV	TP
4.	BAR01008	Architectural Workshop	0-0-4	2		IA	VV	
TOTAL			**11-1-18 = 30**	**26**				

DETAIL SYLLABUS
FIRST SEMESTER BARCH PROGRAMME

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
1ST	BAR01001	**Introduction to Architecture**	03	03	0	0

Objective

This course is introduced in the beginning of the B.Archprogramme to impart an overall orientationtowardsArchitecturalcourse.Toacquaintthestudentswithfundamentalknowledge ofspaceandspatialorganisation,basicaestheticprinciplesinvolvedinarchitecturaldesign,and approachtoconceptualiseanddeveloparchitecturaldesign.

The course can be taught through interactive discussions, audio-visual presentations and creative assignments.

Module 1

ARCHITECTURE, SPACE AND MASS

Introducing Architecture as a profession and role of an Architect, Definitionofarchitecture-elementsofarchitecture-Conceptofspace,Articulationofformand space(Primaryforms,propertiesofform,transformationofforms-dimensionaltransformation, subtractive, additive forms, organization of additive forms), Organisation of spaces, sense of enclosure,openingsinspacedefiningelements.

Module 2

AESTHETICCOMPONENTSOFDESIGN

ExplorationofthebasicprinciplesofdesignsuchasProportion,scale,balance,rhythm,contrast, harmonyaxis,symmetry,hierarchy,datum;Goldenproportion,Theoriesofscaleandproportion, Vitruvian theory, Modular man, Relationship between Art and Design with man, space and environment.

To be explained with building examples both historical as well as contemporary.

Module 3

SPATIALORGANISATIONANDCIRCULATION

Different types of spatial organizations of masses linear, centralised, radial, clustered, grid organization illustrations of buildings both historical & contemporary.

Building approach, building entrance, Configuration of path, Path space relationship.

Module 4

DESIGNPROCESS

Integration of aesthetics, function and form - Understanding of formative ideas, organization concepts, spatial characteristics.

Massing and circulation in design analysis of the following buildings: Falling water house & Guggenheim museum by F. L. Wright -Villa Savoye& Chapel of Notredame Du Haut by Le Corbusier.

Module 5

Case studies of historical and contemporary site and buildings (Study of spatial organisation, form, element andart).

References

1. *FrancisD.K.Ching,Architecture-Form,SpaceandOrder,VanNostrandReinhold Company,1979*
2. *RogerH.Clark,MichaelPause,PrecedentsInArchitecture,VanNostrandReinhold Company ,1996*
3. *K.W.Smithies,PrinciplesofDesigninArchitecture,VanNostrandReinholdCompany,19814.4. SamF.Miller,DesignProcess-APrimerForArchitectural&InteriorDesign,VanNostrand Reinhold Company ,1995*
5. *ErnestBurden,ElementsofArchitecturalDesign–AVisualResource,VanNostrand Reinhold Company ,1994*
6. *V.S.Pramar,DesignFundamentalsinArchitecture,SomaiyaPublications,NewDelhi,1973.*
7. *Vitruvius,Translation:Morris,H.M.(1960).TheTenBooksonArchitecture.*

Course Outcomes:

CO1	Analyze the concept of space, mass and its importance in Architecture
CO2	Implement knowledge about scale and proportion
CO3	Evaluate basic knowledge about spatial organization
CO4	Express the Understanding of aesthetic with relation to form and function
CO5	Implement knowledge through case studies

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	-	1	2	1	3	-	-	3	-	2
CO2	2	3	-	1	2	1	3	-	-	3	-	2
CO3	2	3	-	1	2	1	3	-	-	3	-	2
CO4	2	3	-	1	2	1	3	-	-	3	-	2
CO5	2	3	-	1	2	1	3	-	-	3	-	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	2	3	-	1	2	1	3	-	-	3	-	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
1ST	BAR01002	Building Material - I	03	02	1	0

Objective

Thesubjectobjectsatdevelopingtheunderstandingandknowledgeofbasicbuildingmaterials regarding their typology, availability, constitution, properties, classification, uses and applications inmodernaswellastraditionalconstructionpractice.Alsoitfocusesoneffectsofsun,rain,wind and other climatic and environmental conditions on those materials and their behaviour to them.

Module 1

CLAY PRODUCTS AND STONES

- Bricks—Varioustypesofbricks,propertiesofgoodbrick,useofbricks,classificationof various grades ofbricks.
- Compressedmudblocks,hollowblocks
- Stones—Buildingsstones,types,propertiesofgoodstone,naturalbed,aggregatesfor concretework,useofstones.

Module 2

CEMENTING MATERIALS

- Cement,lime,sand,aggregate,mortarandconcrete.
- Lime—quicklime,hydrauliclime,limemortarmixandpreparation,peelingandflaking.
- Cement — Composition, properties of cement, initial setting time, slow setting, quick settingandrapidhardeningcement.
- Sand— Pit, river and sea sand, uses in mortar and concrete, properties of good sand, impuritiesofsandandtheirremoval.
- Mortar—Varioustypesofmortar,theirmixandproperties,applicationmethods.
- Concrete—Varioustypesofconcrete,theirmixandproperties,applicationmethods.
- Limemortarandplaster-mixandproperties,applicationmethods.

Module 3

TIMBER AND BAMBOO

- Timberofvarioustypesofqualityandproperties,
- Defects intimbers
- Methodsofseasoning,sawingandplanning,
- Bambooasabuildingmaterial
- Bi-products ofbamboo

Module 4

METALS

- VarioustypesofFerrousMetals-WroughtIron,CastIron&Steel
- VarioustypesofNon-FerrousMetals-Aluminium,Copper,Tin,Brass,etc.
- Applicationofmetalsforconstructionofvariousarchitecturalelements
- non-structuralelement
- Applicationofmetalsasstructuralelementsinconstructionpractice

Module 5

CHEMICALS & AGENTS

- Waterproofingagents,Waterproofingmaterialsandsystemsforbasement

- Anti-Termiteagents
- Corrosion resistantagents
- Fungi&algaeresistantagents

Each module should include market surveys of the materials manufactured by different industriesundervariouscompanyandbrandnames.Constructionsitevisitscompulsorily.

References

1. Al-homound, M.S., Performance Characteristics and Practical Applications of Common BuildingThermalInsulationMaterias,BuildingandEnvironment,Vol-40(3),2005.
2. Duggal,S.K.,BuildingMaterials,NewAgeInternationalPublishingCo.,(3rdEd.),2008.
3. Varghese,P.C.,BuildingMaterials,PHILearningPvt.Ltd.,2005.
4. Gurcharan Singh, Building Materials: Materials ofConstruction
5. R.Chudely,BuildingConstructionHandbook.

Course Outcomes:

CO1	Evaluate knowledge about primary building material used for walls and other structure
CO2	Analyze information of different kind of binding agents
CO3	Apply knowledge about timber-based materials in construction practices
CO4	Demonstrate knowledge about metal-based materials in construction practices
CO5	Implement knowledge about use of different chemicals with respect to type of materials

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	2	1	2	-	1	-	2	2
CO2	3	2	-	-	2	1	2	-	1	-	2	2
CO3	3	2	-	-	2	1	2	-	1	-	2	2
CO4	3	2	-	-	2	1	2	-	1	-	2	2
CO5	3	2	-	-	2	1	2	-	1	-	2	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	2	-	-	2	1	2	-	1	-	2	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
1ST	BAR01003	**Applied Mathematics**	03	03	0	0

Objective

The course is aimed to develop basic mathematical techniques required to support architectural and engineering concepts, and is also oriented to understand and analyse practicalengineeringproblems.Thecoursemodulescoverstatisticsandlinearprogramming, whichwillenablethestudentstoanalysefieldstudydataandformulatemathematicalmodels.

Module I

GEOMETRY AND MEASUREMENTS

Proportion, golden ratio, Euclidean geometry: methods to calculate areas of various regular geometrical shapes, surface areas of solids and volumes (cube, sphere, cone, cylinder)

Module 2

NUMERICAL METHODS

Finding roots of equations: Bisection method, Newton's method, Secant method. Numericalintegration:Newton-CotesIntegrationformula(withoutderivation),Trapezoidalrule, Simpson's rule, Gaussian quadrature

Module 3

CALCULUS & APPLICATIONS

Calculus of one variable: Maxima and Minima for a function of one variable, Rolle's theorem, meanvaluetheorem(statementonly),Fundamentaltheoremofcalculus,Calculationofareas usingintegrals:Areaboundedbycurve,Arclengthofcurve.

Module 4

MATRICES&BASICSOFLINEARPROGRAMMING

Elementaryrows&columntransformation,Gausselimination&solutionofSystemofequations, Inversematrix.

Formulation of Linear Programming, Graphical solution, Simplex method.

Module 5

STATISTICS

Measuresofcentraltendency,Mean/Medianmode,measuresofdispersion(Meanderivation/ StandardDerivation,Variance),Co-relationandRegression.

References

1. GrewalB.S.,HigherEngineeringMathematics,35thedition,KhannaPublishers.
2. Kapoor,V.K.andGupta,S.C.,FundamentalsofMathematicalStatistics,Sultan&Sons
3. Kalavathy,S.,OperationsResearch,VikasPublishingHousePvt.Ltd.,2009
4. Boucher,J.S.,Mensuration,PlaneandSolid,Longman,Brown,Green,Longmansand Robert,London.
5. K.H.Rosen:DiscreteMathematicsanditsapplication,5thedition,TataMcGrawHill.

Course Outcomes:

CO1	Implement mathematical techniques required to support architectural and engineering concepts, and in particular get adequate knowledge of findingareas and volumes of various regular geometrical shapes
CO2	Demonstrate the roots of algebraic and transcendental equations
CO3	Analyze knowledge of calculus of one variable, and also able to find areas bounded by the using integrals
CO4	Apply basic principles Gauss elimination method and rank of a matrix in solving linear Equations
CO5	Express the central tendencyand measures of dispersion of a given sample

Course Articulation Matrix

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	-	-	2	-	-	2	-	-	-	-	2
CO2	3	-	-	2	-	-	2	-	-	-	-	2
CO3	3	-	-	2	-	-	2	-	-	-	-	2
CO4	3	-	-	2	-	-	2	-	-	-	-	2
CO5	3	-	-	2	-	-	2	-	-	-	-	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO	3	-	-	2	-	-	2	-	-	-	-	2

Program Articulation Matrix row for this Course

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
1ST	BAR01004	**Ecology and Environment**	03	03	0	0

Objective

To enable the student to understand the ecosystem, effect of pollution, environmental degradation and eco sustainable development.

Module 1

INTRODUCTION TO ECOSYSTEMS AND ENVIRONMENT, ENVIRONMENTAL RESOURCES

Fundamentals of Ecosystem, our earth's Environment. Types of ecosystems, characteristics features,structureandfunctionsofEcosystems–Forest,Grassland,Desert,Aquatic(lakes,rivers andestuaries).Ecosystemprocessesinasite.

Effects of human activities on environment: Agriculture, Housing, Industry, Mining and Transportation activities

IdentificationofPrincipalBio-geographicZonesofIndiaandtheirdescription,

ListIndia'simportantandsensitiveBiodiversityareasinrelationtothephysio-geographicregions.

Module 2

RESOURCES AND ENVIRONMENT: LAND, FOREST, WATER AND ENERGY AS ENVIRONMENTAL RESOURCES.HUMANIMPACTONENVIRONMENTANDPOLLUTION:

LocalandGlobalIssues,Causes,effectsandcontrolmeasuresofAirpollution,Waterpollution, Soilpollution,UrbanandIndustrialwastes,RecyclingandRe-use,Globalwarming,Acidrainand Ozone layerdepletion.

Loss of wet lands, mangroves, increasing desert areas, Social issues and the environment.

Module 3

INSTITUTION AND GOVERNANCE

Institutionalarrangement,Environmentallegislation,IntroductiontoGovernmentregulations, Introduction to Environmental Acts, (eg, Water Conservation and Control of Pollution Act,Air pollutioncontrolact,EnvironmentalProtectionAct,WildlifeprotectionAct,ForestConservation Act,etc.)

Module 4

ENVIRONMENTAL MANAGEMENT

Introduction to principles of sustainable development, Environmental quality and indicators, Managementofenvironment,IntroductiontoSolidwastemanagement.

Module 5

Conduct case studies and prepare report on relevant areas.

References

1. Ecology/ Principles and application ; J.L Chapman & M.J Press; Cambridge
2. Environmental Economics; Charles. D Kolstad: Oxford University Press
3. The hidden connection; F.Capra , Harper and Collins
4. Agarwal, K. C. (2001). Environmental Biology. Bikaner : Nidhi Publications Ltd.
5. Benny, J. (2005). Environmental Studies. New Delhi : Tata McGraw Hill.
6. Bharucha, E. (2005). Text book of environmental studies for undergraduates courses. New Delhi : Universities Press, UGC. .
7. Brunner, R.C. (1989). Hazardous Waste Incineration. New Delhi : McGraw Hill.
8. Kaushik, A. and Kaushik, C. P. (2010). Basics of Environment and Ecology. New Delhi : New Age International Publishers.

Course Outcomes:

CO1	Implement knowledge about ecosystem, impact of human activities on that
CO2	Express the idea about environmental issues on global and local level
CO3	Analyze the knowledge about environmental governance
CO4	Express the knowledge about environmental management
CO5	Demonstrate knowledge through case studies

Course Articulation Matrix

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	-	-	1	1	2	1	1	-	3	2	1
CO2	3	-	-	1	1	2	1	1	-	3	2	1
CO3	3	-	-	1	1	2	1	1	-	3	2	1
CO4	3	-	-	1	1	2	1	1	-	3	2	1
CO5	3	-	-	1	1	2	1	1	-	3	2	1

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO	3	-	-	1	1	2	1	1	-	3	2	1

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
1ST	BAR01005	Basic Design - I	06	0	0	6

Module I

LEARNINGDESIGNPRINCIPLES,SKETCHING,DRAWING,ANDVISUALTHINKING

Introduction to design- importance of design, study and appreciation of design examples from naturalandmanmadeenvironments;Elementsofdesign:point,line,shape,form,space,tone &texture,value,colourandmaterial;

Colour: Colour theory, value and intensity, colour wheel, primary, secondary, tertiary colours, colour schemes,

Introductiontotheprinciplesofcomposition:unity,balance,symmetry,proportion,scale, hierarchy, rhythm, contrast, harmony, focus.

Module 2

TWO-DIMENSIONAL COMPOSITION

Applicationofelementsofdesignintwodimensionalcompositions:Transformationsin twodimensions,shapesandpatterns,useofgridsincreatingrepetitivepatterns.

Application of visual grammar and gestalt principles

Exploratoryexercisesintwodimensionalcompositions:Developingcompositionintwodimensional designslike-logos,coverpage,collage,mural,floorpatterns,grills,railings,gatesetc.

Module 3

FORMS & SPACES

Understanding the Elementary structural forms, Concept of space, interrelationship between spaces;OrdersinArchitecture;

Studyofsolids&voidstoevolvesculpturalforms&spaces;

Makingthreedimensionalsculpturesinvolvingthebasicplatonicsolidsandabstractsculptures: involvingvariouselementsofdesignsuchasShape,Colour,Texture,Transparency,Mass,volume, exploreplayoflight&shade;

Variations in forms with planar juxtapositions,

Formgenerationtechniques–from2Dto3D,AdditiveandSubtractiveform

EvaluationandAnalysisof3Dformwithvisualgrammar

Designs of Entrances, gateways, portal, compound walls, etc.

Module 4

FORMS IN NATURE

Studyofformsinnatureandanalysiswithrespecttotheircolour,form,textureandstructure.

Exercisesinvolvingthesenaturalformsandvariousapproachestoartsuchas–Representation, AbstractionandNon-Representational/Non-Objectivecompositions.Free-handdrawingof human figures, vehicles, trees, buildings etc, to have a better understanding of proportion.

Module 5

MEASURED DRAWING

Understandingofdifferentscales,measurementdeviceandtheirusesinpractice

Drawingstoscale,geometricalrepresentationtechniquesanddraftingskill;

Examples of Measured drawings involving small spaces and building elements: Furniture, Class rooms, one room unit, doors, windows, entrance gate, columns.

References

1. Charles Wallschlaeger&SynthiaBusic Snyder, Basic Visual Concepts & Principles for artists, architects& designers, McGraw hill, USA, 1992.
2. Paul Zelanski& Mary Pat Fisher, Design principles &Problems , 2nd Ed, Thomson & Wadsworth, USA,1996
3. Owen Cappleman& Michael Jack Kordan, Foundations in Architecture: An Annotated Anthology ofbeginning design projects, Van Nostrand Reinhold, New York.
4. TrewinCopplestone, Arts in Society, Prentice Hall Inc, Englewoods Cliffs, N. J. 1983. 4. H. Gardner, Art through ages.
5. Paul Laseau. (2001). Graphic Thinking For Architects and Designers, John Wiley & Sons, New York
6. Ching, F. D. K. (1997). Design Drawing. Hoboken : John Wiley & Sons.
7. Ching, F. D. K. (2012). Architecture: Form, Space and Order. 3rd Ed. Hoboken: John Wiley & Sons.
8. Broadbent, G. (1973). Design in Architecture - Architecture and Human Science. John Wiley and Sons, New York
9. Chauhan, P. (2005). Learning Basic Design. Mumbai : Rizvi College of Architecture.

Studio Project

Exercises in Point, line and shapes; Exploring colour schemes and their application in avisual composition and in architectural forms and spaces; Collage with a given theme; Toachieve focus and centre of interest in design using different textural elements; Developmentof geometric pattern by division, subtraction, and addition, and express them with the use ofcolours; Two & Three dimensional Design Exercises involving real and imaginary objects,drawing compositions and models, to form an appropriate base for subsequent Architecturaldesign and theory. Study models of different materials viz. paper, clay, wax, soap, wires etc.made by themselves. Understanding of scale and proportions through measurement of spacesusing only human body elements.Activities of the Architectural Workshop are to be synchronised with the studio exercise.

Course Outcomes:

CO1	Implement the knowledge of Principles and Elements of Design
CO2	Demonstrate 2 dimensional compositional skills
CO3	Analyze the knowledge of Elementary structural forms and Concept of space
CO4	Evaluate the knowledge about forms in nature
CO5	Demonstrate knowledge of Measure Drawing through case studies

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	2	1	2	2	-	2	-	1	2
CO2	3	3	-	2	1	2	2	-	2	-	1	2
CO3	3	3	-	2	1	2	2	-	2	-	1	2
CO4	3	3	-	2	1	2	2	-	2	-	1	2
CO5	3	3	-	2	1	2	2	-	2	-	1	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	3	-	2	1	2	2	-	2	-	1	2

1.

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
1ST	BAR01006	Architectural Graphics- I	02	0	0	4

Objective

Introducestudentstothefundamentalsofarchitecturaldrawingtechniquesandskills.Equipthe studentswithunderstandingofgraphicalpresentationofobjectsthroughgeometricalprojection andvisualizationistaughtinthiscourse.

Module I

Introductiontofundamentalsofdrawinganditspractice:Practicesinlettering,drafting,and dimensioning, Scale conversion;
IntroductiontoPlanegeometry:ExerciseinconstructionofStraightlines,Circles,Tangentsand Regularpolygons;
Description of Plane Curves: Ellipse, Parabola, Hyperbola, Helix and other special curves.

Module II

ConceptofOrthographicProjection:First-AngleProjection,ProjectionsofPoints,Projectionsof StraightLines,ProjectionsofPlanes,ProjectionsofSolids.

Module III

Section of Solids, True shapes of section

Module IV

Interpenetration of Solids

Module V

Surface development of simple solid forms leading to complex forms

References

1. MorisI.H.GeometricalDrawingforartStudents
2. ThomasEFrenchGraphicscienceanddesign,NewYork,McGrawhill
3. NicholsTBandKeepNorman,Geometryofconstruction,3rded,CleaverHumePressLtd. London,1959.
4. BhattNDandPanchalVMEngineeringDrawing,planeandsolidgeometry,42nded,Chartor Pub. Anand,2000
5. Gill,PS,TextBookofGeometricaldrawing,3rded,DewanSuhilKumarKataria,Ludhiana, 1986
6. ShahMG,KaleCMandPatkiSY,Buildingdrawingwithanintegratedapproachtobuilt environment,7thedTataMcGrawHillpubDelhi2000.
7. BiesDJohn,ArchitecturalDrafting:StructureandEnvironmentBobbs,MerrillEducationalPub. Indianapolis
8. NelsonAJohn,HandbookofArchitectureandCivilDrafting,VonNostrandReinholdNew York,1983.

Note

Alongwithprogressiveevaluationofclassworks,teststobeconductedforDescriptiveGeometry aspartoftheinternalandfinalevaluationprocess.

Course Outcomes:

CO1	Demonstrate the fundamentals of drawing and its practice
CO2	Implement the Concepts of Orthographic Projection
CO3	Apply the basic knowledge about Section of Solids
CO4	Demonstrate the knowledge about Interpenetration of Solids
CO5	Evaluate the knowledge of Surface development

Course Articulation Matrix

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	3	-	-	-	-	1	-	-	-	-	1
CO2	3	3	-	-	-	-	1	-	-	-	-	1
CO3	3	3	-	-	-	-	1	-	-	-	-	1
CO4	3	3	-	-	-	-	1	-	-	-	-	1
CO5	3	3	-	-	-	-	1	-	-	-	-	1

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO	3	3	-	-	-	-	1	-	-	-	-	1

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
1ST	BAR01007	BuildingConstruction-I	04	0	0	4

Objective

Tounderstandvariousconstructionmethodsandtechniquesusingdifferentmaterials,bothinthe contextofmodernandtraditionalconstructionmethodsandpractices.Thestudentsarerequired toproducereportonmaterials,constructionanddetaildrawings.Withtime,eachtopiccanalso focusonlatesttrendsinpracticeandusageofnewtechnology/materials.

Module I

BRICK WORK

Brick masonry- Masonry tools & equipment. Different types of bricks. Bonding of bricks & its principles,Stopend,T,L&crossJunctionsofEnglishbond,Flemishbond&RattrapbondandNon structural bond. Attached & detached piers. Brick jallis, Corbelling, Cornices, Types of coping, pointing &threshold

Module 2

STONE WORK

Stone Masonry- Random rubble masonry, Ashlars masonry, coursed and un-coursed rubble masonry etc. Walls with stone facing and brick backing (composite wall)

Module 3

FOUNDATION:INTRODUCTIONTOSHALLOWANDSPREADFOUNDATIONS

Simple foundations with trenches for load bearing walls; Sections of compound walls, retaining wall, foundation forsteps.

Module 4.

LINTELS, BEAMS AND ARCHES

Lintels:RCC,ReinforcedBrick(RB),Wood,Stone Beam:
RCCBeam
Arches:DifferenttypesofArches,Segmental,Semi-circular,Jackarch,Threecentred,Flatarch

Module 5

SHALLOW FOUNDATION

Types of RCC foundation (Strip, raft, isolated footing, pile foundation)

Note

- Frequentsitevisitstobearrangedasapartofthecurriculum.Sitevisitsshouldbeinline withthepresentstudiowork.Itismandatoryforstudentstosubmitasiteobservation report,eitherperiodicallyorattheendofthesemester.
- Pedagogy should establish the linkage of the relevant material and construction techniquesfrompasttopresent.
- Performing standards and Codes used for various Building Materials and Construction Techniques needs tofocused.
- Alternativeconstructiontechniquesforrespectivetopicsneedstobediscussedindetail.
- ThesubjectistobeintegratedwiththeongoingsubjectofArchitecturalDesign-Ithrough one or manyassignments.

References

1. Barry,R.(1999).TheConstructionofBuildingsVol.2.5thEd.NewDelhi:East-WestPress.
2. Foster,J.andMitchell,S.(1963).BuildingConstruction:ElementaryandAdvanced,17thEd. London:B.T.BatsfordLtd.
3. McKay,W.B.(2005).BuildingConstructionMetricVol.I–V.4thEd.Mumbai:OrientLongman.
4. Hailey and Hancork, D. W. (1979). Brick Work and Associated Studies Vol. II. London : MacMillan.
5. Merritt,F.S.andRicketts,J.T.,BuildingDesignandConstructionHandbook,McGrawHill.
6. Rangwala,S.C.(1963).BuildingConstruction:MaterialsandtypesofConstruction.3rdEd.New York:JohnWileyandSons.
7. Chudley,R.(2008).BuildingConstructionHandbook.7thEd.London:Butterworth-Heinemann.
8. Sushil-Kumar,T.B.(2003).BuildingConstruction.19thEd.Delhi:StandardPublishers.
9. Ching,F.D.K–BuildingConstructionillustrated.VNR,1975
10. A.Agarwal–Mud:Thepotentialsofearthbasedmaterialforthirdworldhousing–IIED,London, 1981.
11. HUDCO–Allyouwantedtoknowaboutsoilstabilizedmudblocks,NewDelhi,1989.

Course Outcomes:

CO1	Evaluate the concept of Brick masonry.
CO2	Evaluate the concept of stone masonry.
CO3	Analyze the concept of Foundation and different types.
CO4	Apply basic principles of Lintel, Beams and Arches
CO5	Analyze the concept of Shallow Foundation

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	1	-	2	2	-	-	-	-	3
CO2	3	2	-	1	-	2	2	-	-	-	-	3
CO3	3	2	-	1	-	2	2	-	-	-	-	3
CO4	3	2	-	1	-	2	2	-	-	-	-	3
CO5	3	2	-	1	-	2	2	-	-	-	-	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	2	-	1	-	2	2	-	-	-	-	3

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
1ST	BAR01008	**Architectural Workshop**	02	0	0	4

Objective

To enable students to acquire basic skills necessary to represent their ideas through models using different materials. To make students practice with various tools essential for making architectural models.

Module I

Need for architectural models, Introduction to different materials for model making, like paper, thermocol, clay, wood, foam sheet, sun board, cork sheet, metal sheets, wires, plaster of Paris (PoP), etc.. Introduction to block models of objects (3D Compositions) and buildings using different materials to explore the nature and texture of the material.

Module 2

Joinery and Carpentry using wood, plyboard, blockboard and other materials. Simple exercises in cutting, finishing and joinery such as Dovetail joint, Mortise and Tenon joint, Lap joint, Butt joint, etc. to be used for making furniture.

Module 3

Introduction to various types of models at appropriate scales- site model, study model, block model, finished presentation models, etc.

Preparation of base for models using wood or boards, Various site elements – Contour representation, Roads/Pavements, Trees/Shrubs, Lawn, Waterbodies, Street furniture, Fencing etc.

Module 4.

Making detailed models which includes the representation of various building elements like Walls, Columns, Steps, Windows/glazing, Sunshades, using materials like Mount-board, Snow-white board, acrylic sheets;

Representing various surface finishes like brick/stone representation, stucco finish etc;

Module 5

Making models of the various structural systems used in buildings like; Space frames – using Match sticks, wires; Different forms of shell roofs using paper, POP, clay, etc; Tensile structures using fabric.

Introduction to digital medium to explore models digitally. Photography in built models, using lighting and natural background

Note:

The subject will be taught in congruence with subjects like Design and Graphics. Assignments for the subject will be linked to design exercises to achieve higher level of learning and understanding the practical application of the same.

References

1. Jannsen, Constructional Drawings & Architectural models, Kari Kramer Verlag Stuttgart, 1973.

3. Harry W. Smith, The art of making furniture in miniature, E.P. Dutton Inc., New York, 1982.

4. Thames and Hudson Manual of Rendering with Pen and Ink - Robert W Gill.

5. Ching, F.D.K. (2009). Architectural Graphics. 5th Ed. New Jersey: John Wiley & Sons.

6. Criss. B.M. (2011). Designing with models: A Studio guide to Architectural Process Models. 3rd Ed. Hoboken: John Wiley & Sons.

7. Kieran, S. and Timberlake, J. (2008). Lobolly House: Elements of a New Architecture. New York: Princeton Architectural Press.

8. Morgan, C.L. and Nouvel, J. (2002). The Elements of Architecture. London: Thames & Hud

son.
***9.** Werner, M. (2011). Model Making. New York : Princeton Architectural Press.*

Course Outcomes:

CO1	Demonstrate the construction of basic architectural models
CO2	Analyze the joinery and carpentry
CO3	Demonstrate preparation of site models
CO4	Evaluate the basic knowledge about advanced materials used for model making
CO5	Analyze the knowledge about non-conventional materials used for model making

Course Articulation Matrix

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	1	-	1	1	2	1	2	1	2	-	1
CO2	3	1	-	1	1	2	1	2	1	2	-	1
CO3	3	1	-	1	1	2	1	2	1	2	-	1
CO4	3	1	-	1	1	2	1	2	1	2	-	1
CO5	3	1	-	1	1	2	1	2	1	2	-	1

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO	3	1	1	1	1	2	1	2	1	2	-	1

SECOND SEMESTER
BARCH PROGRAMME

SECOND SEMESTER								
SL. NO.	**COURSE CODE**	**SUBJECTS**	**CONTACT HOURS (L-T-P)**	**CREDIT**	**SEMESTER EVALUATION (WE, IA, VV, TP)**			
THEORY SUBJECTS								
1.	BAR02001	History of Architecture -I	3-0-0	3	WE			
2.	BAR02002	Advanced Building Materials and finishes	2-1-0	3	WE			
3.	BAR02003	Structural Mechanics	3-0-0	3	WE			
4.	BAR02004	Communication Skill	3-0-0	3	WE			
SESSIONAL SUBJECTS								
1.	BAR02005	Basic Design -II	0-0-6	6		IA	VV	TP
2.	BAR02006	Architectural Graphics - II	0-0-4	2		IA		TP
3.	BAR02007	Building Construction -II	0-0-4	4		IA	VV	TP
4.	BAR02008	Visual Art & Documentation	0-0-4	2		IA	VV	TP
TOTAL			**11-1-18 = 30**	**26**				

DETAIL SYLLABUS
SECOND SEMESTER BARCH PROGRAMME

SEMSTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
2ND	BAR02001	History of Architecture - I	03	03	0	0

Objective

Thearchitectureoftheworldcanbecategorisedasperthetimelineoftherespectiveregionsof theworldwiththerocksheltersandancientcivilisationsoftheworld.

Toprovideaninsightintothearchitectureofprehistoricperiodandlateancientcivilizations,and the architecture of Classical antiquity of late ancient period. Social, religious and political character,constructionmethods,buildingmaterialsandhowtheyinfluencedtheirbuiltformand settlementpatternshallbeexplainedwithsuitableexamples.Combinedinfluenceofgeology, geography,climate,beliefs,religionandcultureonthearchitecturemustbehighlightedsoasto appreciate how architecture is embedded in place specific context. The study must enable students to do a comparative evaluation of various civilizations, appreciate chronological developmentsalongthetimelineandacrossgeographies.

Theunderstandingofspacedevelopmentandstructuralqualitybaseddesignapproachwould enablestudentstodesignsmallerbasicstructures/houseswithapplicablestructuralprinciplesand construction techniques in mind. Innovation in the use of conventional material in non-conventionalway,asportrayedinthelandmarkhistoricbuildings,wouldalsohelpstudentstothink out of thebox.

Module 1

PRE-HISTORICARCHITECTURE&SETTLEMENT:

Introductiontohumansettlement:People,theirshelter,settlement(growth,factorsinfluencingthe developmentofasettlement),burialsystems,megaliths,memorials.*(Structures:Differenttypesof graves,Stonehenge;&Settlements-World:CatalHoyuk,Jericho;India:Mehrgarhetc.)*

INDUS VALLEY CIVILIZATION (IVC)

Indus - People, their shelter & civic buildings (typology, planning, construction & aesthetics), settlementpattern&citadel*(Structures:GreatBath/GreatGranary,simpleHarappanhouse;& Settlements – Mohen-jo-daro/Harappa)*

Module 2

VEDIC:

Introductiontovedicera,societyandculture,latervedicera(People,theirshelter&buildings typology,planning,construction&aesthetics),settlement(typicalvillage,planning,sheltertypes, materials)*(Structures–Vedichouses,Torana,railingaroundvillages;&Settlements–Patliputra)*

Janapadas,riseofmahajanapadas,Magadha

Module 3

NILE VALLEY CIVILIZATION

People, their shelter & buildings, settlement (growth, factors influencing the development of architecture & character, settlements of NVC) and religious (cult temples) & burial structures (typology,planning,construction&aesthetics)*(Structures:Mastabas,Pyramids:stepped,bent& GreatPyramidsofCheops;TempleofAbu-Simble/Amun-Ra)*

MESOPOTAMIAN(EUPHRATES&TIGRIS)CIVILIZATION:

Sumerian, Babylonian & Persian people, their shelter & buildings, settlement (growth,factors influencingthedevelopmentofarchitecture&character,settlements)andreligiousstructures. *(Structures–Ziggurats,Persepolis;&Settlements–PlanningofUr&Babylon)*

Module 4

CLASSICAL ARCHITECTURE OF ANCIENT GREECE (AEGEAN CULTURE):

Evolutionofcitystates,Hellenic&Hellenisticperiod,factorsinfluencingGreekArchitecture,orders inGreekArchitecture,proportion,opticalcorrection.*(Structures–Parthenon,Theatre,Agora, Stoas,&Settlements–Athens&AcropolisofAthensandDelphi)*

Module 5

ROMAN ARCHITECTURE (ETRUSCAN CULTURE)

EvolutionofRepublicanStates,Romanconstructiontechniques(masonry,vaults,domes,orders, useofconcrete),buildingtypology*(Structures*–Forum,Pantheon,Thermae,Basilica,Circus, Colosseum,BathofCaracalla,BathofCaracalla

References

1. Fletcher,B.(1996).AHistoryofArchitectureontheComparativeMethod.20thEd.London:B.T. BatsfordLtd.
2. Copplestone,T.andLloyd,S.(1971).WorldArchitecture:AnIllustratedHistory.London:Verona Printed.
3. Brown,P.(2010).IndianArchitecture:BuddhistandHinduperiod.Mumbai:D.B.TaraporevalaSons andCo.
4. Lloyd,S.andMuller,H.W.,(1986),HistoryofWorldArchitectureSeries,FaberandFaberLtd., London.
5. Crouch,P.D.(1985).HistoryofArchitecture:StonehengetoSkyscrapers. London:McGraw-Hill.
6. Dutt,B.B.(2009).TownPlanninginAncientIndia.Delhi:IshaBooks.
7. Grover,S.(2003).BuddhistandHinduArchitectureinIndia.2ndEd.NewDelhi:CBSPublishers.
8. Roth, M. L. (2006). Understanding Architecture: Its Elements, History, and Meaning. Columbia:West-viewPress.
9. Harris,M.C.(1977).IllustratedDictionaryofHistoricArchitecture.NewYork:M.CourierDover Publications.
10. Ingersoll,R.AndKostof,S.(2013).Worldarchitecture:across-culturalhistory.Oxford:Oxford UniversityPress.
11. Singh,U.(2009).Ahistoryofancientandearlymedieval India:fromtheStoneagetothe12th century.Delhi:PearsonIndia.
12. Hiraskar,G.K.,GreatAgesofWorldArchitecture,DhanpatRai&Sons,Delhi.

Course Outcomes:

CO1	Develop knowledge about prehistoric architecture and its characteristics
CO2	Analyse characteristics and evolution of Vedic Architecture
CO3	Develop knowledge about Nile valley civilization, its architecture and characteristics

CO4	Analyse the development of classical architecture and its influential characteristics
CO5	Recognise the evolution of Roman architecture along with its characteristics

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	1	3	1	1	-	-	1	2	1
CO2	3	3	-	1	3	1	1	-	-	1	2	1
CO3	3	3	-	1	3	1	1	-	-	1	2	1
CO4	3	3	-	1	3	1	1	-	-	1	2	1
CO5	3	3	-	1	3	1	1	-	-	1	2	1

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO
CO	3	3	-	1	3	1	1	-	-	1	2	-

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
2ND	BAR02002	Advanced Building Materials and finishes	03	02	01	0

Objective

Thecourseintendstointroducedifferentmodernbuildingmaterials,andinnovativealternative materials that are being used to make the building more energy efficient and sustainable. To impartknowledgeabouttheproperties andapplicationoffinishingmaterials,whichisthemost dynamic element in the building industry. Property, application and performance of each material is highlighted. To get hands on experience and idea about the material students are requiredtovisitbuildingmaterialoutletsandconstructionsites,andcollectproductinformation.

Module 1

INTRODUCTION AND ADVANCED CONCRETE

Introductiontoadvancedbuildingmaterialsinbuildingindustry.
Roleofadvancematerialsinbuildingperformance.
Contemporary materials in super structure.
Ultra high performance concrete, Ferrock, Liquid granite, Litracon etc.
High-DuctilityConcreteforResilientInfrastructures:EngineeredCementitiousComposite (ECC), Light weight concrete, Engineered stone, etc.

Module 2

GLASS

Speciality Glass as a contemporary building material.
Types and categories of Glass and its application in building facades.
Laminated, curved and tempered glass, Kinetic glass, Smart glass and smart windows.
IntroductiontoDigitalbuildingfacades:Buildingkineticsandfacadeengineering,sensorglasses for interiors.

Module 3

WOODANDCOMPOSITES

Wood as an advanced material for buildings: Reconstructed wood, cross laminated timber, Plyboards,compositeboards,Acousticsboards,andpanellingmaterials,laminatesandveneers, woodfoam.
Advancedfibrecompositematerials:Bamboo,glass-reinforcedplastic(GRP),Fibre-reinforced polymers(FRP),Shapememorypolymercomposites.

Module 4

POLYMERS AND ALLOYS

VacuuminsulationpanelsystemsExternalThermalInsulationCladding System (VIP),stretchedfabricwall(ETICS), Insulated Vinyl Siding.
Different types of stainless steel applications, Polycarbonates.
Aluminium composite panels: application method in interior and exterior facades

Module 5

BUILDINGFINISHES

PaintsandVarnishes:Propertiesandusesofordinarypaints,Varnishesandwoodpreservatives, method of distempering wall surfaces and painting of timber and metal work. Plastic paints, emulsionpaints,cementpaintandtexturedplaster.Enamelandepoxypaints.
ReflectiveindoorcoatingsandHighreflectanceanddurableoutdoorcoatings.
Nano-materialsforbuildingconstructionandfinishes.
Different types of flooring and wall cladding tiles, Antistatic Vinyl surfaces.

NOTE
Site visits for practical exposure to different advanced materials and their application in the buildingindustry.
Casestudiestobeconductedforfurtherdocumentationoftheknowledgeexplored,andreport to besubmitted.

References

1. Al-homound, M.S., Performance Characteristics and Practical Applications of Common BuildingThermalInsulationMaterias,BuildingandEnvironment,Vol-40(3),2005.
2. Duggal,S.K.,BuildingMaterials,NewAgeInternationalPublishingCo.,(3rdEd.),2008.
3. Varghese,P.C.,BuildingMaterials,PHILearningPvt.Ltd.,2005.
4. www.in.saint-gobain-glass.com
5. Punmia,B.C.(1993).BuildingmaterialsandConstruction.NewDelhi:LakshmiPublications.
6. Rai,M.(1986).AdvancesinBuildingMaterialsandConstruction.CSIR.

Course Outcomes

CO1	Develop knowledge about advanced building materials and their uses.
CO2	Analyseglass as a building material, its uses and characteristics.
CO3	Develop knowledge about wood as a building material, its uses and characteristics.
CO4	Develop knowledge about polymers and alloys.
CO5	Analyse the verity and uses of different kind of finishes

Course Articulation Matrix

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	2	-	-	2	1	2	-	1	-	2	2
CO2	3	2	-	-	2	1	2	-	1	-	2	2
CO3	3	2	-	-	2	1	2	-	1	-	2	2
CO4	3	2	-	-	2	1	2	-	1	-	2	2
CO5	3	2	-	-	2	1	2	-	1	-	2	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO	3	2	-	-	2	1	2	-	1	-	2	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
2ND	BAR02003	Structural Mechanics	03	03	0	0

Objective

Tointroducetheconceptsofbehaviorofstructuralcomponentsandsimpleanalyticaltechniques. Thecourseaimsatcoveringbasictheoremsandmechanicalpropertiesofengineeringmaterials, elasticconstants,differenttypesofstressesandstrains,thedeformationofelasticbodiesunder simple stresses, the use and principles of composite sections, geometrical properties such as centroid, moment of inertia etc of sections for different shapes, analysis of perfect frames for verticalloadsbyanalyticalaswellasgraphicalmethods.

Module 1

HISTORY TO STRUCTURAL SYSTEMS

Trabeatedconstruction,vaults,flyingbuttresses,tents,mastedstructures&bridgesthroughancient &medievalhistory,PostIndustrialmodularconstructionoflargespan&suspensionstructuresin steelandconcrete-examplesoficonicprojects.

Module 2

INTRODUCTION TO FORCES AND MOMENTS

Introduction,Forces,systemofforces,resultant,equilibrant,Parallelogramlaw,Trianglelaw,LamisTheo rem,polygonlaw,resultantofcoplanar,concurrentforcessystem,couple,characteristicsof couple,moment,Equilibrium,Varignon'sTheorem

Module 3

SIMPLESTRESSESANDSTRAINS,ELASTICCONSTANTS

Stress,strain,typeofstresses,stress-straincurveforductilematerial.Hooke'slaw,Modulusof elasticity,Barsofvaryingsection,Barsofcompositesection,Shearstress,typesofstrain,Poisson's ratio, Shear modulus, bulk modulus, relationship between three elastic constants, members subjectedto3mutuallyperpendicularforces.

Module 4

CENTRE OF GRAVITY AND MOMENT OF INERTIA

Center of gravity, Center of parallel forces in a plane, Center of gravity, Centroids of curves, Distribution of forces in a plane.
Momentofinertiaofplanefigurewithrespecttoanaxisinitsplane,withrespecttoperpendicular totheplane,parallelaxistheorem,Determinationofareamomentofinertia Massmomentofinertia,productofInertia.

Module 5

TRUSSES AND FRAMES

Studyofstressesandstrainsandtheireffectinvarious elementsofPlanetrusses. Forces in members, analytical method

- Methodofjoints,Methodofsections

Study of bending moment and their effect in various elements of trusses. Bending equation,

- Bendingstressesinsymmetricalandunsymmetricalsections

References

1. Timoshenko,S.,Young,D.H.andRao,J.V.,EngineeringMechanics.4thEd.NewDelhi:Tata McGraw-Hill Education,2007.
2. KhurmiR.S.,AtextbookofEngineeringMechanics,S.ChandandCo,NewDelhi,1999.
3. LaudnerT.J.andArcherR.R.,MechanicsofSolidsinIntroduction,McGraw-HillInternational Editions,1994.
4. JunarkarS.B.,MechanicsofStructuresVol1,CharotarPublishingHouse,India,1995.
5. Rajashekharan,S.andSankaraSubhramanian,G.,FundamentalsofEngineeringMechanics, 2ndEdition,VikasPublishingHousePvt.Ltd.
6. Timoshenko,C.P.,andGere.,Mechanicsofmaterials,McGraw-HillBookCompany,NewYork, 1984.
7. Ferdinand,L.S.,EngineeringMechanics:StaticsandDynamics.3rdEd.NewYork:HarperCollins Publishers,1975.
8. Kumar,K.L.,EngineeringMechanics.Delhi:TataMcGraw-HillEducation,2003.
9. Ramamrutham,S.,EngineeringMechanics:ATextbookofAppliedMechanics.NewDelhi DhanpatRaiPublishingCompany,2008.

Course Outcomes

CO1	Develop knowledge about structural system and its history.
CO2	Evaluate forces and moments along with various laws.
CO3	Define the basic concept of stress and strain and their typologies.
CO4	Evaluate centre of gravity and moment of inertia.
CO5	Analyse the use of Trusses and its various methods of joints and sections.

Course Articulation Matrix

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	-	2	3	-	2	3	-	2	-	1	2
CO2	3	-	2	3	-	2	3	-	2	-	1	2
CO3	3	-	2	3	-	2	3	-	2	-	1	2
CO4	3	-	2	3	-	2	3	-	2	-	1	2
CO5	3	-	2	3	-	2	3	-	2	-	1	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO	3	-	2	3	-	2	3	-	2	-	1	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
2ND	BAR02004	Communication Skill	03	03	0	0

Objective

Tointroducetheconceptsofbehaviorofstructuralcomponentsandsimpleanalyticaltechniques. Thecourseaimsatcoveringbasictheoremsandmechanicalpropertiesofengineeringmaterials, elasticconstants,differenttypesofstressesandstrains,thedeformationofelasticbodiesunder simple stresses, the use and principles of composite sections, geometrical properties such as centroid, moment of inertia etc of sections for different shapes, analysis of perfect frames for verticalloadsbyanalyticalaswellasgraphicalmethods.

Module 1

INTRODUCTION TO COMMUNICATION SKILLS

Introductiontotypesofcommunication,methods,use&application.VerbalCommunication. Developinggroupdiscussionsandelocutionskills.Academicwriting&referencing,avoiding Plagiarism.

Module 2

COMMUNICATION TECHNIQUES-I

Businesspresentation,Illustrationtechniques-preparingflowcharts,tables&diagrams, Booksandmagazines,filmandtelevisionposters,coverageetc.,reprographictechniques.

Module 3

COMMUNICATIONTECHNIQUES-II

Advertising-Typography,artwork,Multimedia-2Ddigitalgraphicdesigntechniques,3D digitalmodelingtechniques,Packaging–surfacedecorationsuchasprint,Printmaking– photoscreen-printingandetching,scanningandlaserprinting.

Module 4

JOURNALISM

Introductiontojournalism,keyconcepts&objectivesofjournalism–specializedjournalism, Theoriesofjournalism,techniquesandprocesses.Understandingjournalismthroughmedia- newspapers, radio, film and television, guidelines for documentation, press laws.

Module 5

ARCHITECTURAL JOURNALISM

Architecturaljournalism,Skillimprovementinreporting,writing,editing,research,write ups,criticismofarchitecture,structureofarchitecturaljournals,writingdescriptiveand analytical supports, book reviews, page compositions, Analysis of historical and contemporaryexamples,reviewandanalysisofpresentarchitecturalstyles.

References

1. GeoffreyLeechandJanSwartvik"AcommunicativeGrammarofEnglish,Longman
2. O'connor,J.D.,BetterEnglishPronunciation,ELBS.
3. Chand, J.K. and Das, B.C., A Millennium Guide to writing and Speaking English, Friends' Publishers
4. John,S.,OxfordGuidetoWritingandSpeakingEnglish,OUP.
5. BoveeEtal,BusinessCommunicationToday,PearsonEducation.

Course Outcomes

CO1	Develop knowledge about academic writing and its various aspects.
CO2	Develop the presentation needs and techniques.
CO3	Develop idea about various communication techniques on print media.
CO4	Analyse the terminology and basic structure of journalism as a whole.
CO5	Evaluate the importance of journalism and share their ideas with the common person in an effective way.

Course Articulation Matrix

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	-	1	-	-	2	-	-	3	2	1	2	-
CO2	-	1	-	-	2	-	-	3	2	1	2	-
CO3	-	1	-	-	2	-	-	3	2	1	2	-
CO4	-	1	-	-	2	-	-	3	2	1	2	-
CO5	-	1	-	-	2	-	-	3	2	1	2	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO	-	1	-	-	2	-	-	3	2	1	2	

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
2ND	BAR02005	Basic Design -II	06	0	0	6

Objective

Module I

ANTHROPOMETRICS

Application of form, space, proportion, scale, order, including golden sections and modular conceptsthroughexamplesfromarchitecturaltheoryandhistorytaughtinthepreviousssemester. Anthropometric study and ergonomics of human figure (including physically handicapped persons),dimensionsoffurniture-relationshipwithhumananthropometrics(likeinkitchens, toilets, bedrooms, staircasesetc.)
Criticalanalysisofsimpleman-madeobjectstounderstandtheunderlyingconceptsintheirdesign. Studiestounderstandfunction-AestheticRelationshipandAnthropometrics.

Module II

BUILDINGELEMENTSASGENERATORSOFDESIGN(Referencetoresidencesorsmallstructures)

Walls,partitions,doors,windows,floors,roof,ceiling,stairs,wardrobes,storagecabinetsandfurniture couldcombineinmulti-variouswaystogeneratedistinctivedesignsolutionsthatarerepresentative of a concept or theme. Study of functional spaces and the issues like clearances, lightingand ventilation, furniture arrangements, Minimum and optimum areas for various functions.

Module III

ARCHITECTUREASADESIGNRESPONSETOTHEPHYSICALATTRIBUTES

Indoor space, outdoor space, the concept of space in buildings; The relationship between man andspace.Definingspacesandthedegreeofenclosure;Organizationofspaces,fenestrationand character of facade, enclosure and internal spaces, Perception of space in terms of mundane, vibrant,soothing,irritating,freeflowingetc.

- Quantitative&qualitativeanalysisof3-dimensionalspacestakingintoconsiderationabove concepts.
- 3-Dimensionalcompositionresultingintospacestodemonstratetheaboveconcepts.

Module IV

UNDERSTANDINGOUTDOORSPACESANDELEMENTS

BasicsofsiteplanningandlandscapingInterpretationofsiteinformationasadecisionmakingaid (Location,access,topography,surroundingsandsiteelementssuchastrees,rock,viewsetc).
Case studies of characteristics of built form – Urban and Rural context.

Module V

DESIGNOFASMALLSTRUCTURE

Milkparlour/Snackkiosk/Gardenpavilion/Entrancegatewithasecuritybooth/Busstopwith toilet,smallshop,memorialandtrafficislandetc.

References

1. MikeW.Lin,Drawing&Designingwithconfidence–Astepbystepguide,JohnWiley &sons,USA,1998.
2. CrissB.Mills,Designingwithmodel:AStudioguidetomaking&usingarchitectural models,Thomson&Wadsworth,USA,2000.
3. DeChiaraandCallender,Timesaverstandardsforbuildingtypes,McGrawHillCompany
4. BousmahaBaiche&NicholasWalliman,NeufertArchitect'sdata,Blackwellscienceltd.

5. Ramsey/Sleeper,NationalArchitecturalgraphicstandards,TheAmericanInstituteof ArchitectsBuildingCode–ISI
6. SamFMiller,Designprocess–VanNostrandReinhold
7. Ching,F.D.K.(2012).Architecture:Form,SpaceandOrder,3rdEd.Hoboken:JohnWiley &Sons.
8. Pandya,Y.(2007).ElementsofSpacemaking,Ahmedabad:Mapin.
9. Peter,V.M.(1998).Elementsofarchitecture–fromformtoplace,1stEd.NewYork: Routledge.

Note

- Studytourofone-weekdurationismandatoryforconductingcasestudyandfieldstudyrelated totheArchitecturalDesignproject.
- AlltheabovemoduleswillbeevaluatedintheformofAudio/visualandverbalpresentationof designwork,writeupmaterial,drawingwork,modelmaking,photographyetc.

Course Outcomes

CO1	Develop the idea about relationship of various spaces and elements with human anthropometrics
CO2	Develop knowledge about various kind of building elements
CO3	Defining spaces and the degree of enclosure and evaluating the organization of spaces
CO4	Developing knowledge about outdoor spaces and its elements
CO5	Applying knowledge for planning smaller built forms

Course Articulation Matrix

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	3	-	2	2	1	2	-	-	-	-	2
CO2	3	3	-	2	2	1	2	-	-	-	-	2
CO3	3	3	-	2	2	1	2	-	-	-	-	2
CO4	3	3	-	2	2	1	2	-	-	-	-	2
CO5	3	3	-	2	2	1	2	-	-	-	-	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO	3	3	-	2	2	1	2	-	-	-	-	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
2ND	BAR02006	Architectural Graphics- II	02	0	0	4

Objective

Equipthestudentswithunderstandingofgraphicalpresentationofobjectsthroughgeometrical projection and visualization.

Tointroducestudentstotechniquesofarchitecturalrepresentationin3-dimensionandtoequip them with the basic methods of presentation techniques. Perspective Drawing and Sciography representationtechniquesarecoveredinthecourse.

Module I

ISOMETRIC VIEWS

Introduction to views, types and advantages. Isometric, of objects, building components

Module II

AXONOMETRICVIEWS

Axonometricviewsofobjects,buildingsandinteriorspaces

Module III

PERSPECTIVE VIEWS

Introductiontoperspectives,differencebetweenviews&perspectives,Typesofperspectives: onepoint,twopoint&threepoint,-PerspectiveDrawingofThreeDimensionalObjects,Interiorsand ExteriorsofBuilding,Sectionalperspectives.

Module IV

SCIOGRAPHY

PrinciplesofShadeandShadows,SciographyofSimpleandcompositeforms,Shadesandshadows onhorizontal,verticalplanes,Studyofshadeandshadowsofsimplegeometricalsolidsofvarious formsandgroupsofforms,shadesandshadowsonbuildingsin2-Dandperspectiveview.

Module V

MEASURED DRAWING

Drawingstoscale,geometricalrepresentationtechniquesanddraftingskill;

Small scalebuildings.

Drawings include plan, elevations and sections with all measurements and geometrical views (whole or sectional) of the structure.

References

1. ThomsE.FrenchGraphicScienceandDesignNewYorkMcGrawhill
2. NicholsT. BandKeepNormanGeometryofConstruction3rdedCleaver-HumePressLtd London1959
3. BhattN. DandPanchalVMEngineeringDrawingPlaneandSolidGeometry42ndedCharotar Pub. Anand,2000
4. GillP. STextBookofGeometricalDrawing3rdedDewanSuhilKumarKatariaLudhiana1986
5. ShahM. G,KaleCMandPatkiSYBuidlingdrawingwithanintegratedapproachtobuilt environment7thedTataMcGrawhillPub.Delhi2000
6. Claude Bailey Design Development of India

Note

This course employs a lab strategy where instructor introduces, demonstrates use of a tool/techniques.Studentsaresupervisedon-to-onebasis.Primarilystressisgiventoskilldevelopment byhands-onexperiencewithsupportofreferencematerial.

Course Outcomes

CO1	Develop the idea about isometric views
CO2	Develop the idea about axonometric views
CO3	Develop the idea about perspective views and applying it on architectural designs
CO4	Developing knowledge about sciography
CO5	Demonstrating the process and techniques of preparation of measure drawings

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	3	-	-	1	-	-	-	-	1
CO2	3	3	-	3	-	-	1	-	-	-	-	1
CO3	3	3	-	3	-	-	1	-	-	-	-	1
CO4	3	3	-	3	-	-	1	-	-	-	-	1
CO5	3	3	-	3	-	-	1	-	-	-	-	1

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	3	-	3	-	-	1	-	-	-	-	1

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
2ND	BAR02007	Building Construction -II	04	0	0	4

Objective

To introduce students to details of shallow and deep foundations. timber Learningofcarpentryjointsandconstructiondetailsoftimberdoorsandwindowsareoneofthe important courseobjective.
Roofing techniques using different materials are taught.

Module I

FOUNDATION

Deep Foundation: Definition, problems in deep excavation, terms of timbering, methods of timbering, precautions to be taken in deep excavation, dewatering. Grillage foundations, Pile foundations, Caisson foundations, Basement wall and foundation, etc.

Module 2

STAIRCASE

Types of R.C.C. & M.S. staircase & ramps.

Module 3

CARPENTRY JOINERY DETAILS

Lengtheningandwideningjoints,Lapjoints,tongueandgrovedjoints,mortiseandtenonedjoints, Haunchedtenonandmortisejoints,dovetailjoints,obliquetenonjoints,etc.

Module 4

TIMBER DOORS AND WINDOWS

Doors: classification of doors; (a) panelled doors. (b) ledged and battened doors, (c) ledged, braced and battened doors, (d) framed, ledged, braced, and battened doors (e) flush doors
Windows: Timber windows; Casement window and its details

Module 5

DIFFERENT TYPES OF ROOFS -

Flat- Madras terrace roof, RCC slab,
Pitched- lean to, coupled, couple close, collar, scissor, king post and queen post
Roofcoveringmaterials-asbestos,GIsheets,Fibre,Glass,Aluminium,asphaltic,polycarbonate, clay tiles.
Roof fixing details along with gutter.

Note

- Frequentsitevisitstobearrangedasapartofthecurriculum.Sitevisitsshouldbeinlinewiththe presentstudiowork.Itismandatoryforstudentstosubmitasiteobservationreport,either periodicallyorattheendofthesemester.
- Pedagogyshouldestablishthelinkageoftherelevantmaterialandconstructiontechniques from past topresent.
- Performing standards and Codes used for various Building Materials and Construction Techniques needs tofocused.
- Alternativeconstructiontechniquesforrespectivetopicsneedstobediscussedindetail.
- ThesubjectistobeintegratedwiththeongoingsubjectofBasicDesign-IIthroughoneormany assignments.

References

1. Barry,R.(1999).*TheConstructionofBuildingsVol.2*.5thEd.NewDelhi:East-WestPress.
2. Bindra,S.P.andArora,S.P.(2000).*BuildingConstruction:PlanningTechniquesandMethodsof Construction*,19thEd.NewDelhi:DhanpatRaiPublications.
3. Ching,F.D.K.(2000).*BuildingConstructionIllustrated*.3rdEd.NewYork:Wiley.
4. Edward,A.andPiano,J.(2009).*FundamentalsofBuildingConstruction:MaterialsandMethods*.5thEd.Hoboken:JohnWiley&Sons.
5. Foster,J.S.(1963).*MitchellBuildingConstruction:ElementaryandAdvanced*.17thEd.London: B.T. Batsford Ltd.
6. HaileyandHancork,D.W.(1979).*BrickWorkandAssociatedStudiesVol.II*.London:MacMillan.
7. McKay,W.B.(2005).*BuildingConstructionMetricVol.1–IV*,4thEd.Mumbai:OrientLongman.
8. Moxley,R.(1961).*Mitchell'sElementaryBuildingConstruction*.London:B.T.Batsford.
9. Rangwala,S.C.(1963).*BuildingConstruction:MaterialsandtypesofConstruction*,3rdEd.New York:JohnWileyandSons.
10. Rangwala,S.(2004).*BuildingConstruction*.22ndEd.Anand.:CharotarPub.House.
11. Sushil-Kumar,T.B.(2003).*BuildingConstruction*,19thEd.Delhi:StandardPublishers.

Course Outcomes

CO1	Develop the knowledge about foundations and its types
CO2	Develop the knowledge about staircase
CO3	Develop the knowledge about carpentry work
CO4	Demonstrating various kind of timber doors and windows
CO5	Develop the knowledge about roofs

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	1	-	2	3	-	-	-	-	3
CO2	3	2	-	1	-	2	3	-	-	-	-	3
CO3	3	2	-	1	-	2	3	-	-	-	-	3
CO4	3	2	-	1	-	2	3	-	-	-	-	3
CO5	3	2	-	1	-	2	3	-	-	-	-	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	2	-	1	-	2	3	-	-	-	-	3

s

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
2nd	BAR02008	Visual Art & Documentation	02	0	0	4

Objective

To introduce the students to fundamentals of visual arts and the use of graphics, colour and rendering for presentation of architectural drawings and visual communication. Visual documentation enables to enhance effective use of graphics and artistic skill for visual communication.Toexposethestudentstorealworldsituationandtorepresenttheobservation andunderstandingthroughgraphics,sketchesandarchitecturaltechnicaldrawings.

Module I

BASIC SKILLS OF VISUAL ART

Basicrepresentationtechniquesindifferentmediathroughdrawingpencil,pen,brush,charcoal, crayonsetc

FreeHandsketching:linestrokes,value,tonesofsimplenaturaland3Dgeometricforms.Studyof formsinnatureandanalysiswithrespecttotheircolour,form,textureandstructure. Exercisesinvolvingthesenaturalformsandvariousapproachestoartsuchas–Representation, AbstractionandNon-Representational/Non-Objectivecompositions.

Module 2

RENDERING TECHNIQUES

Monochromatic&differentthemesofrendering,architecturalrenderingtechniquesusingpen& ink,color,values,tones,andgeneralapproachtorendering.renderingofsky,landscapeelements, andhumanfigures;Renderingofbuildingswithforegroundandsurroundingsshowingshadesand shadows.

Module 3

ORNAMENTATION IN BUILDINGS

Studyofornamentationinarchitecturedesign:useofcircleinmouldings,OvoloCovetta,Ogee, Lancet,Horseshoe,Moorish,Stiltedandrampant-Tudor,threecenteredanddrop,Exerciseson columns,entablature,pediments,cornices,balustrades.

Module 4

DOCUMENTATION

Outdoorsketching:Builtenvironment,NaturalLandscape,Rural,HeritageandUrbanbuilt environment, e.g. streetscape, chowks, squares, skyline, facade, views and vistas. etc. Understanding variety inForms.

Module 5

SOFTWAREGRAPHICS

IntroductionofvarioussoftwareavailableforArchitecturalpresentationsuchasPhotoshop& Coral.BasicToolsforEditingandCreatingGraphics.

Movie making Flash movies, animation graphics, 3D Printing.

References

1. Albert O'Halse, Architectural Rendering:The Techniques of Contemporary Presentation,

McGraw Hill Book Company. New York, 1972.
2. Ching,F.D.K.*ArchitecturalGraphics*.5thEd.Hoboken:JohnWiley&Sons,2009.
3. ShankarMulik,Perspective&Sciography,AlliedPublishers
4. Shah,M.G..&Kale,K.M.,*PerspectivePrinciples,*Asiapublication,Mumbai.
5. Atkins,B.,ArchitecturalRendering.California:WalterFosterArtBooks,1986.
6. FrancisD.K.Ching&StevenP.Juroszek,Designdrawing,JohnWiley&Sons,USA,1998.
7. H.Morris,GeometricalDrawingforArtStudents,OrientLongman,Chennai.
8. Holmes,J.M.,AppliedPerspective.London:SirIsaac,PiotmanandSonsLtd.,1954.
9. ThomsE.FrenchGraphicScienceandDesignNewYorkMcGrawhill
10. AtkinWilliamWCorbellettiRanieroandFiroreRVincent(1962).PencilTechniquesinModern Design4thedReinholdPub.CorporationNewYork

Course Outcomes

CO1	Defining visual art and developing its process
CO2	Demonstrating rendering techniques
CO3	Analysing ornamentation in building
CO4	Developing knowledge about documentation
CO5	Applying the knowledge of software graphics

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	-	3	-	-	-	-	1	-	1	2
CO2	2	3	2	3	-	-	-	-	1	-	1	2
CO3	2	3	-	3	-	-	-	-	1	-	1	2
CO4	2	3	2	3	-	-	-	-	2	-	1	2
CO5	2	3	3	3	-	-	-	-	2	-	1	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	2	3	2	3	-	-	-	-	1	-	1	2

THIRD SEMESTER
BARCH PROGRAMME

THIRD SEMESTER								
SL. NO.	**COURSE CODE**	**SUBJECTS**	**CONTACT HOURS (L-T-P)**	**CREDIT**	**SEMESTER EVALUATION (WE, IA, VV, TP)**			
THEORY SUBJECTS								
1.	BAR03001	History of Architecture -II	3-0-0	3	WE			
2.	BAR03002	Climatology	2-1-0	3	WE			
3.	BAR03003	Structural Analysis	3-0-0	3	WE			
4.	BAR03004	WaterSupplyandSanitation	3-0-0	3	WE			
SESSIONAL SUBJECTS								
1.	BAR03005	Architectural Design - I	0-0-9	9		IA	VV	TP
2.	BAR03006	Surveying and Leveling	1-0-2	2		IA		TP
3.	BAR03007	Building Construction -III	0-0-4	4		IA	VV	TP
4.	BAR03008	Computer Applications - I	1-0-2	2		IA	VV	TP
TOTAL			**13-1-17 = 31**	**29**				

DETAIL SYLLABUS
THIRD SEMESTER BARCH PROGRAMME

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
3RD	BAR03001	History of Architecture - II	03	03	0	0

Late Ancient and Early Medieval (1st Century AD – 1000AD)

Objective

Toprovideanoverviewofthearchitectureofearlymedievalperiodacrossdifferentgeographies. Social,religious,politicalandarchitecturalcharacter,constructionmethodsandbuildingmaterials shallbeexplainedwithsuitableexamples.Toprovideanunderstandingoftheevolutionofclassical periodandChurcharchitectureofthewest,andIndianArchitectureinitsvariousstylisticmodes characterized by technology, ornamentation and planning practices. Combined influence of geology,geography,climate,beliefs,religionandcultureonthearchitecturemustbehighlighted soastoappreciatehowarchitectureisembeddedinplacespecificcontext.Thestudymustenable students to do a comparative evaluation of developments in a chronological manner alongthe timeline and across different geographies.

Module 1

EARLYCHRISTIANARCHITECTURE

Evolution of church form from the Roman Basilica, architectural character & space planning, Schism of Roman Empire to Western & Eastern Provinces, Polymath architecture &Baptisteries,*(Structures – St. Peters Basilica, St. Clemente).*

Module 2

CHURCH ARCHITECTURE OF BYZANTINE

FactorsinfluencingByzantineArchitecture,developmentofDomes&Pendentives,*(Structures– HagiaSophiaatConstantinople);*Romanesque–evolutionofreligiousordersinChristianity–Italy *(PisaCathedralcomplex)*&England*(TowerofLondon).*

Module 3

BUDDHIST AND JAIN ARCHITECTURE

SymbolismofBuddhistArchitecture,rock-cutarchitecture,AshokanSchool(Hinayana&Mahayana Period),developmentofstupa,Buddhistschools–MathuraSchool&TakshashilaSchool(Greek influence)*(Structures–Chaitya&Vihara,MonolithicAshokanPillars,Rock-edicts,StupaofSanchi/ Amravati)*

SymbolismofJainArchitecture,rock-cutarchitecture,generalplanning,sittinganddecorative treatmentsofJaintemples.*(Structures–DilwaratempleofMt.Abu,Jaintemple-Adinathatemple, Ranakpur)*

Prominent Sites:

- Sanchistupa
- Rockedicts:Maski,Kaushambi,Jaugada,Dhaulietc
- Pillaredicts:Lauriya,Rummindei,Rampurvaetc
- Ancienttowns:Girnar,Sarnathetc
- Ajantacaves
- Iron pillar inMehrauli
- BhitragaontempleandDeogarhtemple

- HinduandBuddhisttemplesatSarnath
- Nalanda andTaxila

Module 4
EARLY TEMPLE ARCHITECTURE
StudyofworshippingplacesinIndoaryan/Nagarastyle,roleofShilpasasthras,designof buttressedshikharas,rockcutandstructuralexamplesoftemples.EvolutionofHindutemples,early shrinesofGupta*(Tigwa,Sirpur,Deogarh)*&Chalukya*(LadhKhan,DurgaTemple)*,Developmentof Indo-Aryanstyle*(Papanatha,VirupakshaatPattadakal)*,
Temples and Pagodas of South East Asia: Cambodia- Angkor Wat, Borobudur; Nepal

Module 5
DRAVIDIAN TEMPLE ARCHITECTURE
Study of worshipping places in Dravidian style, role of Shilpa sasthras, design of Gopuram&Shikhara, rock cut and structural examples of temples. Dravidan Style: Rock-cut of Pallavas*(Rathas& Mandapa)* & Structural *(Shore temple of Mahabalipuram).*
Dravidian style in Pallava, Chola, Pandya periods Kailashnath temple Kanchipuram

References

1. Brown,P.(2010).IndianArchitecture:BuddhistandHinduperiod.Mumbai:D.B.TaraporevalaSons andCo.
2. Fletcher,B.(1996).AHistoryofArchitectureontheComparativeMethod.20thEd.London:B.T. BatsfordLtd.
3. Copplestone,T.andLloyd,S.(1971).WorldArchitecture:AnIllustratedHistory.London:Verona Printed.
4. Lloyd,S.andMuller,H.W.,(1986),HistoryofWorldArchitectureSeries,FaberandFaberLtd., London.
5. Crouch,P.D.(1985).HistoryofArchitecture:StonehengetoSkyscrapers. London:McGraw-Hill.
6. Dutt,B.B.(2009).TownPlanninginAncientIndia.Delhi:IshaBooks.
7. Grover,S.(2003).BuddhistandHinduArchitectureinIndia.2ndEd.NewDelhi:CBSPublishers.
8. Roth, M. L. (2006). Understanding Architecture: Its Elements, History, and Meaning. Columbia:West-viewPress.
9. Harris,M.C.(1977).IllustratedDictionaryofHistoricArchitecture.NewYork:M.CourierDover Publications.
10. Ingersoll,R.AndKostof,S.(2013).Worldarchitecture:across-culturalhistory.Oxford:Oxford UniversityPress.
11. Singh,U.(2009).Ahistoryofancientandearlymedieval India:fromtheStoneagetothe12th century.Delhi:PearsonIndia.
12. Hiraskar,G.K.,GreatAgesofWorldArchitecture,DhanpatRai&Sons,Delhi.

Course Outcomes

CO1	Analyze the concept of Early Christian Architecture
CO2	Evaluate the characteristics of Early Byzantine Architecture
CO3	Express the understanding about the Early Buddhist and Jain Architecture
CO4	Analyze the concept of Early Temple Architecture in North India
CO5	Evaluate the characteristics of Early Temple Architecture in South India

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	1	3	1	1	-	-	1	2	1
CO2	3	3	-	1	3	1	1	-	-	1	2	1
CO3	3	3	-	1	3	1	1	-	-	1	2	1
CO4	3	3	-	1	3	1	1	-	-	1	2	1
CO5	3	3	-	1	3	1	1	-	-	1	2	1

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	3	-	1	3	1	1	-	-	1	2	1

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
3RD	BAR03002	Climatology	03	02	01	0

Objective

To impart scientific understanding of processes by which building and entire habitats can be designed to respond to nature, with climate as the basic parameter of design. To study fundamental parameters for thermal comfort. Equip the students with fundamental scientific conceptsrequiredtodesignclimateresponsivebuildings,byofferingaclearunderstandingofthe variousclimaticzonesanditsclimateresponsiveconsiderationsinarchitecturaldesignofbuilding and built upareas.

Module 1

CLIMATE & THERMAL COMFORT

Effect of climate on habitat, shelter and environment. Global Climatic factors, elements of climate, graphic representation of climatic data, psychrometric chart, Mahoneys Tables,

Study of world climatic zones, characteristics of tropical climate.

Humancomfortconditions–Thermalbalanceofthehumanbody,comfortchart,comfortzone, Thermalcomfortindices-Effectivetemperature,CET,humidity,radiation,wind,precipitationand itsconsiderationsatMacroclimateandMicroclimate(Site-climate),challengeofrapid,extreme environmentalchange.

Module 2

PRINCIPLESOFTHERMALDESIGN

Thermalquantities–heatflowrate,surfaceconductance,transmittance–calculationofU-value, convection,radiation,conceptofsol-airtemperature&solargainfactor,conductivity(k–value), resistivity,thermalcapacityandemissivity,conductancethroughamulti-layeredbody.

Basicprinciplesofheattransferthroughbuildings,Exercisesinheatloss&heatgainundersteady stateconditions&itsapplicationinselectionofappropriatematerialsforwalls&roof.

Exercises using different measuring instruments in indoor and outdoor conditions.

Module 3

SOLARGEOMETRY&DESIGNOFSUNSHADINGDEVICES

Apparentmovementofthesun,sunpathdiagrams**(**solarchart)-Solarangles,Shadowangles, solar shading elements, etc.

Exercisesonplottingisopleths,transferofisoplethstosolarchart,fittingashadingmaskoverthe overheatedperiod&designofsunshadingdevicesfordifferentorientations.

Module 4

VENTILATIONINBUILDINGS

Ventilation-Thewind,Theeffectsoftopographyonwindpatterns,principlesofnaturalventilation, windflowaroundbuildingsandairflowpatternsinsidebuildings,airchange,qualityofair,useof fans,thermallyinducedaircurrents,Pressurelosses:Stackeffect,Venturieffect,Useofcourtyard.

Windvelocity–windrosediagram.

Exercisesonanemometeranditsuse.Windtunnelexperimentforwindmovementaroundthe buildings.

Module 5

DESIGNFORCLIMATICTYPES

Buildingdesign&layoutplanningconsiderationforwarmhumid,hotdry&compositeclimates, Tropicalclimate.Evaluatingvariousbuiltformandorientationofsinglebuilding,Buildingmaterial andconstructionforcomfortconditionsinthetropics.EffectoflandscapeelementsonClimate andArchitecture.

PassiveCooling::PassivemethodsofCooling,roofpond,desiccantcooling,EvaporativeCooling andearthshelteredbuildingsetc.

Exercisesonclimaticdatasets,analysis,climategraph,theMahoneytables&itsrecommended specification

References

1. *O.H. Koenigsberger, Manual of Tropical housing and building – Climatic Design, Orient Longman, Chennai,1975.*
2. *M.Evans–Housing,Climate&Comfort,ArchitecturalPress,London,1980.*
3. *E.Schild&M.Finbow–EnvironmentalPhysicsinconstruction&itsapplicationinArchitectural Design,granadar,London,1981.*
4. *Olgyay,A.andOlgyay,V.,SolarControlandShadingDevices.NewJersey: PrincetonUniversityPress,1976.*
5. *Krishan,A.andNickBaker,ClimateResponsiveArchitecture:ADesignHandbookforEnergy EfficientBuildings,McGrawHillEducationPrivateLimited,India,1999.*
6. *B.Givoni,Man,Climate&Architecture,AppliedScience,Essex1982.*
7. *DonaldWatson&Kennethlabs–ClimaticDesign–McgrawhillNewYork1983.*
8. *A.Konya-DesignPrimerforHotClimates,ArchitecturalPress,London,1980.*
9. *Chand,I.andBhargava,P.K.,TheClimaticHandBook.NewDelhi:TataMcGraw-Hill,1999.*

Course Outcomes

CO1	Implement the basic knowledge about Climate and its elements
CO2	Demonstrate the knowledge about thermal design
CO3	Implement principles of solar geometry and sun-shading devices
CO4	Analyze the knowledge about ventilation in building
CO5	Evaluate the building design according to different climatic condition

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	1	2	3	3	-	-	1	2	3
CO2	3	-	-	1	2	3	3	-	-	1	2	3
CO3	3	-	-	1	2	3	3	-	-	1	2	3
CO4	3	-	-	1	2	3	3	-	-	1	2	3
CO5	3	-	-	1	2	3	3	-	-	1	2	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	-	-	1	2	3	3	-	-	1	2	3

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
3RD	BAR03003	Structural Analysis	03	03	0	0

Objective

With the acquired knowledge of statically equilibrium of forces the course aims at teaching methodstodetermineeffectofloadsonmembersofdifferentdeterminatestructuresandgive additionalknowledgeofdeformationofstructurestosolveindeterminatestructures.Tofamiliarize thestudentwiththeeffectsoftransverseforcessuchasshearforce&bendingmomentinbeams; determinationofSF&BMinsimplebeamsunderdifferentloadingsystems;andunderstandingof strengthandforcesincolumnsandarches.

Module 1

Introductiontodeterminateandindeterminatestructures,Differenttypesofloadsactingona structure

BEAMS: TYPES & PROPERTIES

Typesofbeams,itsbehaviour,typesofsupports(fixed,simplesupported),andreactions,bending moment and shear forces; simply supported, cantilever and overhanging beams, relation betweenbendingmomentandshearforce.

Explaining with Shear force diagram (SFD) and Bending moment (BMD).

Module 2

BENDINGANDSHEARFORCES

Shearforeandbendingmomentforfixedandcontinuousbeams,applicationof Clapperayon'stheoremofthreemoments.Momentdistributionmethod.

Determination of member of forces in determinate trusses and simple frames

Module 3

DEFLECTION

Relationbetweenslope,deflectionandcurvature,cantileverbeamswithpointload&udlusing double integration method & moment area methods, three moment theorem, deflection by conjugate beammethod.

Deflection-II,IntroductionofMaculay'smethod,slopesanddeflections,simplysupportedbeams withpointload&udlusingdoubleintegration&Macaulay'smethod,Fixedbeams:Introduction, Application to simple cases including overhanging beams.

Module 4

COLUMNS

Typesofcolumns,columnsandstruts,bucklingandcrushingfailure,Euler'stheory, equivalentlengthandslendernessratio,Rankine'sformula.

Module 5

ARCHES

Determination of horizontal thrust, radial shear and normal force, axial thrust, BendingmomentandShearforceforthree-hingedarch;segmentalarcheswithsupportsatsame levelanddifferentlevels.Structuralconceptsinpost&lintel,arch,dome,andvaultconstruction.

References

1. Junnarkar,S.B.(1991).MechanicsofStructures.Vol.1.20thEd.Delhi:Charotar.
2. Kurmi,R.S.StrengthofMaterials.NewDelhi:S.Chand&Company.
3. Mukherjee,S.ElementsofEngineeringMechanics.NewDelhi:PHILearning.
4. Ramamrutham,S.(2008).EngineeringMechanics:ATextbookofAppliedMechanics.Dhanpat RaiPublishing.
5. VaziraniandRatwani.(2008).AnalysisofStructures.Vol.I.NewDelhi:KhannaPublishers.
6. Gere,J.M&Timoshenko,S.P.,MechanicsofMaterials,CBSPublishers&Distributors.

Course Outcomes

CO1	Analyze the concept of Beams and affecting forces
CO2	Implement principles of bending and shear force
CO3	Analyze the concept of deflection
CO4	Apply basic principles of columns and its structural roles
CO5	Demonstrate basic principles of arches and its structural roles

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	1	-	-	1	-	-	-	1	2
CO2	3	-	-	1	-	-	1	-	-	-	1	2
CO3	3	-	-	1	-	-	1	-	-	-	1	2
CO4	3	-	-	1	-	-	1	-	-	-	1	2
CO5	3	-	-	1	-	-	1	-	-	-	1	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	-	-	1	-	-	1	-	-	-	1	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
3RD	BAR03004	**Water Supply and Sanitation**	03	03	0	0

Objective

To provide knowledge and understanding of the fundamentals of water supply and sanitation infrastructurerequiredforbuildingsandurbanareas,soastoenablethemtocomprehendthe subjectthoroughlyandintegrate thelearninginto architecturaldesign.Studentstobe encouragedtoexploretechnologiesforrecyclingandreuseofwaterandsolidwaste.

Module 1

WATER SUPPLY

Introduction,typesofsources,yield&spacingofwells,intakes,pumpingandtransportationof water. Treatment of water, qualities of potable water. Domestic water distribution system, reservoirs,supplysystemlayouts,Pipeappurtenances,pumps,pumpingplants,overheadtanks, water demand calculations. Building service connection, Ferrules, Water meters. Layout of domesticwaterpipingsystems,joints,fittingsandvalves.Cold&hotwaterlinesinbuildings,Water supply to high rise buildings: problems encountered & systems adopted.

Module 2

BUILDINGSANITATION

Principles of sanitation, collection and disposal of various kinds of refuse from buildings. Methods of carrying refuse, systems of refuse disposal, their principles. Plumbing definitions andrelatedterms,plumbingsystems(onepipe,twopipeetc),Designofdrainageandventpipes, systemforlow-riseandhigh-risebuildings,buildingdrains,sewers,gullies,inspectionchambers, manholes,connectiontopublicsewer,crossconnections,Housedrainagesystem, Drainageofsub-soilwater,Sub-drains,culverts,ditchesandgutters,dropinletsandcatchbasins, roadsandpavements,stormoverflow/regulators.

Module 3

PLUMBINGANDSANITARYAPPLIANCES

Basic principles of Plumbing, need, scope, terminology. Specifications and installation of sanitaryfittingslikeshowertemple,bathtub,Jacuzzi,waterclosets,flushingcisterns,urinals,sinks,washb asins,bidet,lowflowfixtures,etc.

Uses of gate valve, float valve, flap valve, ball valve, flush valve, etc, different types of taps, faucets,stop cocks, bib cocks, 'P', 'Q', 'S', floor/bottle traps used in buildings.

Module 4

SEWERAGE AND SOLID WASTE DISPOSAL

Indianstandardsandbyelawsforsanitaryconveyance.Disposalofsewagefromisolated building,Gradientsusedinlayingofdrainsandsewersforvarioussizes.Septictankdetails & capacity calculation. Sewage treatment. biogas, soil disposal without water carriage, rural sanitation.

Oxidationpond,DispersiontrenchandsoakpitsSewerageTreatmentsystem-Rootzonetreatment system,DecentralizedWastewaterTreatmentSystems(DEWATS),SoilBiotechnology,packaged Bio-ReactorSystemApproachesforsolidwastemanagement,Solidwastescollectionandremoval from buildings. On-site processing and disposal methods, guidelines for municipal solidwaste management, e-wastemanagement

DISPOSALOFWASTES: Sanitarylandfilling,Composting,Vermi-compost,Incineration,Pyrolysis

Module 5

DESIGNOFPLUMBINGSYSTEMS

Design considerations on drainage scheme. Planning of bathrooms, lavatory blocks and kitchenindomesticandmultistoriedbuildings.Preparationofplumbingdrawings,symbols commonlyusedinthesedrawings.

References

1. Birdie,B.S.(1996).WatersupplyandSanitaryEngineering.DhanpatRaiandSons.
2. NationalBuildingCodeofIndia.(2005).
3. Punmia,B.C.,Jain,A.K.andJain,A.K.(1995).WaterSupplyEngineering.NewDelhi:Laxmi Publications.
4. Punmia,B.C.,Jain,A.K.andJain,A.K.(1998).WasteWaterEngineering.NewDelhi:Laxmi Publications.
5. Rangwala,S.C.(2005).WaterSupplyandSanitaryEngineering.CharoterPublishing.
6. HandbookWaterSupplyanddrainagewithSpecialEmphasisonPlumbing.BureauofIndian Standards, NewDelhi.

Course Outcomes

CO1	Analyze the concept of Water sources and water supply system
CO2	Apply basic principles of sanitation process in buildings and other built-forms
CO3	Demonstrate the knowledge about sanitary fittings, valves and faucets
CO4	Demonstrate the knowledge about sewerage and solid waste disposal
CO5	Implement principles of plumbing system and its principles

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	-	3	1	2	1	-	-	-	1	2
CO2	3	1	-	3	1	2	1	-	-	-	1	2
CO3	3	1	-	3	1	2	1	-	-	-	1	2
CO4	3	1	-	3	1	2	1	-	-	-	1	2
CO5	3	1	-	3	1	2	1	-	-	-	1	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	1	-	3	1	2	1	-	-	-	1	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
3RD	BAR03005	Architectural Design - I	09	0	0	9

Objective

To explore the interrelationship between human behaviour and space in a small residential environment, including, volume of space, shape, form, function, climate and materials.

1. MAJOR DESIGN PROBLEM

Residential Built spaces

Intent

Tomakethestudentsknowaboutandresolvethecomplexitiesinvolvedinintegratinglivingand working spaces in urban areas and understanding the relationship of internal spaces in such structures.

Focus Areas

- Formulations of theconcept
- AppropriateSpace-planningmethods(facilitationandcirculation)
- Variousfunctionsandtheirspatialimplications
- Integrationofformandfunction
- Anthropometry and furniturelayout
- Horizontalcirculation
- Interiorvolumesandspacearticulationthroughdifferentmaterials
- Relationshipofvariedspaceshavingacompositerelationshipofoccupancyandtheirnature [vertical(2to3*levels*)/horizontal]
- ImpactofLivingandWorkingenvironmentsonthepsychologyofusers

Allied Knowledge Required

- Typesofrelevantfurnitureandtechniquesofareaanalysis
- Basiccontemporarybuildingmaterialsandtheirapplications
- Principles of framedstructures

ExamplesofStudioProjects

Residencecumworkplace-Artist'sresidence,Architect'sresidence,Doctor'sresidence,Sculptor's residence, Farm houseetc.

2. SMALLSCALEPACESETTERDESIGNPROBLEM

- Smalldesignproblemsusingmetaphors,signs&symbolsasadesigntool
- Smallformorienteddesignproblems

Examples:Doctor'sClinic,smallCafeteria,HighwayRestaurant,Villagepostoffice,Bank extensioncounter

Note

- Studytourofone-weekdurationismandatoryforconductingcasestudyandfieldstudy relatedtotheArchitecturalDesignproject.
- EndSemesterevaluationwillbedonebyexternaljurymember(fromAcademicsor ProfessionalArchitect)otherthantheUniversityfaculty.

References

1. Chaira,J.D.andCrosbie,M.J.(2001).TimeSaverStandardsforBuildingTypes.4thEd.New York :McGraw-Hill.
2. BousmahaBaiche&NicholasWalliman,NeufertArchitect'sdata,Blackwellscienceltd.
3. Hareguchi,H.(1988).AComparativeanalysisof20thC.houses.London:AcademyEditions.
4. Miller,S.F.(1995).DesignProcess:APrimerforArchitecturalandInteriorDesign.NewYork:Van NostrandReinhold.
5. Robson,D.(2002).GeoffreyBawa:TheCompleteWorks.NewYork:Thames&Hudson.
6. Schulz,N.C.(1985).Theconceptofdwelling.NewYork:RizzoliInternationalPublications.
7. UnwinS.(2010).TwentyBuildingseveryArchitectshouldunderstand.NewYork:Routledge.
8. Meiss,V.andPierre,ElementsofArchitecture:FromFormtoPlace.

Course Outcomes

CO1	Implement the concept of Anthropometry
CO2	AnalyzeZoning and Circulation
CO3	Demonstrate Relationship of varied spaces
CO4	Evaluate the Impact of Living and Working environments on the psychology of users.
CO5	Analyze the concepts of Small form-oriented design problems

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	2	2	3	2	2	2	1	2
CO2	3	3	3	3	2	2	3	2	2	2	1	2
CO3	3	3	3	3	2	2	3	2	2	2	1	2
CO4	3	3	3	3	2	2	3	2	2	2	1	2
CO5	3	3	3	3	2	2	3	2	2	2	1	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	3	3	3	2	2	3	2	2	2	1	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
3RD	BAR03006	**Surveying and Levelling**	02	1	0	2

Objective

Toequipstudentswiththebasicprinciplesandtheorieswhichunderliethesystematicstudyof topographicfeatures,throughdifferentmethodsoflandsurveying.Basicskillsoflandformanalysis, executionoffieldsurveyforfoundationlayouting,contoursurvey,gradientplotting,surveying physical features, etc. are covered in the course. To train the students for preparation and interpretationofsurveydrawings,methods,toolsandequipmentnecessarytocarryoutdifferent surveyproceduresandrecentadvancementsinthefieldoflandformssurveyandmeasurements.

NOTE: Theoreticalunderstandingaboutdifferentsurveyingtechniquestaughtineachmoduleto beimpartedinthebeginningoftherespectivemodulesbeforedoingthepracticalsitesurveys.

Module 1

INTRODUCTION AND LINEAR MEASUREMENTS

LECTURE

ReadingofsurveyMaps,understandingoffeaturesandundulationsofground;Scalesusedin Plotting. Linearmeasurementandchainsurvey:useofvarioustypesofchainsandtapes,setting-out& surveystations,measurementofcorrectlengthofline,directandindirectranging,open&closed traverse changing along sloping ground, Obstacles in chaining, errors, and their elimination Compasssurvey,bearings&angles,localattractions,errorsincompasssurvey. Log-books,fieldboundaries,fieldareaestimation.

PRACTICALS

Chainingstationpoints,offsets,field-bookentry,single-&double-lineentry,Triangulation, Traversing, Plotting, Calculation of Areas. Compass Surveying Traversing, balancing, closingerrors,plotting,calculatingareas.

Module 2

LEVELLING

LECTURE

Profilelevelling,Useofautolevelandlevellingstaff;TemporaryandPermanentadjustmentsof autolevel;ReductionoflevelsbyH.Iandriseandfallmethod.Curvatureandrefractionerror, sensitiveness of level tube, reciprocal levelling, levelling difficulties and common errors

PRACTICAL

Profile levelling using auto level and staff.

Module 3

CONTOURS IN LANDFORMS

LECTURE

Characteristicsofcontours,Contourintervalandhorizontalequivalent,methodsofcontouring-directandindirectmethod,contourgradient,blockcontoursurveys,longitudinal&traversecross sections,gradients,Contouringmethods&equipment,plane-table,plottingcontours&profiles, estimating areas &volumes.

PRACTICAL

Method of Plane Table Surveying, Two- & Three-Point Problems.

Module 4
THEODOLITE SURVEY & MEASUREMENT
LECTURE
TheodoliteSurveying,temporaryadjustment,measuringhorizontalandverticalangles,closing errors, theodolitetraversing
PRACTICAL
Theodolite,measuringverticalandhorizontalangles,TheodolitePlotting,balancing closingerrors.

Module 5
PRECISION METHODS
LECTURE
Automated & digital surveying, Total station, G.P.S
PRACTICAL
Demonstration of Surveying with Total Station equipment.

References

1. Shahani,P.B.(1980).TextofSurveyingVol.I.OxfordandIBHPublishing.
2. Punmia,B.C.,Jain,A.K.andJain,A.K.(2005).SurveyingVol.I-III.NewDelhi:LaxmiPublications.
3. Duggal,S.K.(2004).SurveyingVol.1-2.NewDelhi:TataMcGrawHill.
4. Miller,V.C.andWesterback,M.E.(1989).InterpretationofTopographicMaps.Columbus: Merrill.
5. Easterbrook,D.J.(1999).SurfaceProcessesandLandforms.2ndEd.NewYork:McMillan.
6. Carson,M.A.andKirkby,M.J.(1972).HillslopeFormandProcess.LondonandNewYork: Cambridge UniversityPress.
7. Kanetkar,T.P.&Kulkarni,S.V.,Surveying&levelling,Vol-1.

Course Outcomes

CO1	Analyze the concept of survey Maps and undulations of ground
CO2	Analyze the concept of Levelling
CO3	Apply basic principles of contours
CO4	Demonstrate basic principles of Theodolite Surveying
CO5	Express the concept of Automated & digital surveying

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	3	1	-	-	-	-	-	-	-
CO2	3	-	-	3	1	-	-	-	-	-	-	-
CO3	3	-	-	3	1	-	-	-	-	-	-	-
CO4	3	-	-	3	1	-	-	-	-	-	-	-
CO5	3	-	-	3	1	-	-	-	-	-	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	-	-	3	1	-	-	-	-	-	-	-

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
3RD	BAR03007	Building Construction -III	04	0	0	4

Objective

To understand fundamental building material in the context of various construction methods. Focusonvariousbuildingmaterialswouldbeemphasisedbasedontheperformingstandardsand codes,whereinapplicationofeachmaterialwouldbediscussedindetail, bothinthecontextoftraditionalandmodernconstructionmethodsandpractices.Basedonthe lecturedelivered,thestudentsarerequiredtoproduceconstructionanddetaildrawings.With time, each topic can also focus on latest trends in practice and usage of new technology/materials.

Module1

DOORS

IntroductionofGlass,FibreGlass,AluminiumandSteelasbuildingmaterials
Types of doors based on the make
Sliding door, Sliding door, pivoted, revolving, swing, rolling shutter, safety doors, collapsibleandetc.,hardwarefixtures,joinery,door-fixingdetails,andtypesofmaterials usedindoors(metal,glass,aluminium,&PVC).

Module 2

WINDOWS AND VENTILATORS

Types of windows based on the make
sliding, pivot, casement, louvered, fixed, bay window, etc.) and material (steel, glass and aluminum) hardware fixtures, joinery, window fixing
Anodisedaluminium, steel and UPVC window sections.

Module 3

DEEPEXCAVATION,SCAFFOLDING&FORMWORK,SHORING,ANDUNDERPINNING

Definition,problemsindeepexcavation,termsoftimbering,methodsoftimbering,precautionsto betakenindeepexcavation,dewatering.Typesofscaffolding,formwork(slab,arches,vaultsand domes)shoringandunderpinning,precautionstobetaken,andmethodsadoptedwhiledoing.

Module 4

TIMBER FLOORS

Timberfloors:constructiontechniques,typesoftimberfloors:single,doubleandtriplejoisttimber floors
Types of timber partitions: Single, double and flushed timber partitions

Module 5

TIMBER PARTITIONS

Typesoftimberpartitions:Single,doubleandflushedtimberpartitionsfinishedwithlaminates, veneer and othermaterials.

NOTE:
Frequentsitevisitstobearrangedasapartofthecurriculum.Sitevisitsshouldbeinlinewiththe present studio work. It is mandatory for students to submit a site observation report, either periodicallyorattheendofthesemester.

- Pedagogyshouldestablishthelinkageoftherelevantmaterialandconstructiontechniques from past topresent.
- Performing standards and Codes used for various Building Materials and Construction Techniques needs tofocused.
- Alternativeconstructiontechniquesforrespectivetopicsneedstobediscussedindetail.

References

1. Barry,R.(1999).TheConstructionofBuildingsVol.2.5thEd.NewDelhi:East-WestPress.
2. Foster,J.andMitchell,S.(1963).BuildingConstruction:ElementaryandAdvanced,17thEd. London:B.T.BatsfordLtd.
3. McKay,W.B.(2005).BuildingConstructionMetricVol.I–V.4thEd.Mumbai:OrientLongman.
4. HaileyandHancork,D.W.(1979).BrickWorkandAssociatedStudiesVol.II.London:MacMillan.
5. Merritt,F.S.andRicketts,J.T.,BuildingDesignandConstructionHandbook,McGrawHill.
6. Rangwala,S.C.(1963).BuildingConstruction:MaterialsandtypesofConstruction.3rdEd.New York:JohnWileyandSons.
7. Chudley,R.(2008).BuildingConstructionHandbook.7thEd.London:Butterworth-Heinemann.
8. Sushil-Kumar,T.B.(2003).BuildingConstruction.19thEd.Delhi:StandardPublishers.
9. Ching,F.D.K–BuildingConstructionillustrated.VNR,1975
10. A.Agarwal–Mud:Thepotentialsofearthbasedmaterialforthirdworldhousing–IIED,London, 1981.
11. HUDCO–Allyouwantedtoknowaboutsoilstabilizedmudblocks,NewDelhi,1989.

Course Outcomes

CO1	Analyze the concept of Doors.
CO2	Apply basic principles of Windows and Ventilators.
CO3	Express the concept of deep excavation and skafoldings.
CO4	Demonstrate basic principles of Timber Floors.
CO5	Apply basic principles of Timber Partition

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	1	-	2	3	-	-	-	-	3
CO2	3	2	-	1	-	2	3	-	-	-	-	3
CO3	3	2	-	1	-	2	3	-	-	-	-	3
CO4	3	2	-	1	-	2	3	-	-	-	-	3
CO5	3	2	-	1	-	2	3	-	-	-	-	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	2	-	1	-	2	3	-	-	-	-	3

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
3RD	BAR03008	Computer Applications - I	02	1	0	2

Objective

Tofamiliarizestudentswithbasicunderstandingofdocumentationandpresentationsoftware.To developskillinusingComputeraidedArchitecturalDesignsoftwareforpreparingarchitectural drawings.

Module 1

IntroductiontoApplicationsofMSOfficeinpresentation:MicrosoftWord,MicrosoftPowerPoint, MicrosoftExcel,AdobePageMaker.

Module 2

Introductiontocomputeraideddesigninarchitecture.Introductiontotwo-dimensionaldraftingin CAD.

Understanding commands like Draw, Modify, use of tools, layers, plotting system and its applications etc.

Module 3

CustomizationofAuto-CAD,Auto-CADexpresstools,creationofarchitecturallibraryelementsand blocks, applying materials and rendering.

Google Sketch-up application in 3D architectural drawings, modelling, creation of entities, dimensioning, application of solids and surfaces.

Module 4

ApplicationofCADinsmallArchitecturalprojectsdoneinthepreviussemesterdesignclass throughsiteplan,floorplan,presentationplan,elevationandsectionusingappropriatesoftware.

Module-5

SeminaronanotherrelatedsoftwarelikeARCHICAD/REVITtounderstandbasicdifferences between thetwo.

Reference

1. Gindis,E.(2014).UpandRunningwithAutoCAD2015:2D&3DDrawingandModelling.Oxford : Elsevier.
2. Seidler,D.R.(2007).DigitalDrawingforDesigners:AVisualGuidetoAutoCAD2012.London: FairchildPublications.
3. Tutorials:http://www.lynda.com/

Course Outcomes

CO1	Demonstrate basic working of MS Office
CO2	Implement principles of CAD Drawings.
CO3	Demonstrate working of CAD Drawings in projects.
CO4	Apply basic principles of 3D Modelling.
CO5	Analyze the concept of working on CAD and 3D Modelling together

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	3	-	-	-	1	-	1	-	1	1
CO2	2	2	3	-	-	-	1	-	1	-	1	1
CO3	2	2	3	-	-	-	1	-	1	-	1	1
CO4	2	2	3	-	-	-	1	-	1	-	1	1
CO5	2	2	3	-	-	-	1	-	1	-	1	1

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	2	2	3	1	1	-	1	2	1	-	1	1

FOURTH SEMESTER
BARCH PROGRAMME

FOURTH SEMESTER								
SL. NO.	**COURSE CODE**	**SUBJECTS**	**CONTACT HOURS (L-T-P)**	**CREDIT**	**SEMESTER EVALUATION (WE, IA, VV, TP)**			
THEORY SUBJECTS								
1.	BAR04001	History of Architecture -III	3-0-0	3	WE			
2.	BAR04002	Design of RCC Structures	3-0-0	3	WE			
3.	BAR04003	Lighting and Electrical Services	2-1-0	3	WE			
4.		Professional Elective (PE) -I	3-0-0	3	WE			
SESSIONAL SUBJECTS								
1.	BAR04004	Architectural Design - II	0-0-9	9		IA	VV	TP
2.	BAR04005	Building Construction -IV	0-0-4	4		IA	VV	TP
3.	BAR04006	Computer Applications - II	1-0-2	2		IA	VV	TP
TOTAL			**12-1-15 = 28**	**27**				

DETAIL SYLLABUS
FOURTH SEMESTER BARCH PROGRAMME

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
4TH	BAR04001	History of Architecture - III	03	03	0	0

Medieval - Early Modern (10th Century - 19th Century AD)

Objective

Toimpartunderstandingoftheevolutioninarchitectureandurbanismfromthemedievaltoearly Moderntimes;Social,religiousandpoliticalcharacter,buildingmaterials,constructionmethods, landscapeandhowtheyinfluencedtheirbuiltformandsettlementpatternsshallbeexplained withexamples.KnowledgeofEuropeanRenaissanceandMughalarchitectureinIndiais provided;Combinedinfluenceofgeology,geography,climate,beliefs,religionandcultureon thearchitecturemustbehighlightedsoastoappreciatehowarchitectureisembeddedinplace specificcontext.

Module 1

GOTHIC&RENAISSANCEARCHITECTURE

Evolutionofvaulting&developmentofstructuralsystem(flyingbuttress,pinnacles,spires,pointed arches); Italian Gothic *(Vatican City and St Peters Cathedral)*, French Gothic *(Notre Dame at Paris)*,EnglishGothic*(WestminsterAbbey)*.Renaissancearchitectureat ItalyandFrance,Baroque Period.

Module 2

TEMPLEARCHITECTURE

- Indo-Aryan–salientfeatures&developmentofShikharas.Odishan–Early*(VaithalDeula/ Parshurameswar)*,Middle*(Lingaraj/KonarkSunTemple)*,Late*(Mukteswar/RajaRani);*
- Gujarat*(SuryaTemple,Modhera);*CentralIndia*(KhadariyaMahadev,Khajuraho)*;
- Dravidian – Rock-cut of Pallavas (Rathas& Mandapa) & Structural (Shore temple of Mahabalipuram);
  Salientfeatures&developmentofVimanas&Gopuram.Cholastyle*(Brihadeswara,Tanjore)*; PandyaStyle*(Gopuram&templecomplex,MeenakshiTemple)*.

Module 3

ISLAMIC ARCHITECTURE

- EvolutionofIslamicarchitecture-featuresofatypicalmosque,principles&influences;
- Constructiontechniques–domes,arches,minarets,calligraphy,etc.
- ImperialStyle(DelhiSultanate)andProvincialIslamicStyles–Developmentofmosques&tomb prototypesinIndia*(Structures-QutabComplexatDelhi),*Bengal*(AdinaMosque)*,Gujarat *(Jami Masjid)*, Deccan *(Golgumbaz and Bijapur)*, *Hyderabad (*Charminar)*, Lucknow(Bara Imambada and ChotaImambada)*

Module 4

MUGHALARCHITECTURE

DevelopmentofMughalarchitectureunderdifferentrulers*(FatehpurSikri,TajMahal,Redfort)*

INDO SARACENIC ARCHITECTURE

SynthesiswithIndianarchitectureandclimaticfactors-Mysore*(MysorePalace)*/Lucknow*(Char BaghRailwayStation/LaMartiniere)*/Baroda*(LaxmiVilasPalace).*

Module 5

HERITAGEOFINDIA:ALONGWATER,FORTSANDPALACES

- StudyofheritagealongwaterfrontinIndia.(AlongtheGanges)
- Studyondevelopmentoffortification,walledtowns,settlementpattern,andthecausative factorsinIndia;
  Study of Forts (Hill forts of Rajasthan: (Amer, kumbhalgarh, mehrangarh)
- StudyofPalacesandHavelis

References

1. Brown,P.(2003).IndianArchitecture(BuddhistandHinduperiods).Bombay:TaraporevalaandSons.
2. GroverS.TheArchitectureofIndia,VikasPub.HousePvt.Ltd.Ghaziabad,1980
3. Benjamin,R.ArtandArchitectureofIndia
4. Christopher,T.TheHistoryofArchitectureinIndia,fromtheDawnofCivilizationtothe
5. EndoftheRaj.OmBookService,NewDelhi1990
6. Brown,P.(1983).IndianArchitecture(IslamicPeriod).Bombay:TaraporevalaandSons.
7. Fletcher,B.(1996).AHistoryofArchitectureontheComparativeMethod.20thEd.London:B.T. BatsfordLtd.
8. Catherine,A.(2001).ArchitectureofMughalIndia.CambridgeUniversityPress.
9. Faulkner,H.T.(1953).ArchitecturethroughtheAges.NewYork:PutnamAdult.
10. Grover,S.(2002).IslamicArchitectureinIndia.NewDelhi:CBSPublications.
11. Harris,M.C.(1977).IllustratedDictionaryofHistoricArchitecture.NewYork:M.CourierDover Publications.
12. Hillenbrand,R.(1994).Islamicarchitecture-form,functionandmeaning.Edinburgh:Edinburgh UniversityPress.
13. Ingersoll,R.AndKostof,S.(2013).Worldarchitecture:across-culturalhistory.Oxford:Oxford UniversityPress.
14. Mitchell,G.(1978).ArchitectureoftheIslamicworld-itshistoryandsocialmeaning.London: Thames andHudson.
15. Nath,R.(1985).HistoryofMughalArchitectureVolsI-III.NewDelhi:AbhinavPublications.
16. Tadgell,C.(1990).TheHistoryofArchitectureinIndia.NewDelhi:PenguinBooks.

Course Outcomes

CO1	Develop knowledge about Gothic and Renaissance architecture.
CO2	Analysecharacteristics and evolution of Temple Architecture.
CO3	Develop knowledge about Islamic Architecture and characteristics
CO4	Analysethe development of Mughal Architecture.
CO5	Recognise the various Heritage of India.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	1	3	1	1	-	-	1	2	1
CO2	3	3	-	1	3	1	1	-	-	1	2	1
CO3	3	3	-	1	3	1	1	-	-	1	2	1
CO4	3	3	-	1	3	1	1	-	-	1	2	1
CO5	3	3	-	1	3	1	1	-	-	1	2	1

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	3	-	1	3	1	1	-	-	1	2	1

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
4TH	BAR04002	**Design of RCC Structures**	03	03	0	0

Objective

The course aims to impart knowledge about reinforced cement concrete and its applicationsinbuildings.Toequipstudentsaboutthemethodsofdesigningvariousstructural members using reinforced cement concrete and fundamentals of soil mechanics and foundations.

ISI CODE COMPLIANCE

Module 1

INTRODUCTION TO RCC DESIGN

IntroductiontoRCCdesign,characteristicsofRCC,assumptions,nominalmix,Designmix. Neutralaxis;balanced,under&overreinforcedsections.
Working Stress Method, Limit State Method, Various Limit States.
Role of admixtures in concrete, honey combing, cold joint, high performance concrete. Creatingbuildingframesandselectingsizesofstructuralelementsbasedonthumbruleswith guidelines of relevantcodes.

Module 2

DESIGNOFREINFORCEMENTINBEAMS

Design of singly reinforced beams for flexure, shear & bond. Concept and design of doubly reinforced beams and T-beams by Limit State Methods.
Shearfailureofbeams,Shearreinforcement,Curtailmentofreinforcement,Bond,Anchorageand Developmentlength,
IS-Coded provisions, Numerical Problems.

Module 3

BASIC CONCEPTS AND DESIGN OF DIFFERENT TYPES OF SLAB

Concepts and design of different types of slabs spanning in one direction, two directions, continuous slab, cantilevered slab, circular slab and flat slab by limit state method

Module 4

BEARINGCAPACITYOFSOILS,ANDSETTLEMENTSOFFOUNDATIONS

SoilMechanics:Soilformationandresultingsoildeposits,differenttypesofsoilsandtheir physicalproperties,classificationasperIndianstandardsystem.

Foundations:TypesoffoundationsforRCCstructures,Designofisolatedcolumnfooting,retaining wall. Introduction,terminology,factorsaffectingbearingcapacityofsoils,methodsofdetermining bearingcapacity;Typesoffailuresinsoil,General,LocalandPunchingshearfailure.
Methodsofimprovingbearingcapacityofsoil,settlementoffoundations,CausesandEffect ofsettlement-Plateloadtest-Simpleproblems.

Module 5

DESIGNOFRCCCOLUMNSANDSTAIRCASES

Design of RCC columns, axially and eccentrically loaded Columns.
DesignofShortandLongRCCcolumnsunderaxialcompression(IS-CodeProvisions)
ConceptsandDesignofdifferenttypesofstaircases.
Introductiontopre-stressedconcrete,Pre-tensioningandPost-tensioningmethods,Problemsof beams

PRACTICAL
Laboratory:Soiltesting,castingofcementconcretecubes,Compressivetestofcementconcrete cubes,Tensilestrengthofsteel.
Visit to construction site for study of RCC structures.

References

1. Varghese,P.C.(2011).LimitstateDesignofReinforcedConcrete.PHILearning.
2. Ramachandra,S.(2004).LimitStateDesignofConcreteStructures.Scientificpublishers.
3. Ramamrutham,S.(2000).DesignofRCCStructures.NewDelhi:TataMcGrawHillEducation.
4. Ramamrutham.SandNarayanan.R,(1997),ReinforcedConcreteStructures,DhanpatKai Publication, NewDelhi.
5. Punmia,B.C.(2005).SoilMechanicsandFoundationEngineering.Delhi:Laxmipublications.
6. Swamisaran.(2010).AnalysisandDesignofSubstructures.2ndEd.(LSD).
7. Punmia,B.C.(2007).LimitStateDesignofReinforcedConcrete.Delhi:LaxmiPublications 8. I S456-2000
9. I S 875-1987
10. I S 800 -2007.
11. ExplanatoryHandBookSP24DesignAidSP16,
12. DetailingofReinforcement,SP34

Course Outcomes

CO1	Planning and evaluating knowledge RCC Design
CO2	Analysing reinforcement in beams
CO3	Develop knowledge about different types of slabs
CO4	Analysing bearing capacity of soil
CO5	Designing RCC columns and staircases

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	1	-	-	1	-	-	-	1	2
CO2	3	-	-	1	-	-	1	-	-	-	1	2
CO3	3	-	-	1	-	-	1	-	-	-	1	2
CO4	3	-	-	1	-	-	1	-	-	-	1	2
CO5	3	-	-	1	-	-	1	-	-	-	1	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	-	-	1	-	-	1	-	-	-	1	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
4TH	BAR04003	Lighting and Electrical Services	03	02	01	0

Objective

This course gives basic understanding about the science behind Lighting, and fundamental principlesoflightingdesignandelectricalservicesinbuildings.Bylearningthiscoursestudentscan design for optimum lighting requirement for indoor and outdoor spaces. Power distribution network and fundamentals of electrification in buildings is covered to impart technical and practical knowledge.

Module 1

INTRODUCTION TO DAYLIGHTING

Physicsoflight,Transmissionoflight,colouredlight,themunsellsystem,Photometry(Lawof illumination,illuminationfrompoint,lineandsurfacesources),recommendedilluminances,Glare, Luminancedistribution.

Module 2

DESIGNFORDAYLIGHTING

DaylightingDesignPrinciples, Designmethods,Totalfluxmethod,Daylightfactormethod, Planningfordaylight,daylightutilizationfactor,SimpleexperimentstomeasureLuxlevelsunder differentskyconditions,Classroomluxmeasurements,etc.

Module 3

ARTIFICIALLIGHTING

Classification of lighting, Artificial light sources, Spectral energy distribution, Luminous efficiency, Colour temperature, Colourrendering.

Types of luminaries, Power factor, reflector, type of lens, cove lighting, cornice lighting, track lighting, wall washer, down light, spot light and stage lighting.

Exteriorlighting–Flood,street,lightingfordisplaysandsignalling,NeonsignsLED-LCDandlighting forsurveillance.

GeneralIlluminationdesign&interiorlighting:industrial,residential,officedepartmentalstore, indoor stadium, theatre, museum, hospital.

Module 4

ELECTRICALSERVICES

- Generaldistributionofelectricpowerintownsandcities.Substationforsmallschemesand industrialunits,supplyundertaking,meterroom,electricalinstallationinbuildings,connection with the supply company, mains and meter board installation from the meter board to individualunits.
- BasicsofelectricityS,ingleandThreePhaseSupply,Protectivedevicesinelectricalinstallation, Earthingforsafety–Typesofearthing,ISISpecifications.
- Energysavingandsustainablelightingandelectrificationsystems

Module 5

BUILDINGELECTRIFICATION

Electricalinstallationsinbuildings–Typesofwires,Wiringsystemsandtheirchoice–planning electricalwiringforbuilding–Mainanddistributionboards,Planningtransformer&generator rooms,StandbyGenerators&InverterBackupSystems;ElectricalLoadCalculationofBuildings. Electrical layout of a simple residential, school and commercial building
The modules will include experiments and market surveys of the Electrical systems and luminariesmanufacturedbydifferentindustriesundervariouscompanyandbrandnames.
References 1. Szokolay,S.V.(2008).Introductiontoarchitecturalscience.Taylor&Francis. 2. Conceptnine,R.(2008).TheArchitectureofLight:ArchitecturalLightingDesignConceptsand Techniques. SagePublications. 3. Cox,T.J.andD'Antonio,P.(2009).AcousticAbsorbersandDiffusers.2ndEd.Taylor&Francis 4. Cuttle,C.LightingbyDesign.2ndEd.ArchitecturalPress. 5. Rea,M.(2000).TheLightingHandbook.9thEd.IlluminatingEngineeringSocietyofNorth America. 6. Reinhart,C.(2014).DaylightingHandbook. 7. Steffy,G.(2000).Time-SaverStandardsforArchitecturalLighting.McGraw-Hill. 8. Philips,D.,LightinginArchitecturalDesign,MCGrawHills,NewYork. 9. Bovay,H.E.(1981).HandbookofMechanical&ElectricalsystemsforBuildings.McGraw-Hill HigherEducation. 10. BureauofIndianStandards.(2005).CodeofPracticeforElectricalWiringInstallationsIS-732. 11. ElectricalWiring&Contracting(Vol.1toVol.4).

Course Outcomes

CO1	Developing knowledge about day lighting
CO2	Utilisation of concept of day-lighting in design
CO3	Developing knowledge about various aspects of artificial lighting
CO4	Obtain knowledge about various electrical services.
CO5	Obtain knowledge about Building Electrification.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	1	3	2	3	3	-	-	2	3	3
CO2	3	-	1	3	2	3	3	-	-	2	3	3
CO3	3	-	1	3	2	3	3	-	-	2	3	3
CO4	3	-	1	3	2	3	3	-	-	2	3	3
CO5	3	-	1	3	2	3	3	-	-	2	3	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	-	1	3	2	3	3	-	-	2	3	3

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
4TH	BARPE401	ProfessionalElective(PE)–I VernacularArchitecture	03	03	0	0

Objective

EffortsandactivitiesrelatedtopromotionofSustainableArchitectureareunderway,andthiscan be reinforced with the knowledge of Vernacular Architecture. Odisha has a rich treasure of vernaculararchitecture.Theobjectiveistoinstilsensitivitytowardsthelessexploredfieldthatis concerned with Architectural building traditions/practices that are cost effective, ecologically sensible and culturally relevant. Students acquire a working vocabulary that can help them describevernaculararchitectureinmeaningfulways.Thecourseintroducesgrassrootprinciples of indigenous architecture that has evolved over time in response to environment, climate, culture,economyandbasichumanneeds.Thecoursecoversvariationsinbuiltformsandtheir environmentalperformanceacrossdifferentclimaticandgeographicalregionsofIndiawithmore emphasistoOdisha.Casesstudiesofadaptationsofvernaculararchitectureincontemporary buildingsarealsocoveredinthesyllabus.

Module 1

INTRODUCTION TO VERNACULAR ARCHITECTURE

Definitions and theories, Categories, Contextual responsiveness: Climatic, Geographical, Anthropological and Cultural influences

Module 2

ENVIRONMENT AND MATERIALS

Typicalbuildingmaterials,Builtformandelements,ConstructiontechniqueandEnvironmental performance

Module 3

REGIONAL VARIATIONS IN BUILT FORM: TRIBAL ARCHITECTURE

SettlementPattern,DwellingTypology,Symbolism,Typicalfeatures,Constructionmaterialsand techniques

Andhra Pradesh, Madhya Pradesh, Odisha (Kondha and Santals)

Module 4

REGIONAL VARIATIONS IN BUILT FORM: RURAL ARCHITECTURE

SettlementPattern,DwellingTypology,Symbolism,Typicalfeatures,Constructionmaterialsand techniques

Eastern Region

Odisha – Rural houses of the coastal and inland areas; Bengal –Rural house form- AatChala houses, Thakur Bari (Mansions in North Kolkata).

Western Region

Rajasthan-RuralJathousesforfarmingcasteandBhungas(CircularHuts)andHavelis;
Gujarat-DesertsofKutch,PolhousesofAhmedabad,WoodenHavelis;

Southern Region

Kerala–Nalukettu,HousesofNair&Namboothricommunity,Koothambalam;
TamilNadu–TodaHuts,ChettinadHouses(Chettiars);
Andhra Pradesh –Rural Kaccha house

Northern Region

Kashmir–TypicalKutchahouses,Dhoongas(Boathouses),Ladakhihouses,bridges;
HimachalPradesh–Kinnaurhouses

Module 5

EXMPLESOFADAPTATIONSINCONTEMPORARYARCHITECTURE(Tobedecidedbysubjectteacher)

Examples-WorksofLaurieBaker,HasanFathy,AnilLaul,GerardDaCunha,BuildingCentres-Auroville,Anangpur,NizamuddinBuildingCentre

Basics of Architectural Heritage Conservation

References

1. PaulOliver.EncyclopediaofVernacularArchitectureoftheWorld,CambridgeUniversityPress, 1997.
2. AmosRapoport.House,Form&Culture,PrenticeHallInc.1969.
3. RWBrunskill:IllustratedHandbookonVernacularArchitecture.1987.
4. IlayCooperandBarryDawson.TraditionalbuildingsofIndia,ThamesandHudsonLtd., London.1998.
5. Frampton,Kenneth.TowardsaCriticalRegionalism:Sixpointsforanarchitectureofresistance, InTheAnti-Aesthetic:EssaysonPostmodernCulture.EditedbyHalFoster.Seattle,WA:Bay Press.1983.
6. V.S.Pramar.Haveli-WoodenHousesandMansionsofGujarat,MapinPublishingPvt.Ltd., Ahmedabad.1989.
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10. S.Muthiahandothers:TheChettiarHeritage.2000
11. House,Form&Culture,AmosRappoport,PrenticeHallInc,1969.

Course Outcomes

CO1	Developing knowledge about vernacular architecture and its various characteristics.
CO2	Planning the use of materials as per the environment
CO3	Developing knowledge about tribal architecture and its regional variations.
CO4	Developing knowledge about Rural architecture and its regional variations.
CO5	Adaptation of Contemporary architecture.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	2	3	3	3	-	-	-	2	2
CO2	3	2	-	2	3	3	3	-	-	-	2	2
CO3	3	2	-	2	3	3	3	-	-	-	2	2
CO4	3	2	-	2	3	3	3	-	-	-	2	2
CO5	3	2	-	2	3	3	3	-	-	-	2	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	2	-	2	3	3	3	-	-	-	2	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
4TH	BARPE402	ProfessionalElective(PE)–I Barrier FreeDesign	03	03	0	0

Objective

Barrierfreedesignisanintroductiontotheconceptsofaccessibilityanduniversaldesignwitha particularfocusontheimplicationsofabilityanddis-abilityonusabilityofthebuiltenvironment; spaces,buildings,infrastructureandinterfaces.Thestudentwilllearnhowtoapplythisknowledge in architecture, landscape architecture, interior design and planning. The interdisciplinary collaborationwithdisabilitystudies,rehabilitationstudiesandsocialscienceresearchwillprovide studentswithanopportunitytolearnanddevelopwiderunderstandingaboutthesubject.

Module 1

BASICCONCEPTSOFACCESSIBILITYANDUNIVERSALDESIGN

Knowledgeofhumanabilityrelevanttodesignproblemsinhome,workplace,infrastructureand publicspaces.

Typesofdisabilities,AnunderstandingoftheevolutionandlimitationsofAccessibleDesign,and differencesbetweenAccessibleandUniversalDesign.

Module 2

THEORIESOFUNIVERSALDESIGN

Understanding Principles of Universal Design that enable usability and inclusion across the spectrum of age, size, gender, ability and conditions, and contextual derivation of Universal DesignPrinciplesinIndia.

Module 3

UNIVERSALDESIGNFEATURESINEXTERNALANDINTERNALENVIRONMENTS

Devices and Controls for different types of disabilities

Defining Architectural design requirements, Classification of Buildings and Access provisions. DesignElementswithinthebuildings;Siteplanning,parking,approachtoplinthlevels,corridors, entranceandexit,windows,ramps,stairways,lifts,toilets,signage,guidingandwarningsystems, floorfinishesandmaterials,guiderails,lifts,dimensionsofwheelchairs.DesignElementsOutside thebuilding;kerbatfootpath,roadcrossing,publictoilet,busstop,telephonebooth,signage.

Module 4

BARRIERFREECONSIDERATIONSINTYPOLOGYOFSPACES

Provisionsinresidentialbuildings,auditorium,parks,restaurants,railwaystationsetc.Bestexamples andcasestudiesinUniversalDesignpractice.

Educationalinstitutions,hospitals,transportationterminalssuchasbus,railwaystationsand airportsforbarrierfreespaces

Module 5

ACCESSIBILITYLEGISLATION

Informationonvarioustypesofnationalinstitutes,agenciesandprofessionalbodiesinvolvedin disabledwelfare,associatednormsandstandards,standardsasgiveninNBC,CPWDandByelaws

Understanding legislative framework for practice in India; Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act 1995, Amendments and United Nations Convention for Rights of Persons with Disabilities (UNCRPD). Otherinitiativesatglobalandinternationallevelforprotectionofrightsofdisabledandalsoelderly person

References

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4. Persons with Disabilities Act. (1995). Government of India. Available at disabilityaffairs.gov.in/upload/uploadfiles/files/PWD_Act.pdf.
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Course Outcomes

CO1	Introduction and basic concepts of universal design.
CO2	Developing knowledge about the theory of universal design and its need.
CO3	Developing knowledge about Universal Design and its various characteristics.
CO4	Understand the Barrier Free Considerations
CO5	Planning accessibility and understand the legislative framework

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	-	3	-	-	-	2	2
CO2	3	-	-	-	-	-	3	-	-	-	2	2
CO3	3	-	-	-	-	-	3	-	-	-	2	2
CO4	3	-	-	-	-	-	3	-	-	-	2	2
CO5	3	-	-	-	-	-	3	-	-	-	2	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	-	-	-	-	-	3	-	-	-	2	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
4TH	BARPE403	Professional Elective (PE) – I Graphic and Product Design	03	03	0	0

Objective

ThesubjectProductDesignisaspecializedcourseofferedinarchitecturewhichdealswith functionality, safety and provides an aesthetically pleasing product for users.
Thesubjectisintegratedtosubjectslike Design,Graphics,ArtAppreciation

Module 1

BASICCONCEPTSOFGRAPHICANDPRODUCTDESIGN

- Elementsofdesign–visualgrammarandprinciplesofdesign
- Differenttechniquesforformstudies.
- Creating a visual vocabulary through drawing, the development of aesthetic judgment, valuesofform,proportion,colour,symbol,imageandword
- Developmentofproductdesignconcepts-ahistoricreview.
- DefinitionsrelatedtoErgonomicsandProductdesign.
- Role of Productdesigner.

Module 2

APPLICATIONSOFGRAPHICDESIGN

- Typography & type design, publication design, image making, illustration, photography, packaging,printdesign,corporateidentity,branding,information&communicationsystems indigitaldomain,portfoliodesign
- Theoriesandprinciplesoflayoutforcreatingeffectivevisualsignage,andexploretheunique problems andtechnique.
- Introductiontothedesignapplicationsforbuildingsignage.

Module 3

ERGONOMICSANDDESIGN

- Applicationofergonomicsinhuman-productinteraction
- Applicationofhumanfactorsdata.Humanactivities,theirnatureandeffects
- Visual,Auditory,Tactual,Olfactoryhumanmechanisms

Module 4

ASPECTSOFPRODUCTDESIGN

- Physical space andarrangement
- Productdisplay,processofseeing,visualdiscrimination,quantitativeandqualitativevisual display,Alphanumericandrelateddisplays,Visualcodesandsymbols.
- Processes of product designing, User specific criteria, Material selections, Technology, manufacturingandtesting,packagingandrecyclability
- MultipleUtilityorientedapproachtoProductDesign

Module 5

DESIGNOFPRODUCTTYPOLOGY

- DesignofHouseholdelements,toolsanddevices.
- Design offurniture.
- DesignofIndustrialProduct-AutomobilesandElectrical

- Elementdesignfordifferentlyable,oldandchildren.

- Thesubjectwillalsobeintegratedwithasmallcomponentofdesignexercisewiththecurrent oranyofthepreviussemesterdesignworks.
- Thecoursewillincludeoneorseveralexercisesinrelationtocontextofusestudy,market surveys,presentations,reports,etc.

References

1. ElementsofDesignbyAnderson,DonaldM.,Holt-RinehartandWinston,NewYork(1961)
2. GraphicsinUrbandesignbyBalllyMeeda,NeilParkynandDavidStuartWalton.
3. TimeSaverStandardsforInteriorDesign
4. AndrewAlpern,HandbookofSpecialityElementsinArchitecture,McGrawhillCo.,USA,1982.
5. FrancisD.K.Ching,InteriorDesignIllustrated,VNRPublications,NewYork,1987.
6. HelenMarieEvans,AninvitationtoDesign.
7. Crosbie,M.J.andWatson,D.(2005).TimeSaversStandardsforArchitecturalDesign:Technical dataforProfessionalPractice.8thEd.TheMcGraw-HillCompany.

Course Outcomes

CO1	Introduction to graphic and product design
CO2	Developing knowledge about graphic design
CO3	Developing knowledge about ergonomics and design principles
CO4	Developing knowledge about product design and its aspects
CO5	Apply various aspects of designing and typologies of products.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	-	-	-	3	-	2	-	2	3
CO2	3	3	-	-	-	-	3	-	2	-	2	3
CO3	3	3	-	-	-	-	3	-	2	-	2	3
CO4	3	3	-	-	-	-	3	-	2	-	2	3
CO5	3	3	-	-	-	-	3	-	2	-	2	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	3	-	-	-	-	3	-	2	-	2	3

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
4TH	BAR04004	Architectural Design - II	09	0	0	09

Objective

Thescopeofdesigningtoprogresswithcomplexityinusageandaestheticqualitieswithmore emphasisonarchitecturalandfunctionalaspects.

To enable the students to understand the habitat and socio-cultural character of rural environmentanddevelopsensitivityindesigninginruralcontext,asOdishahasasignificantrural character.

There will be at least two design problems, one major and one minor.

INTENT

- ToenabletheunderstandingtoadoptintegrateddesignapproachconsideringSitePlanning, Structuralaspect,LandscapeArchitectureandArtAppreciation.
- To acquaint the students with the contextual background and locale of traditional and vernaculararchitecturetobasetheirideasonfunctionalsimplicity,physicalcomfort,climatic conditions,locallyavailablematerialandculturalbackground.

FOCUS AREAS

- Theaestheticsofbuildingformandmaterials
- Functionalpatterns
- Passivetechniquestocreateclimatesensitivebuiltenvironmentprovidingthermalcomfort
- Relationshipofbuiltspaceswiththesurroundinglandscape

ALLIED KNOWLEDGE REQUIRED

- Anthropometry
- Principlesofloadbearingandframedstructures
- Vernaculararchitecture
- Symbolism andculture
- Basic theories ofdesign
- Basic concepts ofclimatology
- ThescienceofBuildingmaterials;theirstructuralintegrityandtheirbehaviouragainstclimate
- Draftingandpresentationtechniques(VisualGraphics)

1. Examples of MajorProjects

SmallRuralHousingCluster,VillageCommunitycentre,VillageHaat,TribalHousing,Nursinghome, School, Motel, Bank,etc.

2. Examples of MinorProjects

Village Health Centre, Dispensary, Guest House, Club, Restaurant, etc.

Work Plan

- IntroductiontotheDesignExercise/Problem
- Studyanddatacollectionthrough
  - Literaturereviews
  - Fieldstudyandcasestudies
  - SiteVisitandSiteAnalysis
- SynthesisingandAnalysingtheabovedata
- DerivingAreaRequirementsfortheDesignExercise
- ConceptualDesign
- DetailedSitePlanwithbuiltandun-builtspacesandlandscapingfeatures
- Finaldevelopedto-scaledrawings-siteplan,plans,elevations,sections,elevations
- Conceptualwrite-uptothefloorplanforjustificationofprovidedspatialproposals
- Developmentofviewsandconstructiondetails
- Modeloftheproposeddesign

Note

- Studytourofone-weekdurationismandatoryforconductingcasestudyandfieldstudy relatedtotheArchitecturalDesignproject.
- EndSemesterevaluationwillbedonebyexternaljurymember(fromAcademicsor ProfessionalArchitect)otherthantheUniversityfaculty.

References

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14. TimeSaverStandardsforLandscapeType.
15. BousmahaBaiche&NicholasWalliman,NeufertArchitect'sdata,Blackwellscienceltd.
16. Hareguchi,H.(1988).AComparativeanalysisof20thC.houses.London:AcademyEditions.
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20. KulbushanshanJainandMinakshiJain.MudArchitectureoftheIndianDesert,AadiCentre, Ahmedabad.1992.

Course Outcomes

CO1	Developing knowledge of aesthetics of building form and materials
CO2	Applying relationship of built spaces with the surrounding landscape
CO3	Developing knowledge about building materials; their structural integrity and their behaviour against climate
CO4	Synthesizing and analyzing of collected data
CO5	Developed to- scale drawings- site plan, plans, elevations, sections, elevations

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	2	2	3	2	2	2	1	2
CO2	3	3	3	3	2	2	3	2	2	2	1	2
CO3	3	3	3	3	2	2	3	2	2	2	1	2
CO4	3	3	3	3	2	2	3	2	2	2	1	2
CO5	3	3	3	3	2	2	3	2	2	2	1	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	3	3	3	2	2	3	2	2	2	1	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
4TH	BAR04005	Building Construction -IV	04	0	0	04

Objective

Toacquaintthestudentswithconstructionpracticesonframedsteelstructureanditsformwork. Tounderstandbuildingmaterialinthecontextofvariousconstructionmethods.Focusonvarious buildingmaterialswouldbeemphasisedbasedontheperformingstandardsandcodes,wherein applicationofeachmaterialwouldbediscussedindetail, bothinthecontextoftraditionalandmodernconstructionmethodsandpractices.Basedonthe lecturedelivered,thestudentsarerequiredtoproduceconstructionanddetaildrawings.With time, each topic can also focus on latest trends in practice and usage of new technology/materials.

Module 1

IronandSteel:castiron,Steelandwroughtironwithproperties,useofironworkinbuildings. Introductiontotensilestructures
Different types of steel trusses & girders, North light, Tubular, K-Type.

Module 2

Domes, Shells, Foldedplates.
Spaceframe-Singlelayer,Tensilestructures,Pneumaticstructures,cablestructures,Doublelayer. Hyperbolic & parabolicstructure.

Module 3

Glass:Typesofglasslikeplate,decorative,tinted,heatabsorbingetc.structuralglassbricksand glassCrete,fibreglass,wooletc.
Curtain walls & structural glazing-

Module 4

Designing and construction details of types of Lifts and Ramps

Module 5

Modularcoordinationandpre-fabrication,Precast&Prestressedconcreteunits. Advanced tools andequipment.

NOTE:

Frequentsitevisitstobearrangedasapartofthecurriculumandcontacthours.Sitevisitsshould beinlinewiththepresentstudiowork.Itismandatoryforstudentstosubmitasiteobservation report,eitherperiodicallyorattheendofthesemester.

References

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2. Foster,J.andMitchell,S.(1963).BuildingConstruction:ElementaryandAdvanced,17thEd. London:B.T.BatsfordLtd.
3. McKay,W.B.(2005).BuildingConstructionMetricVol.I–V.4thEd.Mumbai:OrientLongman.
4. Merritt,F.S.andRicketts,J.T.,BuildingDesignandConstructionHandbook,McGrawHill.
5. Rangwala,S.C.(1963).BuildingConstruction:MaterialsandtypesofConstruction.3rdEd.New York:JohnWileyandSons.
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8. Ching,F.D.K–BuildingConstructionillustrated.VNR,1975
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Course Outcomes

CO1	Developing knowledge about Iron and Steel
CO2	Developing knowledge of Domes, Shells, Folded plates
CO3	Demonstrating the use of glass
CO4	Designing and construction details of types of Lifts and Ramps
CO5	Developing knowledge on modular, pre-cast and pre-fabricated elemts

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	3	2	3	-	2	-	3	3
CO2	3	2	-	-	3	2	3	-	2	-	3	3
CO3	3	2	-	-	3	2	3	-	2	-	3	3
CO4	3	2	-	-	3	2	3	-	2	-	3	3
CO5	3	2	-	-	3	2	3	-	2	-	3	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	2	-	-	3	2	3	-	2	-	3	3

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
4TH	BAR04006	Computer Applications - II	02	01	0	02

Objectives

To enable the students to understand the fundamentals of computer aided 3D Modeling (3DS-Max/Revit etc.)-Rendering Engines (V-Ray, Lumion etc.) and presentation techniques.

Module 1

INTRODUCTION TO 3D MODELLING

Project: Create 3D sculpture using 3D primitives (cubes, spheres etc.). Introduction to 3D-modelling technique and construction planes, drawing objects, 3D surfaces setting up elevation thickness and use of dynamic projections.

Module 2

3D MODELLING AND RENDERING ENGINES

Project: Visualize a building. Explore the potential of lights and camera and use the same in the model created for the final submission. Rendering and scene setting to create a photorealistic picture, understanding material mapping, environment setting and image filling. Exercise to identify and visualize a building using the above said utilities.

Module 3

ILLUSTRATIONS AND COMPOSITION

Project: Post production of various renders using Photoshop and Illustrator to visualize a building from various perspective. Explore the potential of Birds eye view, Worms eye view, Exploded view etc. by using graphics and texture overlay. Use of photo realistic pictures too compose presentation drawings, understanding various styles and needs of presentation. Exercise to compose sheets involving various technical drawings and photorealistic renders for by using the above said utilities.

Module 4

WALK-THROUGH AND ANIMATION

Project: To understanding the process of creating walkthrough by using rendering engines for 3D Models. Understanding the overall flow of video, Editing clips with sound effects and adding animations.

References

1. Gindis, E. (2014). Up and Running with AutoCAD 2015: 2D & 3D Drawing and Modelling, Oxford : Elsevier.
2. Seidler, D.R. (2007). Digital Drawing for Designers: A Visual Guide to AutoCAD 2012, London: Fairchild Publications.
3. Smith, B.L. (2007). 3ds Max 2008 Architectural Visualization Beginner to Intermediate, Sarasota: 3DATS.
4. 3DSMAX-Advanced 3D modeling and animation – C&M, CADD Centre Tutorials: http://www.lynda.com/
5. Lumion – Rendering Software- https://lumion.com/

Course Outcomes

CO1	Developing knowledge of 3D modelling
CO2	Visualizing and rendering of models
CO3	Developing sense of illustrations and compositions
CO4	Developing the knowledge of preparation of walk-throughs
CO5	Defining the overall flow of video, editing clips with sound effects and adding animations

Course Articulation Matrix

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	2	2	3	-	2	-	2	-	-	-	2	2
CO2	2	2	3	-	2	-	2	-	-	-	2	2
CO3	2	2	3	-	2	-	2	-	-	-	2	2
CO4	2	2	3	-	2	-	2	-	-	-	2	2
CO5	2	2	3	-	2	-	2	-	-	-	2	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO	2	2	3	-	2	-	2	-	-	-	2	2

FIFTH SEMESTER
BARCH PROGRAMME

FIFTH SEMESTER								
SL. NO.	**COURSE CODE**	**SUBJECTS**	**CONTACT HOURS (L-T-P)**	**CREDIT**	**SEMESTER EVALUATION (WE, IA, VV, TP)**			
THEORY SUBJECTS								
1.	BAR05001	HistoryofArchitecture-IV	3-0-0	3	WE			
2.	BAR05002	Landscape Architecture	2-1-0	3	WE			
3.	BAR05003	Design of Steel Structures	3-0-0	3	WE			
4.	BAR05004	Acoustics	2-1-0	3	WE			
5.	BAR05005	EnvironmentandBehavior	3-0-0	3	WE			
SESSIONAL SUBJECTS								
1.	BAR05006	Architectural Design - III	0-0-9	9		IA	VV	TP
2.	BAR05007	Landscape Design Studio	0-0-2	1		IA	VV	
3.	BAR05008	Working Drawingand Detailing- I	0-0-4	4		IA	VV	
TOTAL			**13-2-15 = 30**	**29**				

DETAIL SYLLABUS
FIFTH SEMESTER BARCH PROGRAMME

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
5TH	BAR05001	History of Architecture - IV	03	03	0	0

Modern (19th Century AD – Until Present)

Objective

To impart an understanding of the evolution in architecture and urbanism from theadventofmoderneratopresenttimes.Understandingaboutthetheories,principlesandstyles ofarchitecturethatemergedduringIndustrialRevolutionanditsinfluenceonthebuiltformand settlementpatternsiscovered.Colonialmercantilecapitalismandspreadof Westerninfluences inIndia,andsynthesisofarchitecturalstylesasmodesofpoliticalaccommodationareimparted inthecourse.Thesocio-economicandpoliticalcontext,scientificinventions,andtechnological improvements,andtheexchangeofstylesandphilosophiesisdiscussedthroughnotableworksof leadingarchitects.

Module 1

- **INDUSTRIALREVOLUTION**
  Itsimpact,newmaterials&techniques,Exhibitions*(GreatExhibition1851)*,development ofrailways&changeinsettlementpattern,rapidurbanization&urbancrisis.ArtNouveau, Art&Craft,ArtDeco;NeoClassicism;GothicRevival*(JohnRuskin,worksofVictorHorta, AntonioGaudi).*

- **SELFCONSCIOUSMODERNITY**
  Chicagoschool*(LouisSullivan)*,BauhausMovement*(PeterBehrens,WalterGropius)*,Late-ModernStyles;worksofgreatmasters*(MiesVanderRohe,F.L.Wright,LeCorbusier,Louis Kahn,AlvarAalto,KenzoTange,etc).*

Module 2

COLONIAL ARCHITECTURE IN INDIA

Spread of European mercantile capitalism and development of early colonial architecture, British,FrenchandPortugueseinfluences;Inflowofnewculturalpracticesandconstruction technology,Stylistictransformations;SynthesiswithIndiantraditionalmotifsandclimaticfactor.

- ***EARLY:***Portuguese*(BasilicaofBomJesus)*,French*(Pondicherry-OldFrenchColony)*& British*(St.Andrew'sKirk)*,JewishsettlementofKerela
- ***LATE:****EdwinLutyens,HerbertBaker*andplanningofNewDelhi,Indo-Decoarchitecture *(Rashtrapati Bhawan / Victoria Terminus / Umaid Bhawan Palace, Jodhpur).*

Module 3

WORLDARCHITECTURE1950ONWARDS

Post modernism and classical revivalism *(James Sterling, I. M. Pei, Robert Venturi)*; Counter reaction,De-constructivismandindustrialarchitecture*(ZahaHadid,RenzoPiano,NormanFoster, SantiagoCalatrava,FrankO.Gehry)*Alternativepractices*(HassanFathy,GeoffreyBawa,TadaoAnd ao)*

Module 4

ARCHITECTURE IN INDIA: POST INDEPENDENT ERA

Planning and Design of Post Independent Cities and Towns: Chandigarh, Bhubaneswar, Amaravati,AurovilleExperiments,NehruviannationBuildingInitiatives,Planningcommission&industrialization,ArchitecturebygreatIndianandInternationalMasters:*A.Kanvinde,B.V.Doshi, CharlesCorrea,RajRewal,JosephA.Stein*;Alternativepractices*(LaurieBaker)*,Awardwinning works of contemporaryarchitects.

Module 5

Presentationsandcriticalanalysisofanyothersignificantworksofarchitects,asdecidedbythe subjectfaculty.

Reference

1. Benevolo,L.(1977).HistoryofModernArchitecture.2Vols.,reprint,MITPress.
2. Curtis,W.J.(1982).ModernArchitecturesince1900.PhaidonPress.
3. Giedon,S.,Space,TimeandArchitecture:TheGrowthofNewTradition,HarvardUniversity Press.
4. Frampton,K.(1994).ModernArchitecture:ACriticalHistory.London:Thames&Hudson.
5. Jenks,C.(2007).TheStoryofPost-Modernism.London:WileyandSons.
6. Lang,J.,Desai,M.andDesai,M.(2000).ArchitectureandIndependence:Thesearchfor Identity–India1880to1980.NewDelhi:OxfordUniversityPress.
7. Lang,J.T(2002).AConciseHistoryofModernArchitectureinIndia
8. Mehrotra,R.(2011).ArchitectureinIndiaSince1990.Pictor.
9. Tadgell,C.(1990).TheHistoryofArchitectureinIndia.NewDelhi:PenguinBooks(India)Ltd.
10. Johnson, P. and Wigley, M. (1988). Deconstructivist Architecture. New York : Museum of ModernArt.
11. Schulz,C.N.(1993).MeaninginWesternArchitecture.NewYork:RizzoliInternationalPublishers.
12. Singh,M.andMukherjee,R.NewDelhi-MakingofaCapital.NewDelhi:RoliBooks.
13. Tafuri,M.(1980).ModernArchitecture.HarryN.AbramsInc.
14. Verma, P.(2010).BecomingIndian–TheUnfinishedRevolutionofCultureandIdentity.New Delhi : PenguinIndia.

Course Outcomes

CO1	Implement principles of of different social reformations and movements on the field of architecture
CO2	Analyze the concept of evolution of colonial architecture in India
CO3	Express the concept of evolution in the field architecture after 1950 world wide
CO4	Express the concept of evolution in the field architecture after independence in India
CO5	Demonstrate basic principles through seeing works of eminent Architects

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	1	3	1	1	-	-	1	2	1
CO2	3	3	-	1	3	1	1	-	-	1	2	1
CO3	3	3	-	1	3	1	1	-	-	1	2	1
CO4	3	3	-	1	3	1	1	-	-	1	2	1
CO5	3	3	-	1	3	1	1	-	-	1	2	1

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	3	-	1	3	1	1	-	-	1	2	1

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
5TH	BAR05002	**Landscape Design**	03	02	1	0

Objective

Toenablethestudentstounderstandtheprinciplesofsiteplanning,siteanalysistechniquesand itsapplicationindesignofdifferentlandscapetypes.

Module 1

PRINCIPLES

Landscapedesign-definition,Theoriesandprinciples,aestheticvalueoflandscape,sitesurvey, analysisandappraisal,Elementsoflandscapedesign

Module 2

LANDSCAPE ELEMENTS

- Contours-RepresentationofLandformandLandformdesign,interpolationofcontours, slope analysis,Grading,
- Designofwaterbodies,swimmingpool,stormwaterdrainagedesign,designtoreduce surfacerunoff,pavingandsurfacetreatments.
- Vegetation, planting design principles and practice, Indoor landscaping, terrace gardening, industriallandscaping.
- Anassignmenttobegiventoidentifynativeplantspecies,theiravailability

Module 3

LANDSCAPEDESIGNSTYLES

Historyoflandscapedesign.Landscapedesignstyleandprinciples:Chinese,Japanese,English, French,Moghul.

Module 4

SITEPLANNINGANDLANDSCAPEDESIGN

- SiteZoning.Organizationofvehicularandpedestriancirculation;parking;streetwidths; turningradii;streetintersections;stepsandramps.Siteplanningconsiderationsinrelation towatersystems,sewagedisposal,outdoorelectricalsystems.
- Landscapingofresidentialareas,parks,archaeologicalgardens,urbanavenues,Roads andHighwaysandParkingdesign
- Landscapingdetails.
- Anassignmenttobepreparedondesigningandexecutionofasmalllandscape.

Module 5

Methods for multi-criteria landscape evaluation.

References

1. Appleton.(1996).*TheExperienceofLandscape*.Wiley.
2. Laurie.(1986).*AnIntroductiontoLandscapeArchitecture*.Elsevier.
3. Lynch,K.(1962).*SitePlanning*.Cambridge:TheMITPress.
4. Simonds,J.O.(2006).*LandscapeArchitecture:AManualofLandPlanningandDesign*.

Course Outcomes:

CO 1: Express the concept of theories and principles of landscape design
CO 2: Analyze the concept of elements of landscape design
CO 3: Demonstrate the different styles of landscape design world wide
CO 4: Implement the basic principles of site planning
CO 5: Demonstrate basic principles of landscape evaluation

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO1
CO1	3	2	-	1	2	2	1	2	2	1	1	1
CO2	3	2	-	1	2	2	1	2	2	1	1	1
CO3	3	2	-	1	2	2	1	2	2	1	1	1
CO4	3	2	-	1	2	2	1	2	2	1	1	1
CO5	3	2	-	1	2	2	1	2	2	1	1	1

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	2	-	1	2	2	1	2	2	1	1	1

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
5TH	BAR05003	**Design of Steel Structures**	03	03	0	0

Objective

To introduce the concepts of designing with steel structures and its components. To enable studentstoanalysisanddesignsimplesteelstructuralcomponents;Toenablethestudentsto selectsuitablesteelrooftrussfordifferentspansofindustrialbuildingsandlargespanstructures.

Module 1

INTRODUCTION

IntroductiontoSteelstructures:Steelstructuralshapes,IntroductiontoIS800;Rivets,welded connection,Steelstructuralmembers,tension,compressionandbendingMembers.Designof rivetedandweldedconnectionslikebeamendconnections(LimitStressmethod).

Module 2

STRUCTURAL ELEMENTS

Designofstructuralelements;Trussmembersundertension,alaterallyrestrainedbeamusingrolled steelsections.Designofstructuralelementundercompressioninatruss,acolumnusingrolled steelsections,effectivelengthbulkingload.(Practicalcasestudyofasteelsection).

Module 3

FOUNDATION

Conceptoftypeoffoundation;Designofslabbaseandgussetedbase;Introductionofplastic design.

Module 4

DESIGNOFAUNIT

Visit to a construction site to study steel fabrication work. Design of shed in steel structure

Module 5

Innovative designs in steel for space frames and box frames.

Reference

1. Ramachandra.S,DesignofsteelstructuresVol.I,Standardpublication,NewDelhi,1992.
2. Vazirani.V.N,andRatwani.M.M,Steelstructures,KhannaPublications,NewDelhi,1995.
3. Arya.A.S,Ajamani.J.L,DesignofSteelStrctures,NemChandandBros,Roorkee,1999.
4. Subramanian,N.(2008).DesignofSteelStructures.OxfordUniversityPress.
5. Duggal,DesignofSteelstructures,TataMcGrawHillCompany,NewDelhi,2000
6. Lin.T.R,andScalzi.J.B,DesignofSteelstructures–BresslerWeleyEasternPvt.Ltd.,NewDelhi, 1960.
7. Dayaratnam.P,DesignofSteelStructures,WheelersPublishingCompanyCo.Ltd,1990
8. HandbookofTypifiedDesignsforStructureswithsteelrooftrusses,SP38(S&T)–1987,BIS,New Delhi,1987.

9.CodeofpracticeforEarthquakeResistantDesignandConstructionofBuildingsIS4326-1976, BIS, NewDelhi.

Course Outcomes:

CO 1: Implement the basic use of steel structures and its members
CO 2: Analyze the designing structural elements under different structural conditions
CO 3: Evaluate the design process of foundation for steel structure
CO 4: Implement the design shed in steel structure with proper site visit
CO 5: Demonstrate the knowledge about innovative approach in steel structure design

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	1	-	-	1	-	-	-	1	2
CO2	3	-	-	1	-	-	1	-	-	-	1	2
CO3	3	-	-	1	-	-	1	-	-	-	1	2
CO4	3	-	-	1	-	-	1	-	-	-	1	2
CO5	3	-	-	1	-	-	1	-	-	-	1	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	-	-	1	-	-	1	-	-	-	1	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
5TH	BAR05004	**Architectural Acoustics**	03	02	1	0

Objective

Thecourseimpartsfundamentalunderstandingaboutarchitecturalacousticsandenvironmental noise. Physics of sound and acoustical design for built spaces are covered, which enables the student to provide appropriate acoustic solutions for both indoor and outdoor spaces.

Module 1

FUNDAMENTALSOFARCHITECTURALACOUSTICS

Fundamentals: Definitions, terms related to acoustics, sound waves, frequency, amplitude, intensity, wavelength, sound pressure, measurement of sound, decibels. Characteristics of speech, music and hearing.

Module 2

ROOMACOUSTICSCONCEPTS

- RoomAcoustics:resonance,reverberation,echo,reverberationtime(Sabine'sformula)
- Materialproperty:Absorption,reflection,scattering,diffusion,transmission,absorptionco-efficient,NoiseReductionCoefficient(NRC),
- Absorbing materials used and their choices for different acoustic treatment, Sound insulation
- Simpleexercisesinvolvingreverberationtimeandabsorption

Module 3

ACOUSTICSINBUILDINGDESIGNANDTREATMENT

Basicroomacousticsconceptsanddesign:shape,volume,defects,treatmentforinteriorsurface, basic principles in designing, cinemas, recording studios, class rooms, conference halls, Auditorium.

Module 4

ENVIRONMENTAL NOISE

- Noise and its control- Air and structure borne, sound transmission, vibrationisolation, damping.
- Noisesourcewithinbuildingsanditscontrol(Fans,chillers,boilers,HVACnoisesources).
- Externalnoisesourceanditscontrol:Openairacoustics,Freefieldpropagationofsound, absorptionfromairandnaturalelements,Siteplanning,Designofopenairtheatres,Types anddesignofNoisebarrier,effectsoflandscapeelements

Module 5

Acousticdesignofsmallspacesusinginnovativetechniquesandmaterialsbyapplyingmanual orsimulationsoftwaremethod,asdecidedbythesubjectteacher.

Reference

1. Szokolay,S.V.(2008).Introductiontoarchitecturalscience.Taylor&Francis.
2. Vigran,T.E.(2008).BuildingAcoustics.1stEd.Taylor&Francis.
3. Barron.M.(2009).Auditoriumacousticsandarchitecturaldesign.2ndEd.Taylor&Francis.
4. Eagan,D.ConceptsinArchitecturalAcoustics.
5. Kang,J.(2006).UrbanSoundEnvironment.1stEd.CRCPress.
6. Meyer,H.B.andGoodfriend,L.AcousticsforArchitects.Reinhold.
7. Smith,B.J.,Peters,R.J.,andStephanie,O.(1982).AcousticsandNoiseControl.NewYork: Longman.

Course Outcomes:

Upon completion of the subject the students will demonstrate the ability to:

CO 1: Evaluate thethe fundamental knowledge about role of acoustic in Architecture
CO 2: Express the basic knowledge about different scientific terms involved in acoustic
CO 3: Demonstrate the basic principles of acoustic for designing spaces
CO 4: Implement the term noise and its environmental impact
CO 5: Demonstrate the Design of indoor spaces with keeping consideration of acoustic

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO1
CO1	2	3	-	1	1	2	1	2	2	2	2	1
CO2	2	3	-	1	1	2	1	2	2	2	2	1
CO3	2	3	-	1	1	2	1	2	2	2	2	1
CO4	2	3	-	1	1	2	1	2	2	2	2	1
CO5	2	3	-	1	1	2	1	2	2	2	2	1

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	2	3	-	1	1	2	1	2	2	2	2	1

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
5TH	BAR05005	**Environment and Behavior**	03	03	0	0

Objective

To impart knowledge about sociological and psychological implications in designing built environment.Thefocusisonunderstandingman-environmentrelationship,behavioraldynamics withrespecttospatialpattern,andmethodsofconductingbehavioralstudies.

Module 1

SPATIALIMPLICATIONSOFSOCIOLOGY

Differenceinlifestyleduetosocio-economicbackground,andtheniplicationinarchitectural design.Sociologicalaspectsinthehistoryofevolutionofhousingorshelterforms.Roomuse, geometry&meaning,Personalspace,adjacencies,Territoriality.

Module 2

SOCIOLOGYANDPLANNING

Essential elements of society: Rural and Urban communities. Growth of socio-culturalfactors throughages,dynamicsofurbangrowthandsocialchange,Behavioralassumptionsinplanning.

Module 3

SOCIO-PSYCHOLOGICALDIMENSIONS

Socialaspectsofphysicalenvironment,Perceptualdimensionofspace,Psychologicalaesthetics, Patternsofactivityintimeandspaceacrossdifferentdemographics,social&psychologicalissues inneighborhoodsandpublicspaces,environmentalcognition.

Module 4

METHODS FOR BEHAVIOURAL STUDIES

Socialsurveyandsocialresearch,Cognitivemapping,activity/adjacencyrelationshipmatrices, Area use frequency program, charts, pictograms.

Module 5

APPLICATIONS ENVIRONMENTAL BEHAVIOUR IN ARCHITECTURE

Case studies, fieldwork.

Reference

1. Burnette,C.(1971).ArchitectureforhumanbehaviourPhiladelphiaChapter:AIA.
2. Canter,D.andLee,T.(1974).PsychologyandthebuiltenvironmentNewYork:HalsteadPress.
3. Christopher,A.etal.(1977).APatternLanguage.NewYork:OxfordUniversityPress.
4. Clovis,H.(1977).BehaviouralArchitecture.McGrawHill.
5. Lynch,K.(1973).Theimageofacity.Cambridge:MIT.
6. Sanoff,H.(1991).VisualResearchMethodsinDesign.NewYork:JohnWiley&Sons.
7. Zeisel,J.(1984).Enquirybydesign:ToolsforEnvironment-BehaviourResearch.Cambridge: Cambridge UniversityPress.
8. 8.Zeisel,J.andEberhard,J.P.(2006).InquirybyDesign-Environment/Behaviour/Neuroscience inArchitecture,Interiors,LandscapeandPlanning.NewYork:W.W.Norton&Company.

Course Outcomes:

CO 1: Analyze the relationship of sociology and architecture
CO 2: Evaluate the basic knowledge about elements of society and their role in planning
CO 3: Demonstrate the knowledge about user psychology of society and their role in neighborhood and public place planning
CO 4: Express the data representation for studies
CO 5: Demonstrate the knowledge through case-studies

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	-	2	1	2	1	2	1	2	2	1
CO2	2	3	-	2	1	2	1	2	1	2	2	1
CO3	2	3	-	2	1	2	1	2	1	2	2	1
CO4	2	3	-	2	1	2	1	2	1	2	2	1
CO5	2	3	-	2	1	2	1	2	1	2	2	1

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	2	3	-	2	1	2	1	2	1	2	2	1

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
5TH	BAR05006	Architectural Design - III	09	0	0	9

Objective

To enable capability of designing buildings of specific categories for multiple user group and understanding the allied structural and building services requirement.

1. MAJOR DESIGN PROBLEM

Designing for multifunctional environments within specific categories (Medium scale)

INTENT

To let the students explore design possibilities of multifunctional environments with group of facilities supporting variety of user-groups; To expose the students to the challenges of site planninganddesigningbuildingswithvariedfunctions,havinganarrayofactivitiesandservices; To familiarize the students to the task of coordinating integration of structural design and specializedbuildingservicesintheframeworkofarchitecturaldesign.
Studentsarerequiredtobewellversedwithallthebuildingstructuralsystems,sothattheywillbe abletocategorizeandchoosestructuralsystemsforamultistoried(2-3storied)building.Thiscould bedonethroughliteraturestudy/lectures/discussions/videos,studymodels,presentationetc.
Studentsshouldexplorevariousnewbuildingmaterialsappropriateforthebuildingtypology–An exhaustive list of materials could be prepared through market survey/ case studies/ books/ papers/reports,presentation,displayetc.

FOCUS AREAS

- Considerationsforplanningofcampuses/groupofbuilt-upspaces
- Zoning and orientatingpatterns
- Spatialintegration
- Functional efficiency (utilitarian parameters, space optimization, integration of structural systemsandbuildingservices(HVAC,electrical,plumbingetc.)
- Man - Environmentrelationship

ALLIED KNOWLEDGE REQUIRED

- Site planningtechniques
- SustainableDesign
- Barrier freeenvironments
- Buildingservices
- Landscapedesign

Examples of Major Studio Projects

School,Vocationaltraininginstitute,Schoolforspecialcategories,Hospitalitybuildings(Hotels, Resorts,Motels),Multi-specialtyclinicanddiagnosticcenter,Smallcommercialorofficecomplex, Interpretationcenter,Culturalcenter,ArtandCraftCentre

Examples of Minor Studio Project

Auditorium,Gymnasium,oranysmall-scalebuildingofapproximateareaof200sqmt.,Smallscale place of worship.

PROCESS

Learningoutcomecouldbeachievedaftercompletingtheinitialdesignprocessstepsasstated below:

- Introducing DesignProblem
- SiteVisit
- SiteAnalysis
- Designing the designProgram
- CollectingandanalyzingDataforvariousspaces

- AreaProgramming
- Flowdiagram(relationofvariousspaces)
- Bubblediagram(locatingvariouszonesonsite)
- SiteZoning
- TryandRe-create(AnalyzingspacesinalldimensionsthroughBlockModels)
- Single lineGraphics
- Itispreferableifthestudentscommunicatetheapplicationofallservicesintheirdesign.
- Studentsmustmakeenlargeddrawingsshowingallarchitecturaldrawings,detailsforanypart of thebuilding.
- StudymodeloftheDesigntobemade
- Studentsmayintegratetheknowledgegainedfrompreviustheorybasedsubjects(like buildingservicesmathematicsforarchitecture,buildingmaterialsandconstruction,structures etc.)andapplyintheirdesignduringdesigndevelopment/detailstage.
- Formativeassessmentinthestudiocouldbedonethroughindividualcritique,groupdiscussion formalandinformalfeedbacketc.
- Summative assessment of the studio work could be achieved through Panel discussion, presentation, criteria basedevaluation

Note

- Study tour of one-week duration is mandatory for conducting case study and field study relatedtotheArchitecturalDesignproject.
- End Semester evaluation will be done by external jury member (from Academics or ProfessionalArchitect)otherthantheUniversityfaculty.

Reference

1. Baiche,B.andWalliman,N.(2012).NeufertArchitectsData,4thEd.Oxford:Wiley-Blackwell.
2. Chiara,J.D.andMichael,J.C.2001.TimeSaversStandardsforBuildingTypes.Singapore: McGraw HillProfessional.
3. Gauzin-Muller,D.(2002).SustainableArchitectureandUrbanism:Concepts,Technologies, Examples.1stEd.Basel:BirkhauserVerlagAG.
4. National Building Code2005

Course Outcomes:

CO1	Analyze and explore design possibilities of multifunctional environments
CO2	Evaluate thechallenges of site planning and designing buildings with varied functions
CO3	Demonstrate the knowledge about Spatial integration
CO4	Demonstrate the importance of Barrier free environments in design.
CO5	Implement the concept of knowledge Landscape design in design process

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	2	2	3	2	2	2	1	2
CO2	3	3	3	3	2	2	3	2	2	2	1	2
CO3	3	3	3	3	2	2	3	2	2	2	1	2
CO4	3	3	3	3	2	2	3	2	2	2	1	2
CO5	3	3	3	3	2	2	3	2	2	2	1	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	3	3	3	2	2	3	2	2	2	1	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
5TH	BAR05007	**Landscape Design Studio**	02	0	0	1

Objective

Toenablethestudentstodesignlandscapeswithimplementationsofprinciplesofsiteplanning, siteanalysistechniques,understandtheelementsandtheirpracticaluseinlandscapedesign.

Elements of Designed Landscapes

- Briefoverviewoftheuseoflandforms,water,plants,builtelements,applicationofmaterials, streetfurnitureinadesignedlandscape.
- Hardlandscapes,pavingdetails,designofpaths,roadways,streets,terracesetcanduseof land formeffectively
- Softlandscapes,designoflawns,shrubs,hedges,trees,inrelationtobuildingsandother landscapeelements.

Design and Construction Details

- Design concepts related to use of sculpture, outdoor lightings, Architectural feature,steel furnitureandgroupingthemintomeaningfulcompositionsforvisualandfunctionaleffects.
- Study of landform, its technical expression through grading plan, sections and earthwork computations.
- Constrictionofstructureinlandscapecirculationroads,parkingpaths,levelchanges,walls, steps,lamps,constructionofscreens,trellis,wallfences,galesdecks,poolsetc,
- Contemporary concepts and concerns, contemporary attitude to development and design ofopenspaceslikeurbanlandscape,parks,rurallandscapeetc.
- Introduction to concepts of green architecture and micro climate planning, the role of landscapecomponentsinmodifyingmicroclimatewithrespecttotemperature,humidity, precipitation andpercolation

Assignments

Simple exercises in using plants and landscape elements
Studio exercise and emphasizing relationship between built form and outdoor areas and site planning issues

Reference

1. Appleton.(1996).TheExperienceofLandscape.Wiley.
2. Geoffrey,andJellico,S.(1987).TheLandscapeofMan.ThamesandHudson.
3. Holl,G.P.(2006).QuestionsofPerceptionPhenomenonlogyofArchitecture.Richmond: William StoutPublishers.
4. Laurie.(1986).AnIntroductiontoLandscapeArchitecture.Elsevier.
5. Lynch,K.(1962).SitePlanning.Cambridge:TheMITPress.
6. Reid,G.(2002).LandscapeGraphics.NewYork:Watson-Guptill.
7. Simonds,J.O.(2006).LandscapeArchitecture:AManualofLandPlanningandDesign.
8. ManandNaturebyGeorgePerkinsMarshandDavidLowenthal

Course Outcomes:

CO1	Analyze the use of landforms.
CO2	Evaluate the design of Hard landscapes and soft landscapes
CO3	Demonstrate the knowledge about design of lawns and pathways
CO4	Demonstrate concepts of green architecture and micro climate planning.
CO5	Implement the concept of knowledge Landscape in design process

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	2	2	2	1	1	1	2	1	2
CO2	3	3	-	2	2	2	1	1	1	2	1	2
CO3	3	3	-	2	2	2	1	1	1	2	1	2
CO4	3	3	-	2	2	2	1	1	1	2	1	2
CO5	3	3	-	2	2	2	1	1	1	2	1	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	3	-	2	2	2	1	1	1	2	1	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
5TH	BAR05008	Working Drawing and Detailing- I	04	0	0	4

Objective

TointroduceWorkingdrawingsandtheirsignificanceintheconstructionofbuildings.Toteach studentstheessentialcomponentsofworkingdrawings,notations,drawing standards,andstrengthenstudents'knowledgeaboutpreparingworkingdrawingsforvarious stagesofbuildingconstructionandfordetailsofbuildingelements.

Introduction to various building components and precise purpose of set of workingdrawings. Studyofeachdrawingwithreferencetospecification&schedulesofvariousbuildingmaterials.

- Preparationsofchecklistasguideforlistofworkingdrawings.
- Studyofbuildingbyelawsforvariousconstructiondetails.
- Methodofrepresentingvariouscontents&specificinformationinworkingdrawings.
- Preparation of municipal drawings and importance of working drawing as a legal document and tenderdocument.

Load Bearing Structure

Onesetofworkingdrawingofanyloadbearingstructurealongwithlarge-scaledetailsofany specificallydesignedsituations.Thefollowingsetofdrawingsmaybepreparedforthesame.

- Corporationdrawing
- Siteplan
- Center lineplan
- Excavationplan
- Foundationplan
- FoundationDetails
- Sill levelplan
- Schedule ofopenings
- Lintellevelplan
- Slab levelplan
- Terracelevelplan&terracingdetailing
- Electricallayout
- Plumbinglayout
- Sections
- Elevations
- Toiletlayout

Reference

1. BuildingandConstructionAuthority.(2005).CONQUAS-21.Singapore:TheBCAConstruction Quality AssessmentSystem.
2. Jefferis,A.andMadsen,D.A.(2005).ArchitecturalDraftingandDesign.5thEd.NewYork: Thomson DelmarLearning.
3. Joe,B.(Ed).(2002).DetailsinArchitecture:Vol.I-V.Victoria:TheImagesPublishinggroup.
4. Osamu, A. W., Linde, R. M. and Bakhoum, N. R. (2011). The professional practice of architecturalworkingdrawings.4thEd.Hoboken:JohnWiley&Sons.
5. Weston,R.(2004).PlansSectionsElevations–Keybuildingsofthetwentiethcentury.London: Laurence KingPublishing.

Course Outcomes:

CO1	Analyze Working drawings and their significance in the construction of buildings
CO2	Demonstrate the knowledge about essential components of working drawings
CO3	Analyze the concept of load bearing structures
CO4	Demonstrate working drawings of various floor plans
CO5	Implement various service layouts in the working drawing set

Course Articulation Matrix

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	2	2	2	3	1	2	3	2	1	1	-	1
CO2	2	2	2	3	1	2	3	2	1	1	-	1
CO3	2	2	2	3	1	2	3	2	1	1	-	1
CO4	2	2	2	3	1	2	3	2	1	1	-	1
CO5	2	2	2	3	1	2	3	2	1	1	-	1

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO	2	2	2	3	1	2	3	2	1	1	-	1

SIXTH SEMESTER
BARCH PROGRAMME

SIXTH SEMESTER								
SL. NO.	**COURSE CODE**	**SUBJECTS**	**CONTACT HOURS (L-T-P)**	**CREDIT**	**SEMESTER EVALUATION (WE, IA, VV, TP)**			
THEORY SUBJECTS								
1.	BAR06001	Theory of Design	3-0-0	3	WE			
2.	BAR06002	Human Settlement Planning and Housing	3-0-0	3	WE			
3.	BAR06003	EstimationValuationand Specification	3-0-0	3	WE			
4.	BAR06004	HVAC Systems	2-1-0	3	WE			
SESSIONAL SUBJECTS								
1.	BAR06005	Architectural Design - IV	0-0-9	9		IA	VV	TP
2.	BAR06006	Interior Design	1-0-4	3		IA	VV	TP
3.	BAR06007	Working Drawingand Detailing - II	0-0-4	4		IA	VV	
TOTAL			**11-1-17 = 29**	**28**				

DETAIL SYLLABUS
SIXTH SEMESTER BARCH PROGRAMME

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
6TH	BAR06001	Theory of Design	03	03	0	0

Objective

Toenablethestudentstounderstandtheprinciplesofsiteplanning,siteanalysistechniquesand itsapplicationindesignofdifferentlandscapetypes.

Module 1

INTRODUCTION TO DESIGN

Definitionofdesign,ValueJudgmentsinDesign(DesignandMorality/Ethics,SociallyResponsive DesignProcess,InclusiveDesign),evaluationofdesign,DesignSkills,Generaldiscussionon Manmade and Naturalelements/structures

Module 2

DESIGNPROCESSANDTHINKING

Context for architectural design problems

Designprocess-stagesinthedesignprocess,differentideasofdesignmethodology,analysisand synthesis,simulation,actionabilityandimplementationofintentions.

Understanding the terms - creativity, imagination, etc. Theories on thinking, convergent and divergentthinking,lateralandverticalthinking,creativetechniqueslikechecklists,brainstorming, syntactic,etc.,blocksincreativethinking.

Module 3

DESIGNTHEORIES

Achronologicaloverviewofprinciplesandphilosophyofarchitecturalmovementinart,design and architecture, worldview, theories & perceptions of time and space, mode of reasoning throughdiscussiononworksofnotablearchitects

- Theoriesofperceptionandvariabilityofperception,Phenomenologyofperception-Merleau-Ponty
- Modernism
  RelatedtoworksofWalterGropius,LeCorbusier,MiesvanderRohe,FrankLloydWright,Louis Sullivan
- Postmodernism
  Work of Michael Graves, Robert Venturi, Philip Johnson

Module 4

DESIGNCONCEPTSANDPHILOSOPHIES

Achronologicaloverviewofprinciplesandphilosophyofarchitecturalmovementinart,design and architecture, worldview, theories & perceptions of time and space, mode of reasoning throughdiscussiononworksofnotablearchitects

- Structuralism
  CharlesAlexanderJencks,AldovanEyck,HermanHertzberger,KenzōTange,ClaudeLévi-Strauss
- Post-structuralism/Deconstruction
  BernardTschumi,PeterEisenman,HenriLeFebvre,FrankGehry,DanielLibeskind,ZahaHadid.
- Biomimicry/biomimetics
  AntoniGaudi,NormanFoster

Module 5
Book review, seminars and discussions

READING:
- *LouisSullivan(FormFollowsFunction)*
- *LeCorbusier(TowardsanewArchitecture)*
- *Bernard Tschumi(deconstructivism)*

Reference

1. GeoffreyBroadbent-DesigninArchitecture-Architectureandthehumansciences-John Wiley&Sons,NewYork,1981
2. NigelCross-DevelopmentsinDesignMethodology,JohnWiley&Sons,1984
3. BryanLauson-HowDesignersThink,ArchitecturalPressLtd.,London,1980.
4. TomHeath-MethodinArchitecture,JohnWiley&Sons,NewYork,1984
5. Johnson,P,Wigley,M,(1988)."DeconstructivistArchitecture"inDeconstructivistArchitecture, NewYork:MuseumofModernArt,pp10-20.
6. C.Jencks,(1991)."TheLanguageofPostModernArchitecture"WileyAcademy.
7. P.Eisenman,(1999)."DiagramDiaries".Universe,NewYork.
8. Merleau-Ponty,M.,(1964)."Theprimacyofperception".InThePrimaryPerceptionandother essaysonphenomenologicalpsychology,thephilosophyofart,history,andpolitics,(J.M.Edie Trans),NorthwesternUniversityPress.
1. RobertVenturi,(1966)"ComplexityandContradictioninArchitecture.NewYork:TheMuseum of ModernArt.
2. Tschumi,B.(1994)."Architectureanddisjunction.Cambridge",Mass:MIT.

Course Outcomes

CO1	Develop knowledge about theories of design
CO2	Analyze the process of design
CO3	Develop knowledge about various design concepts
CO4	Analyze various design philosophies
CO5	Reviewing books

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	2	2	2	3	-	-	-	3	-
CO2	3	2	-	2	2	2	3	-	-	-	3	-
CO3	3	2	-	2	2	2	3	-	-	-	3	-
CO4	3	2	-	2	2	2	3	-	-	-	3	-
CO5	3	2	-	2	2	2	3	-	-	-	3	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	2	-	2	2	2	3	-	-	-	3	-

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
6TH	BAR06002	HumanSettlementPlanningand Housing	03	03	0	0

Objective

Thecourseaimstoimpartacomprehensiveknowledgeofurbanplanningandhousingasmeans of understanding architecture in the macro scale. The students are exposed to concepts of publicrealm,understandingofthecityasathreedimensionalentityandperceptionofspaces atmultiplescales;Planningconcepts,settlementplanning,housingpolicies,planningpolicies, differentlevelsofurbanplanning,familiarizewiththeimplementationprocessesthroughvarious statutory andnon-statutory guidelines.

Module I

Originandevolutionofearlyhumansettlements,factorsresponsiblefordevelopmentofvarious settlementforms,typesofsettlements(urbanandrural)classificationofareas withintheurbansettlementsintermsoftypesoflanduses,densities,administrativedivision,land Sociologicalaspects,essentialelementsofsocietyruralandurbancommunities.

Module 2

- PrinciplesofEkistics,briefintroductiontothetheoryof'Ekistics'.
- Introductiontotheconceptsofgreenbelts,satellitetowns,
- Introductiontoruralsettlementsplanning,Urban-ruralfringe,problemsofmigration

Module 3

URBANPLANNING

LevelsofplanningandstepsofpreparationofMasterPlan,StructureplanandZonaldevelopment plan.Land-useClassificationofacity.Land-usesubdivision,regulationandzoning.SmartCity concepts;CompactCityandSustainableCity;ConceptsofTransitOrientedDevelopment,Public Participation inPlanning.

Module 4

INTRODUCTION TO TRANSPORTATION PLANNING

IntroductiontoTransportationplanningandtrafficdesign,potentialandlimitationsofroadways, railways,airwaysandwaterwaysinthedevelopmentofasettlement,IntroductiontoUrbanroads, ElementsandHierarchyofUrbanRoads,RoadIntersections,Interchanges,GradeSeparators

Module 5

HOUSING

Introductiontohousingandcommunityfacilities.RoleofF.S.Ianddensitiesinhousing.Housing schemesinIndia,Urbanrenewalandurbansprawl;Briefintroductiontoslums,redevelopment schemes,conceptsregardingSlumclearance,redevelopment,rehabilitationandresettlement**.**

Note:

FieldstudiesofSlums,Studyofpoliciesandguidelinesonrecenthousingschemes,Reviewof MasterPlansofDifferentCities.

Reference

1. Larice,M.andMacdonald,E.Ed.(2013).TheUrbanDesignReader.2ndEd.TheRoutledge
2. UrbanReaderSeries,Abingdon,Oxon:Routledge.
3. Carmona,M.,Heath,T.,Oc,T.andTiesdell,S.(2010).PublicPlacesUrbanSpaces.Oxford: ArchitecturalPress.
4. Marshall,S.(2009).Citiesdesignandevolution.NewYork:Routledge.
5. Lang, J. T. (2005). Urban Design: A Typology of Procedures and Products. Oxford: Elsevier/ArchitecturalPress.
6. Moughtin,C.,Cuesta,R.,Sarris,C.andSignoretta,P.(2003).UrbanDesign-Methodsand
7. Techniques.Oxford:ArchitecturalPress.
8. Watson,D.,Plattus,A.andShibley,R.(2003).Time-Saverstandardsforurbandesign.NewYork: McGrawHill.
9. JosephDeChiarraandLeeCoppleman,"PlanningDesignCriteria",VanNostrandReinhold Co., New York,1968
10. TownPlanning,A.Bandopadhyay,BooksandAllied,Calcutta2000.
11. BaburMumtazandPatweikly,UrbanHousingStrategies,PitmanPublishing,London,1976.
12. GeofreyK.Payne,LowIncomeHousingintheDevelopmentWorld,JohnWileyandSons, Chichester,1984.
13. JohnF.C.Turner,Housingbypeople,MarisonBoyars,London,1976.
14. MartinEvans,Housing,ClimateandComfort,ArchitecturalPress,London,1980.
15. ForbesDavidsonandGeoffPayne,UrbanProjectsManual,LiverpoolUniversityPress,Liverpool, 1983.
16. Rangwala,TownPlanning,Charotarpublishinghouse.
17. G.K.Hiraskar, TownPlanning.
18. RameGowda,UrbanandRegionalplanning.
19. N.V.Modak,V.N.Ambedkar,TownandcountryplanningandHousing,OrientLongman,

Course Outcomes

CO1	Develop knowledge about origin and evolution of human settlement.
CO2	Analyze the principles and concepts related to human settlement
CO3	Demonstrateknowledge about Urban Planning.
CO4	Applyknowledge about Transportation Planning.
CO5	Acquireknowledge about Housing.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	2	2	2	3	-	-	2	3	2
CO2	3	2	-	2	2	2	3	-	-	2	3	2
CO3	3	2	-	2	2	2	3	-	-	2	3	2
CO4	3	2	-	2	2	2	3	-	-	2	3	2
CO5	3	2	-	2	2	2	3	-	-	2	3	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	2	-	2	2	2	3	-	-	2	3	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
6TH	BAR06003	Estimation, Valuation and Specification	03	03	0	0

Objective:
The course intends to provide knowledge of methods of estimation and valuation forbuilding industry. Students get equipped with practical and working knowledge in areas of building constructionandspecification,quantifyingmaterialsandrateanalysis.

Module 1
ESTIMATION
Introductiontothesubject,definition,aimandobjective.Scopeandimportanceofthesubject, principlesofandmethodsofestimating.Differenttypesofestimation.Approximateanddetailed estimation

Module 2
Methodsofapproximateestimating-BuiltinorCarpetareamethod,Cubiccontentmethodand numeroussystems.Ratesofmaterials,Rateanalysis,Pricingofbillofquantities,Abstractand detailedestimate.Takingoutquantitiesofvariousitems.Commonabbreviations.Costestimates, standardsmodesofmeasurements,writingschedules,elementsofcostaccountancyandbook keeping.

Module 3
VALUATION
Principlesofvaluationofrealpropertiesforthepurposeofsaleandpurchase,mortgage,lease, Freeholdandleasehold,interest,formsofrents,seller'svalues,fairvalue,mortgagevalues,distress salevalues,buyer'svalue,fancyvalue,annualvalue,year'spurchase,depreciationvalue. Methodsofvaluation-Valuationofland,methodsofbelting,methodsoffrontland,landbuilding methodsofvaluation,shoppremisesproperties.

Module 4
Valuationofresidentialoffices,commercial,industrial,leaseholdagriculturalproperties,valuation ofmunicipalrate,andcompulsoryaccusationvaluationofindustriesasgoingconcernfactories, mills,easementrightsandvaluationthereof,developmentofproperties.Arbitration-litigationlaws

Module 5
Complete estimation of a small scale building as decided by the faculty.

Reference

1. Birdie,G.S.(2005).TextBookofEstimatingandCosting.DhanpatRaiPublishing.Chakraborty, M. Estimating, Costing, Specification & Valuation
2. C.P.W.D.StandardScheduleofRates.
3. 3. Dutta, B. N. (1998). Estimating and Costing in Civil Engineering. 24th Ed. UBS Publishers Distributors Ltd.

Course Outcomes

CO1	Develop knowledge about basic process of estimation.
CO2	Applying various methods of approximate estimation.
CO3	Analysevaluation of preojects.
CO4	Applying process of valuation for residential and commercial buildings
CO5	Demonstrate estimation process for live projects

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	-	2	1	-	-	3	-	-	-	3	2
CO2	2	-	2	1	-	-	3	-	-	-	3	2
CO3	2	-	2	1	-	-	3	-	-	-	3	2
CO4	2	-	2	1	-	-	3	-	-	-	3	2
CO5	2	-	2	1	-	-	3	-	-	-	3	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	2	-	2	1	-	-	3	-	-	-	3	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
6TH	BAR06004	**HVAC Systems**	03	02	1	0

Objective

This course aims to impart fundamental understanding about heating, ventilation and air-conditioning in buildings. Basic principles of thermodynamics and air-conditioning process is coveredwithaspecificorientationtowardshumancomfort.thecourseenablesthestudentto calculateandestimateheatingorcoolingloadofabuildinganddesigntheair-conditioning systeminaneffectivemanner.Differenttypesofair-conditioningsystemandductingsystemare alsotaughtinthecourse.

Module 1

DEFINITIONS AND LAWS

Definition&UnitsofThermodynamicquantities-Heat(Specificheat&Latentheat),Pressure (Absolute,Gauge&AtmosphericPressure),AbsoluteTemperature(Scales&measurement).PH diagramofwatertounderstandLatentheat,Sensibleheat,Superheat&Enthalpy,Degreeof Superheat & DrynessFraction.

LawsofThermodynamicswithrespecttorefrigerators&heatpumps,COP&EERofHVACsystems.

WorkingprincipleofaVaporCompressionRefrigerationsystemwithschematics&TSdiagram.

Application, Properties & Dupont Nomenclature of refrigerants.

Module 2

AIRCONDITIONINGPRINCIPLES

Heat Gains in Building Systems – Thermal Conductivity and U value of Building Materials. Conductiveheattransferthroughcompositewalls&pipes.SolarHeatGainthroughFenestration systems.Numerical

Sensible and Latent Gains, Humidification & Dehumidification, Thermal comfort conditions & Comfort Chart.

Classification,Principle,constructionandworkingofSummerandWinterAir-conditioningsystems.

CoolingloadcalculationsNumericalusingPsychometricchart.

Module 3

HEATING SYSTEMS

Space Heating: Conventional & Unconventional Heating systems, Radiant panel and Hydronic Heating systems. Passive heating and cooling techniques, Green heating systems.

Module 4

COOLING SYSTEMS

Air Distribution Systems – Natural & Mechanical ventilation systems, Supply, Return and RecirculationDucts.IndoorairqualityandAirFilters.

Thermostats and Humidistat. Centrifugal blowers and Exhausters.

Differenttypesofair-conditioningsystems.Window,split,ductableAC,etc.

Introductiontocentralairconditioningsystems.

Understanding 2 pipe & 4 Pipe CV and VAV systems. Chilled Air and Water systems, Spatial requirement of HVAC plants and duct layout.

Module 5

Design of Air-conditioning system for a small office or commercial building.

References

1. Bovay,H.E.(1981).HandbookofMechanical&ElectricalsystemsforBuildings.McGraw-Hill HigherEducation.
2. Sawhney, G. S. (2006). Fundamentals of Mechanical Engineering: Thermodynamics, MechanicsandStrengthofMaterials.NewDelhi:PrenticeHallofIndia.
3. Willim,J.McG.(1971).Mechanical&ElectricalEquipmentforBuildings.
4. Ambrose,E.R.(1968).HeatpumpsandElectricHeating,JohnandWileyandSonsInc,New York.
5. HandbookforBuildingEngineersinMetricsystems(1968),NBC,NewDelhi.
6. WilliamH.SevernsandJulianR.Fellows.Airconditioningandrefrigeration.JohnWileyandsons, London
7. Khurmi,Gupta&Arora.RefrigerationandAirConditioning,SChand&Co.

Course Outcomes

CO1	Develop knowledge about terminologies and laws related to air conditioning.
CO2	Develop knowledge about Air conditioning system.
CO3	Evaluating heating system.
CO4	Evaluating cooling system.
CO5	Designing of Air Conditioning system.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	2	-	2	2	3	-	-	1	3	2
CO2	3	-	2	-	2	2	3	-	-	1	3	2
CO3	3	-	2	-	2	2	3	-	-	1	3	2
CO4	3	-	2	-	2	2	3	-	-	1	3	2
CO5	3	-	2	-	2	2	3	-	-	1	3	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	-	2	-	2	2	3	-	-	1	3	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
6TH	BAR06005	**Architectural Design - IV**	09	0	0	9

Objective

Theobjectiveofthisstudioistoexposethestudentstothecomplexitiesofprovidingbuiltupspace inanurbansetting.Toexposethestudentstothechallengesofbiggerscalesiteplanninginvolving agroupofbuildings,spaceprogramming,complexitiesofprovidingbuildingservicesand infrastructurefacilitiesandeconomicfeasibility.Toenablethestudentstounderstandhowto designincompliancewithbuildingregulationsandspacestandards.

INTENT

Togenerateanunderstandingwithinthestudentstodealwiththecomplexitiesofmixingvarious usergroups(economicandsocio-cultural)inlivingenvironments.Whiledesigningsocio-economic determinantsandtechnologicalalternativesshallbestudiedindetail.Specialemphasestoput on structural aspects of high rise buildings, utilitarian parameters, space optimisation, conformancewithregulatoryrequirements,integrationofstructuralsystemsandbuildingservices. They are also expected to be conscious about the need for climate sensitive passive design techniques. Design and standards for different physical infrastructure such as,roads/streets, pedestrianpathways,parkingprovision(basementparking,othercoveredandopenparking), sitedrainage,solidwastemanagementfacilities,waterconservationsystems.

ALLIED KNOWLEDGE REQUIRED

- Building regulations andcodes
- Buildingandsiteservices(technical)
- Sustainablearchitecture

EXAMPLES OF MAJOR DESIGN PROBLEM

Design-problem may focus but not limited to a multi-functional, service (advanced services) orientedbuildinglikeGrouphousing(Housingtypesbasedonheightofbuildings,andoccupancy densities,Gatedcommunity,housingtypesbasedonaffordability,etc.) Multi-specialityHospitals,HighendstarcategoryHotels,Shoppingcomplex/Malls,Officebuilding, Mixed use occupancy buildings etc. in an urban setting including application of urban development, controls, codes and bye-laws.

Emphasismayalsobelaidonsiteplanningaswellasonadvancedservicesatbuildingandatsite level.Thefocuswouldbeonunderstandinghowtodesignforanurbansetting.

EXAMPLES OF MINOR STUDIO PROJECT

Clubhouse,Meditationhall,Multi-levelparking,Footoverbridge,Smallscaledesigninaheritage context.

PROCESS

- Thismodulecanbestartedwithawarm-upexercise/literaturereview(grouporindividual). Studentscouldbesensitized(social-culturalsensitization)throughdocumentary/movies/ photosetc.
- Studentsmayvisitsiteforcollectingcontextspecificdataforgettingbetterunderstandingof real-lifeprojectdetails.Thecollecteddatamaybeanalyzedandpresentedforevaluation.
- Theabove-mentionedmoduleteachingmethodsaresuggestive.Facultymaychooseother pedagogicalapproachesfordesignthinkingprocess.

- Readings/ short movies/ Discussion on designers' philosophies could be initiated for idea generation.Furtherapproachesfordesigniterationsmayinvolvemorecommontechniques likeFlowdiagramtoexplorerelationofvariousspaces,bubblediagramforlocatingvarious zonesonsite,tryandre-createforanalysingspacesinalldimensionsthroughBlockModels andsinglelinegraphicsandstudymodelsforchoosingtherightoption.
- Itispreferableifthestudentscommunicatetheapplicationofallservicesintheirdesign.
- Studentsmustmakeenlargeddrawingsshowingallworkingdetailsforsuperstructure.
- Formativeassessmentinthestudiocouldbedonethroughindividualcritique,groupdiscussion formalandinformalfeedbacketc.
- Summative assessment of the studio work could be achieved through panel discussion, presentation.

Note

- Study tour of one-week duration is mandatory for conducting case study and field study relatedtotheArchitecturalDesignproject.
- End Semester evaluation will be done by external jury member (from Academics or ProfessionalArchitect)otherthantheUniversityfaculty.

Reference

1. Baiche,B.andWalliman,N.(2012).NeufertArchitectsData,4thEd.Oxford:Wiley-Blackwell.
2. Chiara,J.D.andMichael,J.C.2001.TimeSaversStandardsforBuildingTypes.Singapore: McGraw HillProfessional.
3. Gauzin-Muller,D.(2002).SustainableArchitectureandUrbanism:Concepts,Technologies, Examples.1stEd.Basel:BirkhauserVerlagAG.
4. Huxtable,A-L.(1984).TallBuildingsArtisticallyReconsidered.
5. Kloft,E.andJohann,E.(2003).High-riseManual:TypologyandDesign,Constructionand Technology,1stEd.Basel:BirkhauserVerlagAG.
6. Markus,K.,Rollbacher,R.,Herrmann,E.,Wietzorrek,U.andEbner,P.(2009).Typology+:
7. InnovativeResidentialArchitecture.Basel:BirkhauserVerlagAG.
8. Parker,D.AndWood,A.(2013).TheTallBuildingsReferenceBook.NewYork:Routledge.
9. Wood,A.andRuba,S.(2012).GuidetoNaturalVentilationinHighRiseOfficeBuildings.New York :Routledge.
10. Correa,C.(2010).APlaceintheShade:TheNewLandscapeandOtherEssays.NewDelhi: PenguinBooks.
11. Ferre, A. and Tihamer, S. H. (2010). Total Housing: Alternatives to Urban Sprawl. New York : ACTARPublishers.
12. Brooks,R.G.(1988).SitePlanning:Environment,ProcessandDevelopment.Michigan.
13. Richard Untermann and Robert Small, "Site planning for cluster housing", Van Nostrand Reinhold Company,1977.

Course Outcomes

CO1	Generate and understanding within the students to deal with the complexities of mixing various user groups
CO2	Develop knowledge about Building regulations and codes Building and site services (technical)
CO3	Develop knowledge about site services (technical)
CO4	Evaluating design process of multi-functional, service (advanced services) oriented building
CO5	Analysing site planning as well as on advanced services at building and at site level

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	2	2	3	2	2	2	1	2
CO2	3	3	3	3	2	2	3	2	2	2	1	2
CO3	3	3	3	3	2	2	3	2	2	2	1	2
CO4	3	3	3	3	2	2	3	2	2	2	1	2

CO5	3	3	3	3	2	2	3	2	2	2	1	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO	3	3	3	3	2	2	3	2	2	2	1	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
6TH	BAR06006	Interior Design	03	01	0	4

Objective

Tofamiliarizestudentsabouttheneedofinteriordesign;itsprinciplesandtheorieswithspecific referencetocolor,texture,lightandtheireffects.Toexplorecreativityandinnovativedesign optionswiththebasicknowledgeofanthropometrics,buildingmaterialsandfinishesand construction details.

Module 1

Interiorspaceprogramming,Introductiontobasicphysicalfactors/elementsofinteriordesigni.e walls,floors,ceiling,doors,windowsetc.

Historical evolution of interior styles and furniture, vernacular interior elements (design and materials used)

Usage of modern, traditional as well as cost effective materials

- Anassignmenttobesubmittedonmarketsurveyofvariousinteriormaterials.

Module 2

Studyoftherelationshipbetweenfurnitureandspaces,humanmovements&furnituredesignas relatedtohumancomfort.Function,materialsandmethodsofconstruction,changingtrendsand lifestyles,innovationsanddesignideas.Studyonfurnitureforspecifictypesofinteriorslikeoffice furniture,children'sfurniture,residentialfurniture,displaysystems,etc.

- Assignmentondifferentfurnituretypesandproductdesign.

Module 3

Studyofdaylightandartificiallightingforspecificfunctions;differenttypesofinteriorlightingtheir effects;typesoflightingfixtures;Electricallayout,Otherelementsofinteriorslikeaccessoriesused forenhancementofinteriors,paintings,objects-de-art,etc.Interiorlandscapingelementslike rocks,plants,water,flowers,fountains,paving,artefacts,etc.

- Assignment on two interior schemes of different functional types:residential/commercial /Public buildings at different scales

Module 4

Details like false ceiling, partition, flooring, wall paneling/cladding; color scheme; furnishings.

Module 5

- Presentationoneminentinteriordesigners'work
- Onetimeproblemof3hours(oneweek)tobeconducted.

Reference

1. Ching,F.D.K.(1987).*InteriorDesignIllustrated*.NewYork:V.N.R.Publications.
2. Doshi,S.(Ed.)(1982).*TheImpulsetoadorn-StudiesintraditionalIndianArchitecture.*Marg Publications.
3. Kathryn,B.H.andMarcus,G.H.(1993).*LandmarksoftwentiethCenturyDesign*.AbbeyVille Press.
4. Penero,J.andZelnik,M.(1979).*HumanDimensionandInteriorspace:ASourceBookofDesign ReferenceStandards.*NewYork:WhitneyLibraryofDesign.
5. Slesin,S.andCeiff,S.(1990).*IndianStyle*.NewYork:ClarksonN.Potter.
6. Dorothy, S-D., Kness, D. M., Logan, K. C. and Laura, S. (1983). *Introduction to Interior Design.*Michigan : MacmillanPublishing.

Course Outcomes

CO1	Develop knowledge about Interior space programming
CO2	Develop knowledge of the relationship between furniture and spaces, human movements & furniture design
CO3	Develop knowledge about natural and artificial lighting for specific functions
CO4	Planning and designing of various design elements
CO5	Analysing the works of eminent designers.

Course Articulation Matrix

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	3	3	3	2	2	3	2	2	2	1	2
CO2	3	3	3	3	2	2	3	2	2	2	1	2
CO3	3	3	3	3	2	2	3	2	2	2	1	2
CO4	3	3	3	3	2	2	3	2	2	2	1	2
CO5	3	3	3	3	2	2	3	2	2	2	1	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO	3	3	3	3	2	2	3	2	2	2	1	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
6TH	BAR06007	**WorkingDrawingandDetailing- II**	**04**	**0**	**0**	**4**

Objective

TotrainthestudentstopreparedetailedWorkingdrawingsforeffectiveexecutionatconstruction site, preparation of integrated services drawings, and detailing of building components, and methodsoftransmittalsandrecordkeeping.

Introductiontovariousalliedservicesdrawings,buildingcomponentsandprecisepurposeofset ofworkingdrawings.Studyofeachdrawingwithreferencetospecification&schedulesofvarious buildingmaterials.

Frame Structure

Onesetofworkingdrawingofanyframestructurealongwithlarge-scaledetailsofanyspecifically designedsituationswithbasement.Thefollowingsetofdrawingsmaybepreparedforthesame.

- Corporationdrawing
- Siteplan
- Centre lineplan
- Excavationplan
- Footingplan
- Footingdetails
- Groundbeam&plinthbeamdetails
- Sill levelplan
- Schedule ofopenings
- Lintel levelplan
- Slab levelplan
- Terrace levelplan
- Electricallayout
- Plumbinglayout
- Sections
- Elevations
- Toilet & Kitchenlayout
- Sewerage & drainlayout
- Rainwater harvestingsystem
- Flooring pattern &finishes
- Wall pattern &finishes
- Wood finishes &fixates
- Fabricationdetails
- Boundary Walldrawing

Reference

1. Building and Construction Authority. (2005). CONQUAS-21. Singapore : The BCA ConstructionQualityAssessmentSystem.
2. Jefferis,A.andMadsen,D.A.(2005).ArchitecturalDraftingandDesign.5thEd.NewYork: Thomson DelmarLearning.
3. Joe,B.(Ed).(2002).DetailsinArchitecture:Vol.I-V.Victoria:TheImagesPublishinggroup.
4. Osamu, A. W., Linde, R. M. and Bakhoum, N. R. (2011). The professional practice of architecturalworkingdrawings.4thEd.Hoboken:JohnWiley&Sons.
5. Weston,R.(2004).PlansSectionsElevations–Keybuildingsofthetwentiethcentury. London:LaurenceKingPublishing.

Course Outcomes

Course Articulation Matrix	**CO1**	Develop knowledge about drawings required for site execution
	CO2	Develop knowledge of the site issues
	CO3	Producing quality drawings for execution at site
	CO4	Applying computer added skills for mitigating errors
	CO5	Compiling various administrative and working drawings.

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	2	2	2	3	1	2	3	2	1	1	-	1
CO2	2	2	2	3	1	2	3	2	1	1	-	1
CO3	2	2	2	3	1	2	3	2	1	1	-	1
CO4	2	2	2	3	1	2	3	2	1	1	-	1
CO5	2	2	2	3	1	2	3	2	1	1	-	1

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO	2	2	2	3	1	2	3	2	1	1	-	1

SEVENTH SEMESTER
BARCH PROGRAMME

SEVENTH SEMESTER								
SL. NO.	**COURSE CODE**	**SUBJECTS**	**CONTACT HOURS (L-T-P)**	**CREDIT**	**SEMESTER EVALUATION (WE, IA, VV, TP)**			
THEORY SUBJECTS								
1.	BAR07001	Introduction to Urban Design	3-0-0	3	WE			
2.	BAR07002	Advanced Building Systems and Services	2-1-0	3	WE			
3.		Professional Elective -II	3-0-0	3	WE			
4.		Open Elective-I	3-0-0	3				
SESSIONAL SUBJECTS								
1.	BAR07003	Architectural Design - V	0-0-9	9		IA	VV	TP
2.	BAR07004	Research Methods and Seminar	1-0-4	3		IA	VV	TP
3.	BAR07005	Non-Conventional Building Technologies	0-0-4	4		IA	VV	TP
TOTAL			**12-1-17 = 30**	**28**				

DETAIL SYLLABUS
SEVENTH SEMESTER BARCH PROGRAMME

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
7TH	BAR07001	IntroductiontoUrbanDesign	03	03	0	0

Objective:
To introduce Urban design as a professional discipline situated at the interface between architecture, landscape architecture and urban planning; To sensitise the students about the conceptofpublicrealm,understandingofthecityasathreedimensionalentityandperception of spaces at multiple scales; familiarize with the implementation processes through various statutory and non-statutory guidelines.

Module 1
INTRODUCTION AND SCOPE
Relationship between Architecture, Urban Design and Urban Planning; Brief review of the evolutionoftheurbandesignasadiscipline,basicprinciplesandtheories.Broadunderstanding ofurbanformsandspacesatvariousspatialscalesthroughexamplesfromhistoriccities,examples ofmedieval,industrial,renaissance).Philosophiesandconceptsofdifferentpioneersoftown planning(PatrickGeddes,EbenzerHoward,PatrickAbercrombie,ReymondUnwin,SoriaY.Mata, etc.)

Module 2
TYPOLOGIESANDPROCEDURES
Concept and characteristics of Neighbourhoods (Clarence Perry), Neighbourhood Unit- Size , Boundaries,SocialrelevanceandMeaning,SocialmixedandBalancedCommunities;Concepts ofpublicandprivaterealm;Conceptofpublicopenspace;Understandingdifferenttypesand procedures of urban design interventions their scale relationships.

Module 3
ELEMENTS OF URBAN DESIGN
Understandingthecityasathreedimensionalelement;Urbanformasdeterminedbyinterplayof masses,voids,order,scale,harmony,symmetry,colourandtexture;Organizationofspacesand theirarticulationintheformofsquares,streets,vistasandfocalpoints;Imageofthecityandits componentssuchasedges,paths,landmarks,streetfeatures.

Module 4
URBANDESIGNANDSUSTAINABILITY
Sustainabilityconcept;Relationshipofurbandesignwitheconomic,environmentalandsocial sustainability;EnvironmentalDesign-Microclimate,Windshading,DesigningforSunandShade, NaturalLighting,CompactCity,HealthyCityandWalkableCity.

Module 5
URBANDESIGNIMPLEMENTATION
Urbandesignanditscontrol;Institutionalarrangementsfordesignandplanning;Urbanrenewal; ConceptsofTransitOrientedDevelopment;Parking,ServicingandInfrastructure

References

1. Larice,M.andMacdonald,E.Ed.(2013).*TheUrbanDesignReader*.2ndEd.TheRoutledge UrbanReaderSeries,Abingdon,Oxon:Routledge.
2. Carmona,M.,Heath,T.,Oc,T.andTiesdell,S.(2010).*PublicPlacesUrbanSpaces.*Oxford: ArchitecturalPress.
3. Marshall,S.(2009).*Citiesdesignandevolution.*NewYork:Routledge.
4. Lang,J.T.(2005).*UrbanDesign:ATypologyofProceduresandProducts*.Oxford: Elsevier/ArchitecturalPress.
5. Moughtin,C.,Cuesta,R.,Sarris,C.andSignoretta,P.(2003).*UrbanDesign-Methodsand Techniques*.Oxford:ArchitecturalPress.
6. Watson,D.,Plattus,A.andShibley,R.(2003).*Time-Saverstandardsforurbandesign*.NewYork : McGraw Hill.

Course Outcomes

CO1	Implement the basic meaning of Urban design and its history
CO2	Analyze the concept of different theories and concepts
CO3	Analyze the concept of elements of Urban design
CO4	Demonstrate basic principles of interrelation of Urban design and sustainability
CO5	Analyze the concept of implementation of Urban design in practical concepts

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	2	2	2	3	-	-	2	3	2
CO2	3	2	-	2	2	2	3	-	-	2	3	2
CO3	3	2	-	2	2	2	3	-	-	2	3	2
CO4	3	2	-	2	2	2	3	-	-	2	3	2
CO5	3	2	-	2	2	2	3	-	-	2	3	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	2	-	2	2	2	3	-	-	2	3	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
7TH	BAR07002	Advanced Building Systems and Services	03	02	01	0

Objective:
To develop know-how and understanding of important advanced systems and services in buildings, their definitions and terms used, functioning and their applications in building.

Module 1
FIRE SAFETY
ClassificationofFires&Extinguishers,DryRiser,WetRiser&DownComersystems,Sprinkler& Drenchersystems,Firedetectionsystems,FireLifts&FireEscapePlan,Fireprevention,safetyand security measures andregulations.
Fire fighting layout, Reflected ceiling plan of smoke detectors / sprinklers, etc.

Module 2
PARKINGANDCIRCULATIONSYSTEMS
MultilevelParkingSystems,Semi-automaticandautomaticparkingsystems,Elevatortypesand spatialrequirementswithrespecttoPassenger,Service&Firelifts,EscalatorsandTravellators, ApplicationsofRaisedFloorsystems.

Module 3
BUILDINGUTILITIES
BuildingAutomation–Objectives&advantages,Smartdevicesusedinillumination,Climate control,BuildingSecuritysystemsetc.,Laundry&Garbagechutes,UnderstandingBioMedical Wasteandtheirdisposal,ChemicalandBiologicalToilets,Hotwatersystemsforapartmentsand hotels, Cooking gas distribution system for residences. Communication systems: space and connectionfacilitiesforLAN,computerserver,PABXandtelephone.

Module 4
STANDARDS AND REGULATIONS
Study of building services with reference to NBC (National Building Code), ECBC (Energy ConservationandBuildingCode)andBISregulations(BureauofIndianStandards).

Module 5
APPLICATIONS
Case studies on applications of building systems and services.

References

1. SteinReynoldsMcGuinness–MechanicalandElectricalequipmentforbuildings,Vols1&2, John Wiley &sons.
2. FranciscoAsensioCerver–ThearchitectureofSkyscrapers,HearstBookInternational,New York,1997
3. BennettsIan&JosephBurns–StructuralsystemsforTallbuilding
4. William,J.McG.(1971).Mechanical&ElectricalEquipmentforBuildings
5. Bovay,H.E.(1981).HandbookofMechanical&ElectricalsystemsforBuildings.McGraw-Hill HigherEducation.
6. BureauofIndianStandards.(2005).CodeofPracticeforElectricalWiringInstallationsIS-732.
7. Kloft,E.andJohann,E.(2003).High-riseManual:TypologyandDesign,Constructionand Technology,1stEd.Basel:BirkhauserVerlagAG.
8. National BuildingCode
9. EnergyConservationandBuildingCode

Course Outcomes

CO1	Demonstrate basic principles of fire-safety in buildings
CO2	Express the concept of circulation and parking system in buildings
CO3	Analyze the concept of building utilities
CO4	Implement principles of standard rules and regulations
CO5	Demonstrate knowledge through case studies

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	2	-	2	2	3	-	-	1	3	2
CO2	3	-	2	-	2	2	3	-	-	1	3	2
CO3	3	-	2	-	2	2	3	-	-	1	3	2
CO4	3	-	2	-	2	2	3	-	-	1	3	2
CO5	3	-	2	-	2	2	3	-	-	1	3	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	-	2	-	2	2	3	-	-	1	3	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
7TH	BARPE701	Professional Elective (PE) – II Green building and Infrastructure	03	03	0	0

Objective:

The objectives include creating awareness and understanding of the concept of sustainable architecture, green building techniques and energy efficiency in buildings that respond to the climate, material and natural resources. To develop analytical skills to understand the energy consumption and hence cater to reduction. To create awareness about tools and practices to calculate energy consumption

Module 1

SUSTAINABLE PRINCIPLES AND PRACTICES

Introduction to the ideas, issues and concepts of sustainable development; principles of environmentally and ecologically sensitive architecture; Importance of water, energy, materials and community in architecture for sustainable development; Brief introduction to green rating systems and criteria for evaluation of different categories of built development - IGBC, GRIHA and LEED rating systems.

Module 2

GREEN BUILDING DESIGN

Sustainable site planning and landscape design; Building form and orientation for sun and Wind; Building envelope design - Fenestration design, shading devices, facade treatment, efficient use of daylighting; Integrated Use of Landscape: Vertical Landscape, Green Wall, Green Roof.

Module 3

SOLAR PASSIVE TECHNIQUES

Passive Heating techniques: General principles – Direct gain systems - Glazed walls, Bay windows, Attached sunspaces etc. Indirect gain systems - Trombe wall and Solar Chimney

Passive Cooling techniques : General principles – Evaporative cooling, Nocturnal radiation cooling, Passive Desiccant cooling, induced ventilation, earth sheltering, Wind Towers, Earth-Air tunnels, Air Vents.

Case studies on buildings designed with passive heating and cooling techniques.

Module 4

GREEN PRACTICES AND TECHNOLOGIES

Energy utilization in buildings, Renewable and Non-Renewable energy sources. Integration of non-conventional energy systems from renewable source of energy - solar (photovoltaic), wind and biomass

Water conservation practices - Rainwater Harvesting systems; Recycling of wastewater: Physical, Chemical and Biological treatment methods, Root zone treatment, Use of recycled water.

Environment friendly materials (paints, light sensitive glass, etc), Embodied energy of materials, Bio-degradable materials, Recycling and Reuse of materials.

Module 5

Introduction to building performance simulation software (as decided by the faculty)

Example-Ecotect,IES(IntegratedEnvironmentalsolutions),Radiance.
References 1. Sustainabledesignmanual,Vols.1&2,Theenergyandresourceinstitute,NewDelhi. 2. Krishan,A.andNickBaker,ClimateResponsiveArchitecture:ADesignHandbookforEnergy EfficientBuildings,McGrawHillEducationPrivateLimited,India,2001. 3. EnergyConservationBuildingCode(ECBC),USAID-INDIA. 4. Szokolay,S.V.,IntroductiontoArchitecturalScience-TheBasisofSustainableDesign, ArchitecturalPress. 5. RalphLebensM.,PassiveSolarArchitectureinEurope–2,ArchitecturePress,London1983. 6. MendlerS.&OdellW.,TheGuideBookOfSustainableDesign,JohnWiley&Sons,2000. 7. LawsonB.,BuldingMaterials,EnergyAndTheEnvironment;TowardsEcologicallySustainable Development Raia, Act,1996.

Course Outcomes

CO1	Implement principles of sustainability
CO2	Analyze the concept of green building design process
CO3	Apply basic principles of solar impacts in building
CO4	Demonstrate basic principles of green practices in modern building
CO5	Apply basic principles of simulation software

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	1	3	2	3	3	-	-	2	3	3
CO2	3	-	1	3	2	3	3	-	-	2	3	3
CO3	3	-	1	3	2	3	3	-	-	2	3	3
CO4	3	-	1	3	2	3	3	-	-	2	3	3
CO5	3	-	1	3	2	3	3	-	-	2	3	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	-	1	3	2	3	3	-	-	2	3	3

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
7TH	BARPE702	Professional Elective (PE) – II Architecture and Urbanism in Asia	03	03	0	0

Objective:
To provide an overview about dynamic urban transformation and resultant architecturaldevelopmentstakingplaceinmajordevelopingcountriesinAsia–andthusgaina non-Westernperspective;Toprovideaplatformforthestudentstocontextualizethearchitectural andurbandevelopmentprocessesinIndiawiththeneighbouringcountries;Thinkfromaholistic andmultidisciplinaryperspectiveaboutcommonproblems.

Module 1
SETTINGTHECONTEXT
UnderstandingandAsia'surbanshiftanditsmultipledimensions;EvolutionoftheAsian cities:Morphologyofpre-modern,market,colonialandcontemporaryAsiancities.

Module 2
OPPORTUNITIES AND CHALLENGES
Understanding contemporary issues: Demographic transition, urbanisation trends, economic momentum and environmentalconsequences.

Module 3
LOOKINGTOWARDSEASTANDSOUTHEASTASIA
Understanding underlying socio-political dynamics and critiquing new architecture and urban developmentpatternsinAsianmetropolisessuchasSriLanka,Tokyo,Beijing,Shanghai,Hong Kong,Singapore,BangkokandJakarta.

Module 4
LOOKINGTOWARDSSOUTHANDWESTASIA
Understandingunderlyingsocio-politicaldynamicsandcritiquingnewarchitectureandurban development patterns in Asian metropolises such as Dubai, Abu Dhabi, Karachi, Dhaka and Paro.LocatingIndiancitiesinchangingAsia:Economictransformationandsettlementpatterns

Module 5
SIMILARITIES AND DISSIMILARITIES
LocatingIndiancitiesinchangingAsia:Economictransformationandsettlementpatterns– informalandformalcities,Issuesofsustainability,resilienceandurbanform;Rolesofstate andnon-stateactorsinIndia'surbandevelopmentprocess.

References
1. AsianDevelopmentBank.(2008).ManagingAsianCities:MandaluyongCity,Philippines.
2. Hamnett,S.andForbes,D.(2011).PlanningAsianCities.Routledge.
3. MeeKam,N.andHills,P.(2003).Worldcitiesorgreatcities?Acomparativestudyoffive Asianmetropolises.Cities.Vol.20,No.3,pp.151-165.
4. Srivastava,S.(2014).EntangledUrbanism:Slum,GatedCommunityandShoppingMall inDelhiandGurgaon.NewDelhi:OxfordUniversityPressIndia.
5. UNHabitat.(2011).TheStateoftheAsianCities.2010/11.
6. Weightman,B.A.(2011).DragonsandTigers.AGeographyofSouth,EastandSoutheast Asia.Wiley.
7. WorldBank.(2010).CoastalRisksandAdaptationinAsianCoastalMegacities-ASynthesis Report.WashingtonDC:WorldBank.

Course Outcomes

CO1	Express the concept of social changes in Asia which had an impact on architecture
CO2	Demonstrate basic knowledge about opportunities and challenges
CO3	Analyze the concept of socio-political scenario of east and south-east Asia
CO4	Apply basic principles of socio-political scenario of west and south Asia
CO5	Demonstrate basic principles of about forms, process and issues

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	2	2	2	3	-	-	2	3	2
CO2	3	2	-	2	2	2	3	-	-	2	3	2
CO3	3	2	-	2	2	2	3	-	-	2	3	2
CO4	3	2	-	2	2	2	3	-	-	2	3	2
CO5	3	2	-	2	2	2	3	-	-	2	3	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	2	-	2	2	2	3	-	-	2	3	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
7TH	BARPE703	Professional Elective (PE) – II Set Design for Events	03	03	0	0

Objective

Studentswilllearnhowtoanalysescriptsforproperscenery,howtoconceptualizedesignsthat willtranslateintoactualsets,anddevelopvisualthinkingwithinthecreativeprocess.Thecourse imparts understanding of designing stage and event setting through language, colour, and architecturalstyles.

Module 1

HISTORYOFPERFORMINGART,SOCIETYANDSETDESIGN

Insightintotherepresentationofcultureandsocietythroughperformingartsandfilmsindifferent period of history. Modern interpretations of different performing art forms. Investigation of productionmethods,dramatictheoryandconventions,andscenedesignofvariousmediumof performanceformotionpictureanddifferentformsofotherperformingartsinthe20thand21st century.

Module 2

GRAPHICDESIGNANDTYPOGRAPHYFOREXHIBITDESIGN

Principles of layout for creating effective visual signage and explore the unique problems, technique,theory,andapproachesofdesigningsignageforfilms,theatre,andotherformsof events andexhibition.

Module 3

CONCEPTS FOR SET DESIGN

Introductiontothebasicconcepts,throughtheoryandpracticeofscenedesignfortheatre,film, otherperformingarts,eventsandentertainmentmedia.Scriptanalysis,visualartsanalysis(colourandgr aphics,researchskills,andapplicationofprinciplesandelementsofdesign.

Module 4

PROCESS OF SET DESIGN

Stagedesignprocessfrominceptiontoperformance,Materialsandtechniquesusedforerecting differenttypes,CreativeLightingdesign,acousticprovisions,modernequipmentusedforstage control.

Module 5

Studyvisittoafilmstudiooranyeventasdecidedbythesubjectteacher.

References

1. BaicheBousmaha&Walliman Nicholas. Neufert Architect's data. Blackwell science ltd.

2.ChiaraDeJoseph&crosbie.J.Michael.1990.Timesaverstandardsforbuildingtypes.McGraw Hillcompany.

Course Outcomes

CO1	Express the concept of history of set design and arts
CO2	Apply basic principles of layout and signage
CO3	Demonstrate the principles, theories and concepts involved in set design
CO4	Apply basic principles of materials and techniques
CO5	Analyze the concept of site visits about practical approach

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	2	1	2	3	1	1	-	1	2
CO2	3	2	-	2	1	2	3	1	1	-	1	2
CO3	3	2	-	2	1	2	3	1	1	-	1	2
CO4	3	2	-	2	1	2	3	1	1	-	1	2
CO5	3	2	-	2	1	2	3	1	1	-	1	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	2	-	2	1	2	3	1	1	-	1	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
7TH	BARPE704	Professional Elective (PE) – II Architectural Journalism	03	03	0	0

Objective

Toenhancewritingskillsandawarenessaboutarchitecturaljournalism.Toequipstudentswith digital and 3D presentation techniques, fundamentals of photography, basic skills about architectural photography, anddocumentation.

Module 1

ARCHITECTURAL JOURNALISM

IntroductiontoArchitecturaljournalism,Skillimprovementinreporting,writing,editing,criticismof architecture,descriptiveandanalyticalwriting,bookreviews,reporting,reviewandanalysisof historicalandcontemporaryarchitecturalexamplesandnews,Pagecomposition.

Module 2

DIGITALPRESENTATIONS

IntroductionofvarioussoftwareavailableforArchitecturalpresentationsuchasPhotoshop& Coral. Basic Tools for Editing and Creating Graphics. Rendering AutoCAD drawings with appropriatematerials.Compilingandarrangingdrawingsonsheetforpresentationorportfolio. Imagedoctoringandmanipulationusingcomputersoftwareforgraphicsandanimation (Photoshop and Flash).

Module 3

COMMUNICATION TECHNIQUES

Advertising - Typography, artwork, Multimedia - digital graphic design techniques, surface decorationsuchasprint,Printmaking–photoscreen-printingandetching,scanningandlaser printing.

Module 4

3DDIGITALPRESENTATIONS

Movie making Flash movies, animation graphics, and walkthroughs, 3D Printing.

Module 5

PHOTOGRAPHY

Introduction to photography, types of Cameras, equipment- cameras & lenses, Principles of photo composition, properties & priorities: Exposure, Aperture, Speed, colour, black & white photography.

ArchitecturalPhotography-ExteriorandInteriorphotography.

Practical exercises to understand composition, photo documentation of buildings, highlighting quality of architectural spaces.

References
1. Dinsmore,G.A.(1968).AnalyticalGraphics.Canada:D.VanNostrand,CompanyInc.
2. Freeman,S.(1978).WrittenCommunication.NewDelhi:OrientLongman.
3. Sounders,D.(1988).ProfessionalAdvertisingPhotography.London:Merchurst.
4. Edward,J.F.andLee,J.(2000).FeatureWritingforNewspapersandMagazines.4thEd. Longman.
5. Harris,M.(2002).ProfessionalInteriorPhotography.FocalPress.
6. Heinrich,M.(2008).BasicsArchitecturalphotography.BikhauserVerlagAG.

Course Outcomes

CO1	Implement principles of about writing, editing and criticism
CO2	Express the process of digital representation
CO3	Demonstrate different types of communication techniques
CO4	Express the concept of 3D presentation techniques
CO5	Implement principles of photography and its role in architectural journalism

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	3	-	1	1	2	1	2	3	2	2	2
CO2	1	3	-	1	1	2	1	2	3	2	2	2
CO3	1	3	-	1	1	2	1	2	3	2	2	2
CO4	1	3	-	1	1	2	1	2	3	2	2	2
CO5	1	3	-	1	1	2	1	2	3	2	2	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	1	3	-	1	1	2	1	2	3	2	2	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
7TH	BAROE701	OPEN ELECTIVE-I FURNITURE DESIGN	03	03	0	0

Objective

To learn how to design furniture using various principles of design.

Module 1

INTRODUCTION TO FURNITURE DESIGN

Development of Furniture design concepts - a historic review.

- Elementsofdesign–visualgrammarandprinciplesofdesign
- Differenttechniquesforformstudies.

Module 2

ERGONOMICS

Application of ergonomics in human-furniture interaction

- Designofergonomicmodelforspecificuser-problem
- Usabilitystudyofproductform

Module 3

UNIVERSALDESIGNFURNITURE

- Understanding physically challengedusers
- Furnituresfordifferentcategoryofdisability

Module 4

APPLICATIONOFMATERIALSINFURNITUREDESIGN

- Studyofpropertiesofvarioustypesofmaterials
- Applicationofmaterialforvariousfurniture

Module 5

FURNITUREMAKING

- Tools andequipment
- Hardware
- Architecturedetailing

References

1. Ching,F.D.K.(1987).*InteriorDesignIllustrated*.NewYork:V.N.R.Publications.
2. Doshi,S.(Ed.)(1982).*TheImpulsetoadorn-StudiesintraditionalIndianArchitecture.*Marg Publications.
3. Kathryn,B.H.andMarcus,G.H.(1993).*LandmarksoftwentiethCenturyDesign.*Abbey VillePress.
4. Penero,J.andZelnik,M.(1979).*HumanDimensionandInteriorspace:ASourceBookof*

Design Reference Standards. New York : Whitney Library of Design.
5. Slesin,S.andCeiff,S.(1990).*IndianStyle.*NewYork:ClarksonN.Potter.
6. Dorothy,S-D.,Kness,D.M.,Logan,K.C.andLaura,S.(1983).*IntroductiontoInteriorDesign.*

Course Outcomes

CO1	Demonstrate knowledge about concepts and elements of furniture design
CO2	Implement principles of about ergonomics and its application in furniture design
CO3	Express the concept of about furniture design for physically challenged persons
CO4	Analyze the concept of materials
CO5	Demonstrate knowledge about tools and equipment.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	-	-	2	3	1	2	-	2	3
CO2	3	3	-	-	-	2	3	1	2	-	2	3
CO3	3	3	-	-	-	2	3	1	2	-	2	3
CO4	3	3	-	-	-	2	3	1	2	-	2	3
CO5	3	3	-	-	-	2	3	1	2	-	2	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	3	-	-	-	2	3	1	2	-	2	3

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
7TH	BAROE702	**Open Elective - I** **Art Appreciation**	03	03	0	0

Objective

DisseminatingabroadoverviewofArtandDesignandenablingstudentstounderstandvisual awareness,creativityandculturalunderstandingofDesignasaMultidimensionalcreativeArt.

Module 1

INTRODUCTION-DEFININGTHEDISCIPLINARYDIFFERENCES

IntroductiontovarioustypesofArt,ConceptofbeautyandAesthetics.Evolutionofartand design.

Module 2

ARTANDDESIGN-AHISTORICALPERSPECTIVE

HistoryofArt.Artthroughages.ImportanceofVisualperception,Designelementsfrom nature.

Module 3

EXPRESSION OF ART AND DESIGN

RelationshipbetweenArtandDesignwithman,spaceandenvironment.Conceptofspace. Articulationofform,senseofenclosure,Organisationofspaces.

Module 4

INTRODUCTION TO THEORIES

Goldenproportion,Theoriesofscaleandproportion,Vitruviantheory,Modularman, principlesofDesignandelementsofArchitecture.

Module 5

RELATIONS IN ART, DESIGN AND ARCHITECTURE

FactorsinfluencingtheprocessofArt,DesignandArchitecture.Formandfunction.Review of selectedexamples.

References

1. Cantanese,A.J.andSnyder,J.C.(1988).*IntroductiontoArchitecture*.NewYork:McGrawhill BooksCo.
2. Ching,F.D.K.,Jarzombek,M.andPrakash,V.(2010).*AGlobalHistoryofArchitecture*.2ndEd. John Wiley &Sons.
3. Fred,S.K.(2009).*ArtthroughtheagesaGlobalHistory*.3rdEd.ClarkBaxter.
4. Heidegger,M.(1993).*TheoriginoftheworkofArt-Basicwritings*.HarperCollins.
5. Heskett,J.(2002).*Design-Averyshortintroduction*.OxfordUniversityPress.
6. Rapoport,A.(1969).*HouseFormandCulture*.NewJersey:PrenticeHall.
7. Salingaros,N.(2009).*ATheoryofArchitecture*.Umbau-Verlag.
8. Vitruvius,Translation:Morris,H.M.(1960).*TheTenBooksonArchitecture*.

Course Outcomes:

CO 1: Demonstrate knowledge about evolution and type of arts
CO 1: Analyze the concept of history of arts
CO 2: Demonstrate relationship of art and design
CO 3: Apply basic principles of different theories of Art
CO 4: Demonstrate the influencing factors

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	2	1	2	2	2	2	1	-	1
CO2	3	3	-	2	1	2	2	2	2	1	-	1
CO3	3	3	-	2	1	2	2	2	2	1	-	1
CO4	3	3	-	2	1	2	2	2	2	1	-	1
CO5	3	3	-	2	1	2	2	2	2	1	-	1

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	3	-	2	1	2	2	2	2	1	-	1

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
7TH	BAROE703	Open Elective - I Industrial Architecture	03	03	0	0

Objectives

Thecourseaimstofocusonthestudyofdesignconsiderations,environmentalfactors,structural considerationsandsafetycontrolsforindustrialbuildings.Tomakethestudentsawareofthe requirement of adaptability and flexibility in design to accommodate new technology and changes necessary in industrialdevelopment.

Module1

INTRODUCTION TO INDUSTRIAL ARCHITECTURE

Historicdevelopmentofindustrialarchitecture;Roleofarchitectsinthedesignofmodernindustrial buildings;Basicknowledgeoftypesandcategoriesofindustries;Considerationsfordevelopment ofmasterplanforindustrialareasandsiteselection;Designcriteriaforsitelayout,loadingand unloadingarea.

Module 2

DESIGNCONSIDERATIONS

Designconsiderationindevelopmentofindustrialbuildings-flexibility,adaptability,structural selection.Integrationofstructureandservices,rooflighting,internalcirculationandmaterial handling; Alternative technologies and materials for industrial use.

Module 3

ENVIRONMENTALCONSIDERATIONS

Workingenvironmentforindustrialworkerswhichwillcontributetocomfortandproductivityby considering - work space and ergonomic, use of colour, lighting design, noise and vibration, thermalcomfortconditions,ventilation,buildingfabric,Visualenvironmentandlandscaping.

Module 4

SOCIALCONSIDERATIONS

Safety, security and warning control.
Considerationofotherfacilitieslike:restroom,lockerroom,sanitary,changingroom,cafeteria, recreationaletc.Health,welfareandchildcareinindustrialpremises.

Module 5

STRUCTURE

Large Span Construction-flat slabs-shell structures, folded plates, portal frames, space frame & trusses, tensile structures.
Pre-fabricatedconstruction&Pre-engineeredbuilding;NewMaterialinConstruction,Cold formsections.

References

1. Adam, J., Hausmann, K., and Juttner, F., A Design Manual- Industrial Buildings
2. Blum, M.L., and Naylor, J.C., Industrial Psychology, CBS, Delhi
3. Philips, A., The Best in Industrial Architecture
4. Sinha, R.K., and Heart, S., Cleaner Production-Greening of Industries for Sustainable Development.
5. Drury, J., Factories- Planning, Design and Modernization.

Course Outcomes:

CO 1: Demonstarte knowledge about history of industrial architecture and factors
CO 2: Demonstarte the design considerations and structural aspects
CO 3: Analyze the environmental consideration
CO 4: Express views on social impact, safety and security aspects, general needs
CO 5: Demonstarte about industrial structures and construction techniques

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	1	1	2	3	2	1	2	2	2
CO2	3	2	-	1	1	2	3	2	1	2	2	2
CO3	3	2	-	1	1	2	3	2	1	2	2	2
CO4	3	2	-	1	1	2	3	2	1	2	2	2
CO5	3	2	-	1	1	2	3	2	1	2	2	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	2	-	1	1	2	3	2	1	2	2	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
7TH	BAR07003	ARCHITECTURALDESIGN-V	09	0	0	9

Objective

Theobjectiveofthisstudioistofocusonfunctionality,creativityinform,understandingofdifferent structuralsolutions,andintegrationofadvancedtechnologyandservices.Toexposethestudents tothechallengesofbiggerscalesiteplanninginvolvingagroupofbuildings,spaceprogramming, complexitiesofprovidingbuildingservicesandinfrastructurefacilitiesandeconomicfeasibility. TheDesignstudioalsoaimstoinculcatethetechniquesofdesigningforsustainability,andto enablethestudentstounderstandhowtodesignincompliancewithbuildingregulations,codes and spacestandards.

1. MAJOR DESIGN PROBLEM

INTENT

Toletthestudentsexplorethepossibilitiesofinnovationthroughdesigningandknowledgeof structure,andunderstandhowmultipleusersbehaveinlargescaledevelopments.Theintentisto developdesigningabilitiestohandlebuildingswithcomplexspatialorganizations,multifunctional spaces, large spans and variable circulation patterns. Various techniques of energy-efficient designandrecyclingtechnologiesforwater&wastesisessentialasthesehavetobeincorporated inthedesignproposals.Environmentalissuesaretobeemphasizedandawarenessaboutbest practicesinprofessionisexpected.Studentsarerequiredtodothelandscapelayoutindetailto develop appreciation of a holistic environmental design. Site planning exercise should depict understandingofvehicularandpedestrianmovement
patterns, land grading and conservation of ecologically sensitive features.

FOCUS AREAS- Large Span Structures/Built-ups consuming large volumes

- Spatialorganisation
- Structuralinnovations
- Sustainabledesign

ALLIED KNOWLEDGE REQUIRED

- Advanced concepts ofstructures
- Advanced buildingservices
- Buildingautomationandintelligentbuildings

EXAMPLES OF STUDIO PROJECTS

Educationalcampus,IndustrialTownship,Stadiums,Conventioncenters,Exhibitionpavilions, Museumcomplex.

EXAMPLES OF MINOR STUDIO PROJECT

Small scale design in a heritage context.

PROCESS

- Thismodulecanbestartedwithawarm-upexercise/literaturereview(grouporindividual). Studentscouldbesensitized(social-culturalsensitization)throughdocumentary/movies/ photosetc.

- Studentsmayvisitsiteforcollectingcontextspecificdataforgettingbetterunderstandingof real-lifeprojectdetails.Thecollecteddatamaybeanalyzedandpresentedforevaluation.
- Theabove-mentionedmoduleteachingmethodsaresuggestive.Facultymaychooseother pedagogicalapproachesfordesignthinkingprocess.
- Readings/ short movies/ Discussion on designers' philosophies could be initiated for idea generation.Furtherapproachesfordesigniterationsmayinvolvemorecommontechniques likeFlowdiagramtoexplorerelationofvariousspaces,bubblediagramforlocatingvarious zonesonsite,tryandre-createforanalysingspacesinalldimensionsthroughBlockModels andsinglelinegraphicsandstudymodelsforchoosingtherightoption.
- Itispreferableifthestudentscommunicatetheapplicationofallservicesintheirdesign.
- Studentsmustmakeenlargeddrawingsshowingallworkingdetailsforsuperstructure.
- Formativeassessmentinthestudiocouldbedonethroughindividualcritique,groupdiscussion formalandinformalfeedbacketc.
- Summative assessment of the studio work could be achieved through panel discussion, presentation.

Note

- Study tour of one-week duration is mandatory for conducting case study and field study relatedtotheArchitecturalDesignproject.
- End Semester evaluation will be done by external jury member (from Academics or ProfessionalArchitect)otherthantheUniversityfaculty.

Reference

1. Baiche,B.andWalliman,N.(2012).NeufertArchitectsData,4thEd.Oxford:Wiley-Blackwell.
2. Chiara,J.D.andMichael,J.C.2001.TimeSaversStandardsforBuildingTypes.Singapore: McGraw HillProfessional.
3. Gauzin-Muller,D.(2002).SustainableArchitectureandUrbanism:Concepts,Technologies, Examples.1stEd.Basel:BirkhauserVerlagAG.
4. Krishan,A.andNickBaker,ClimateResponsiveArchitecture:ADesignHandbookforEnergy EfficientBuildings,McGrawHillEducationPrivateLimited,India,1999.
5. Huxtable,A-L.(1984).TallBuildingsArtisticallyReconsidered.
6. Kloft,E.andJohann,E.(2003).High-riseManual:TypologyandDesign,Constructionand Technology,1stEd.Basel:BirkhauserVerlagAG.
7. Wood,A.andRuba,S.(2012).GuidetoNaturalVentilationinHighRiseOfficeBuildings.New York :Routledge.
8. Parker,D.AndWood,A.(2013).TheTallBuildingsReferenceBook.NewYork:Routledge.

Course Outcomes

CO1	Generate and understanding within the students to deal with the complexities of mixing various user groups
CO2	Develop knowledge about Building regulations and codes Building and site services (technical)
CO3	Develop knowledge about site services (technical)
CO4	Evaluating design process of multi-functional, service (advanced services) oriented building
CO5	Analysing site planning as well as on advanced services at building and at site level

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	2	2	3	2	2	2	1	2
CO2	3	3	3	3	2	2	3	2	2	2	1	2
CO3	3	3	3	3	2	2	3	2	2	2	1	2
CO4	3	3	3	3	2	2	3	2	2	2	1	2
CO5	3	3	3	3	2	2	3	2	2	2	1	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	3	3	3	2	2	3	2	2	2	1	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
7TH	BAR07004	RESEARCH METHODS AND SEMINAR	03	01	0	4

Objective

- Thesubjectexposesthestudentstoageneralunderstandingofresearchanddifferent researchmethodologies
- Toemphasizeonthedevelopmentofcriticalandtechnicalwritingandcomposingskills byinculcatinganattitudetowardsanalyticalreading.
- Itisaseminar-typecoursewherethefocusisonlibraryresearch,regularpresentationof students'workandgroupdiscussions.

INTENT

- Itisexpectedthatthestudentswillacquire,skillstodoresearch,understandingabout different researchmethodologies.
- ResearchMethodology-methodsofdatacollections(literaturereview,physicalandsocial surveys),itstoolsandanalysistechniques,referencing&citationetc.
- Thiscoursewillalsohelpstudentstounderstandhowresearchprojects/topicscanbe convertedtodesignprojects/proposalsandwritingresearchpaper.

The seminar would lead to bringing out research paper of a subject of theoretical/ philosophy/currentissuesrelatedtoanyaspectofArchitecture,Urbandesign,Landscape Architecture,SustainableArchitecture,ArchitecturalConservation.

- Thepaperwordcountcanrangefrom3000to5000words.
- Individualguidancecanbeprovidedbyrespectivesubjectexpertswithinthefacultyof theinstitution.
- Submissionofreportcontainingaim,designobjectives,literaturereview,preliminarycase studiesanalysis,findings,suggestionsandconclusions.
- Thecourseistoprogressbydeliveringregularpresentationsandpreliminarysubmissions ofwritingsontheseminartopicbythestudents.

Reference

1. Sanoff,H.(1991).VisualResearchMethodsinDesign.NewYork:JohnWiley&Sons.
2. Kothari, C.R. and Garg, G., Research Methodology: Methods and Techniques, New Age InternationalPublishers.
3. Anderson,J.andPoole,M.(1998).Thesisandassignmentwriting.Brisbane:JohnWiley.
4. Borden,I.andRay,K.R.(2006).Thedissertation:anarchitecturestudent'shandbook.2ndEd. Oxford : ArchitecturalPress.
5. Fink,A.(1998).Conductingresearchliteraturereviews:frompapertotheInternet.Thousand Oaks :Sage.
6. Murray,R.(2005).Writingforacademicjournals.Berkshire:Maidenhead,OpenUniversityPress.

Course Outcomes

CO1	Demonstrate skills to do research.
CO2	Analyze the concept of different research methodologies.
CO3	Express views onmethods of data collections.
CO4	Express views onvarious analysis techniques.
CO5	Demonstrate understanding of writing academic papers related to design ideas.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	2	2	3	2	2	2	1	2
CO2	3	3	3	3	2	2	3	2	2	2	1	2
CO3	3	3	3	3	2	2	3	2	2	2	1	2
CO4	3	3	3	3	2	2	3	2	2	2	1	2
CO5	3	3	3	3	2	2	3	2	2	2	1	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	3	3	3	2	2	3	2	2	2	1	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
7TH	BAR07005	Non-conventional Building Techniques	04	0	0	4

Objective

Thesubjectaimstofamiliarizestudentswiththenon-conventionalbuildingtechniques,theirneed, theirperformance,scopeandlimitations.Itwillalsoenablethestudentstounderstandtheuseof differentkindofnewmaterialswithreferencetotheclimaticcontextaswellascostoptimization.

Module 1

EARTHENCONSTRUCTION

Study of construction techniques involving mud, i.e. COB walls, Rammed earth construction technique, adobe construction, wattle and daub technique, their material specification, limitations, shuttering details, stabilization techniques, technical specifications.

- Assignmentonanyexistingbuildingconstructedusinganyofthesetechnology
- Preparationoftechnicaldrawingsandreports

Module 2

BAMBOOCONSTRUCTION

Study of bamboo as a building material, structural specifications of bamboo, bamboo constructioninIndia,Bambooconstructionasasolutioninearth-quakeproneregion,treatment ofbamboo,joinerydetails,scopeandlimitationsofBamboobaseconstructiontechniques.

- Preparationoftechnicaldrawingsandreports

Module 3

ENVIRONMENT FRIENDLY WOOD ALTERNATIVES

Cellulosefibreboardsmadeoutofrecycledpapers,engineeredandcompositewoodenpanels, particle boards, medium density fibre boards, low density fibre boards (thermal and acoustic insulationforwallsandceilings)

- Preparationoftechnicaldrawingsandreports

Module 4

NON-CONVENTIONAL CONCRETE ALTERNATIVES

Self-Healing (Bacterial) Concrete

StudyofSelf-Healing(Bacterial)concrete,roleofAlkaliphilicbacteria,Preparationsofbacterial concrete,methodofdirectapplication,encapsulationmethod,itsmechanism,advantagesand disadvantages,applications

Cellular Lightweight Concrete

StudyofCellularLightweightConcrete(CLC),itsuseinconstructionofschools,hospitals,industrial and commercial buildings, air-curing process of lightweight concrete with fly-ash as a major ingredient,shutteringandinstallationdetails,scopeandlimitations.

- Preparationoftechnicaldrawingsandreports

Module 5

StudyofGovt.policiesandinitiativestopromoteNon-conventionalconstructiontechniques,role ofBMTPC,UseofNon-conventionalconstructiontechniquesinnaturaldisaster-proneregions.

- AssignmentonanytechniquesdevelopedbyBMTPC
- Preparationoftechnicaldrawingsandreports

Reference
1. KrahnT,EngP.(2019).*EssentialRammedearthConstruction*.NewSocietyPublishers.
2. JulesJ.A.(1995).*BuildingwithBamboo.*PracticalActionPublications.
3. UffelenC.V.(2014).*BambooArchitecture&Design.*BraunPublishing.
4. ClarkeJ.L.(2002).*StructuralLightweightAggregateConcrete*.CRCPress.
5. ShortA.(1963).*LightweightConcrete.*C.R.Books.

Course Outcomes

CO1	Apply basic principles of Earthen Construction.
CO2	Analyze the concept of Bamboo Construction.
CO3	Express views on Environment friendly wood alternatives.
CO4	Analyze the concept of Non-Conventional Concrete Alternatives
CO5	Demonstrate understanding of Govt. policies to promote Non-conventional construction techniques

Course Articulation Matrix

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	2	-	-	3	3	3	-	2	-	3	3
CO2	3	2	-	-	3	3	3	-	2	-	3	3
CO3	3	2	-	-	3	3	3	-	2	-	3	3
CO4	3	2	-	-	3	3	3	-	2	-	3	3
CO5	3	2	-	-	3	3	3	-	2	-	3	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO	3	2	-	-	3	3	3	-	2	-	3	3

EIGHTH SEMESTER
BARCH PROGRAMME

EIGHT SEMESTER								
SL. NO.	**COURSE CODE**	**SUBJECTS**	**CONTACT HOURS (L-T-P)**	**CREDIT**	**SEMESTER EVALUATION (WE, IA, VV, TP)**			
THEORY SUBJECTS								
1.	BAR08001	Disaster Resilient Architecture	3-0-0	3	WE			
2.	BAR08002	Professional Practice	3-0-0	3	WE			
3.		Professional Elective -III	3-0-0	3	WE			
4.		Open Elective-II	3-0-0	3				
SESSIONAL SUBJECTS								
1.	BAR08003	Architectural Design - V	0-0-9	9		IA	VV	TP
2.	BAR08004	Pre-Thesis Dissertation	1-0-4	3		IA	VV	
3.	BAR08005	Advanced Building Technology	0-0-4	4		IA	VV	TP
TOTAL			**13-0-17 = 30**	**28**				

DETAIL SYLLABUS
EIGHTH SEMESTER BARCH PROGRAMME

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
8TH	BAR08001	**Disaster Resilient Architecture**	03	03	0	0

Objectives

The course is framed to provide an overview of the occurrence, causes and consequences of disasterandunderstandingoffundamentalconceptsandapplicationofdisasterresilientdesign. Itintroducesformulationofmanagementplananddisastermitigationstrategies

Module-1

INTRODUCTION

Overviewofdisaster,majornaturaldisasters-flood,tropicalcyclone,droughts,landslides,heat waves,earthquakes,firehazardsetc;Hazard(earthquakeandcyclone)mapoftheworldand India.

Module 2

DESIGNFORCYCLONE

Climate change and its impact on tropical cyclone; Nature of cyclonic wind; Behaviour of structures in past cyclones and wind storms, case studies.

Cyclonicretrofitting-strengtheningofstructuresandadaptivesustainablereconstruction;Life- line structures such as temporary cyclone shelter.

Generalplanning/designconsiderations,NormsandStandardsforwindstorms&cyclones; Coastalzoningregulationforconstruction&reconstructionphaseinthecoastalareas;innovative constructionmaterials&techniques;traditionalconstructiontechniquesincoastalareas.

Module 3

DESIGNFOREARTHQUAKE

Causesofearthquake;Pasteffectsofearthquakeongroundandbuilding-Behaviourofvarious typesofbuildings,structures,andcollapsepatterns;

Seismicretrofitting-Weaknessinexistingbuildings,conceptsinrepair,restorationandseismic strengthening.

GeneralPlanninganddesignconsideration,NormsandStandards;Varioustypesandconstruction details-Foundations,retainingwalls,plinthfill,flooring,walls,openings,roofsandboundarywalls.

Innovativeconstructionmaterialsandtechniques,traditionalregionalpractices

Module 4

DISASTER MANAGEMENT

Strategies for disaster prevention and mitigation; Disaster management plan; National crisis managementcommittee;statemanagementgroup

Module 5

Exercises on design and construction techniques for disaster resilient buildings

Reference

1. AgaKhanAwardforArchitecture.Ed.Shelter.(1996).TheAccesstoHope.AKDN,Istanbul andGeneva.
2. Agarwal,P.andShrikhande,M.(2009).EarthquakeResistantDesignofStructures.New Delhi: PHILearning.
3. Singh,P.P.andSharma,S.(2006).Moderndictionaryofnaturaldisaster.Deep&Deep Publications.
4. SimiuE.andScanlanR.H.(1996).WindEffectsonStructures-Fundamentalsand ApplicationstoDesign.3rdEdn.,JohnWiley.
5. Sinha,P.C.(2006).DisasterMitigation,preparedness,recoveryandResponse.NewDelhi: SBSPublishers.
6. Talwar,A.K.andJuneja,S.(2009).CycloneDisasterManagement.Commonwealth Publishers.
7. Taranath,B.S.(2004).WindandEarthquakeResistantBuildings:StructuralAnalysisand Design. CRCPress.
8. U.N.D.P.(2004).ReducingDisasterRisk:AChallengeforDevelopment.NewYork:UNDP.
9. WorldBank.(2009).HandbookforReconstructingafterNaturalDisasters.
10. SeismicDesignhandbookforBuildings
11. EarthquakeArchitecture:Newconstructiontechniquesforquakedisaster Prevention.

Course Outcomes

CO1	Develop knowledge about natural disasters and hazards.
CO2	Analyse design of cyclone resistant structures.
CO3	Analyse design of earthquake resistant structures.
CO4	Analysethe process of disaster management.
CO5	Planning and designing of disaster resilient buildings.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	1	2	2	2	2	-	-	2	3	3
CO2	3	-	1	2	2	2	2	-	-	2	3	3
CO3	3	-	1	2	2	2	2	-	-	2	3	3
CO4	3	-	1	2	2	2	2	-	-	2	3	3
CO5	3	-	1	2	2	2	2	-	-	2	3	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	-	1	2	2	2	2	-	-	2	3	3

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
8TH	BAR08002	**Professional Practice**	03	03	0	0

Objectives

To enable the students to understand the logistics of state & central govt. in enhancing better living conditions to all without losing the interest of self. It lays down the criteria for constructing built up spaces in cities & sub-urban; good ph & sanitation; safety & security, etc. and familiarize the students about current professional practice guidelines, codes, ethics as well as norms of professional fees & charges. It will expose them to skills and techniques for organizing a particular project, its preparation and execution etc. The same course will also contribute in getting acquainted with project management, contractual implication as well as legal formalities.

Module 1

PRACTICING ARCHITECTURE

Introduction to Architects duties and liabilities, salient features of **architect's act 1972**, the council of architecture

Understanding office management and project awarding; organization structure, responsibility towards employees, consultants & associates; maintenance of accounts; filing of records; balance sheet, Income tax; Service tax; Professional tax.

Various architectural services, additional services and scale of professional fees.

Building regulations related to submission of approval drawings to concerned public bodies.

Module 2

ARCHITECTURAL COMPETITIONS & LEGISLATIONS

Regulations governing the conduct of competitions, open & closed competitions

Role of development authorities & urban arts commissions, Environmental acts & laws, special rules governing hill area development & coastal area management, heritage act of India etc. Pre-requisite for Indians to work in other countries & vice versa, emerging trends in architectural collaborations.

Module 3

TENDER

Types of tenders, invitation of tender and conditions of tender documents, submission, scrutiny, recommendations & award of tender.

Module 4

CONTRACT

Definitions and general principles of Indian Contract Act and building, contract documents, conditions of contract, Execution of contract, various certifications, defects liability.

Module 5

ARBITRATION

Need for Arbitration, Principles of Indian Arbitration Act-1974, role of arbitrators, umpire etc, excepted matters, arbitral award. Municipal Acts, Fire prevention, safety and security measures in buildings.

References

1.COA. (1989). Architects (Professional conduct) Regulations, Architectural Competition guidelines.CouncilofArchitecturePublications.
2. COA.(2005).HandbookofProfessionalDocuments.CouncilofArchitecture.
3. RH..Namavati,Professionalpractice,7thed,lakshmibookdepot,mumbai,1997.
4. EnvironmentalActsoftheMinistryofEnvironment&forests,Govt.ofIndia
5. Architects Practice,J.J.Scott.
6. HandbookofProfessionalPractice,MadhavDeobhakta.

Course Outcomes

CO1	Develop knowledge about rules and regulation of CoA and professional conduct.
CO2	Develop knowledge about rules and regulation of architectural competition
CO3	Develop knowledge about process involved in tender.
CO4	Analyse about process involved in contracts.
CO5	Analyse about process involved in arbitrations.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	-	-	-	-	-	-	-	3	3	3	-	-
CO2	-	-	-	-	-	-	-	3	3	3	-	-
CO3	-	-	-	-	-	-	-	3	3	3	-	-
CO4	-	-	-	-	-	-	-	3	3	3	-	-
CO5	-	-	-	-	-	-	-	3	3	3	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	-	-	-	-	-	-	-	3	3	3	-	-

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
8TH	BARPE801	**Professional Elective (PE) – III Architectural Conservation**	**03**	**03**	**0**	**0**

Objective:

This course gives a brief introduction to the subject of Architectural Conservation. It discusses the history, theory and best practices in Architectural conservation. Moving from basic theories, the course touches upon the technical aspects and ethics of conservation.

- Explore the history, philosophy and science of architectural conservation through lectures and seminar discussions.
- Encourage appropriate methodologies and tools for recording, documentation and inventorying of heritage structures.
- Develop sensitivity to design in heritage environment.

Module 1

INTRODUCTION TO ARCHITECTURAL CONSERVATION

Definition of Conservation and its socially accepted Meanings.
Justification for conservation.
Development of Theory of conservation and various charters of International, Role of organisations such as UNESCO and INTACH.
Concepts of Values, Significance, Authenticity and Integrity.

Module 2

CRITICAL ANALYSIS OF HERITAGE COMPONENTS

Understanding the concepts to analysis heritage sites and structures.
Understanding the Scales of various heritage components: Buildings, Areas, Towns, Region (Local, National, International).

Module 3

DECAY AND REMEDIES

Introduction to Decay in Cultural property, Materials and Structural failures.
Internal and External environment of historic buildings.
Climatic causes of decay. Botanical, biological and microbiological causes of decay.
Insects and other pests as causes of decay. Man-made causes of decay.

Module 4

DEGREES OF INTERVENTION IN HISTORIC BUILDINGS AND MONUMENTS

Prevention of deterioration. Preservation of the existing state. Consolidation of the fabric. Restoration. Rehabilitation.

Module 5

DOCUMENTATION

IntroductiontoHeritageDatabaseandSurveysforconservation.
ListingandInventories.
MeasuredDrawing:TechniquesofMeasurement,DrawingandPresentation.
PhotographicDocumentation.

Reference:

1. Fielden,Bernard,2003,ConservationofHistoricBuildings,ArchitecturalPress.
2. Fielden,Bernard,1989,GuidelinesforConservation,INTACH,NewDelhi.
3. HistoricEngland,PracticalBuildingConservation:ConservationBasics,2013,Routledge.
4. SalvadorMunoz-Vinas,2005,ContemporaryTheoryofConservation,Elsevier.
5. Letellier,Robin,2007,Recording,Documentation,andInformationManagementforthe ConservationofHeritagePlaces-GuidingPrinciplesby,GettyConservationInstitute.Los Angeles.
6. Chandler,I.(1992).*RepairandRenovationofModernBuildings*.McGraw-Hill.
7. DanishStandardsAssociation.(2004).*RepairofConcreteStructuretoEn1504:Aguidefor*
8. *renovationofconcretestructuresrepairmaterialsandsystemsaccordingtotheEN1504series.*
9. *Boston* :Elsevier.
10. Guha, P. K. (2011). *Maintenance and Repairs of Buildings*. New Delhi: New Central Book Agency.
11. Nayak,B.S.(2013).*AManualofMaintenanceEngineering*.NewDelhi:KhannaPublishers.
12. Roger,G.andHall,F.(2013).*BuildingServicesHandbook*.NewYork:Routledge.

Course Outcomes

CO1	Develop knowledge about philosophy and science of architectural conservation.
CO2	Analyse critical evaluation of heritage components.
CO3	Analyse the cause of deterioration.
CO4	Apply suitable methodology with reference to given context.
CO5	Acquire skills for documentation, survey, photography and research.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	-	2	2	3	2	-	1	2	3	2
CO2	3	3	-	2	2	3	2	-	1	2	3	2
CO3	3	3	-	2	2	3	2	-	1	2	3	2
CO4	3	3	-	2	2	3	2	-	1	2	3	2
CO5	3	3	-	2	2	3	2	-	1	2	3	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	3	-	2	2	3	2	-	1	2	3	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
8TH	BARPE802	Professional Elective (PE) – III Transportation Planning	03	03	0	0

Objective

The course imparts basic concepts and theories related to transportation planning and traffic engineering.Toexposestudentstoforecastingtechniquesthatarerelevanttotransportation planning.Tointroducestudentstogeometricdesignofroadsandenvironmentalissuesandpolicy related totransportation.

Module 1

INTRODUCTION TO TRANSPORTATION SYSTEMS

Transportation systems and modes; Demand and supply of transportation services; Physical structure of the city and transportation system.

Module 2

TRANSPORTATIONPLANNING

Inter-relationship of land use and transportation; Transportation planning process; Systems approachtotransportplanning;Traveldemandforecasting;Planningforpublictransportsystem, goodstransportation.

Module 3

TRAFFICSTUDYANDDESIGN

Trafficflowcharacteristics;Transportationsurvey:Typeofsurveys,origindestinationsurvey,Traffic analysesanddesignconsiderations;Designofintersections;Trafficsignalsandsigns;Streetdesign: street lighting, street furniture; street plantation; Parking: Parking problems, Parking space requirementstandards.

Module 4

ENVIRONMENT AND POLICY ASPECT

Environmentalimpactoftraffic;Energyissuesintransportation,Transportationpoliciesandsafety standards.

Module 5

APPLICATION

Transitorienteddevelopment;Studyofdifferenttransportationproposals(BusRapidTransitSystem-BRTS, Metrorail)

References

1. Khisty,C.J.andLal,B.K.,TransportationEngineering:AnIntroduction.
2. Papacostas,C.S.,FundamentalsofTransportationEngineering.
3. Bruton,M.J.,IntroductiontoTransportationPlanning.
4. Khanna, S. K., and Justo, C. E. G., Highway Engineering.

Course Outcomes

CO1	Develop knowledge about the modes, demand and supply relationship, physical structure.
CO2	Analyse process of transport planning and factors.
CO3	Develop knowledge about design and study of traffic
CO4	Develop knowledge about environmental policies
CO5	Evaluating in terms of practical applications in terms of planning of TOD, BRTS and metro rail

Course Articulation Matrix

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	-	1	2	2	2	3	-	-	-	3	3
CO2	3	-	1	2	2	2	3	-	-	-	3	3
CO3	3	-	1	2	2	2	3	-	-	-	3	3
CO4	3	-	1	2	2	2	3	-	-	-	3	3
CO5	3	-	1	2	2	2	3	-	-	-	3	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO	3	-	1	2	2	2	3	-	-	-	3	3

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
8TH	BARPE803	Professional Elective (PE) – III Environmental Impact Assessment	03	03	0	0

Objective

Introduce tools and techniques of EIA and its application; Ensure that environmental factors are considered as a part of decision making process; to identify possible adverse impacts so as to avoid or mitigate them.

Module 1

INTRODUCTION

Definition, concepts, need & relevance of Environmental Impact assessment in decision making process; Evolution of EIA and its importance in global, Indian and local context; Principles of EIA; Classification of EIA projects.

Module 2

PROCESS AND METHODOLOGIES

Measurement of environmental impact, Process of EIA in India & Abroad; Importance of scoping & screening in EIA process; Role of public participation at various levels of decision making; Methodologies, checklists, matrices, network & social cost-benefit analysis, habitat evaluation systems, comprehensive study of various project types, impact calculation & ways to mitigate.

Module 3

ENVIRONMENTAL AUDIT AND MANAGEMENT

Definitions & concepts of audits, GHG Emissions, energy footprint, carbon footprint, partial audits, compliance audits, methodologies & regulations.

Module 4

VARIOUS OTHER ASSESSMENT TECHNIQUES

PRA techniques, definition & concepts, objectives, techniques, advantages & limitations; SEA, evolution need and relevance, scope and tasks.

Module 5

EIA IN INDIA

EIA regulations in India, initiatives, environmental appraisal procedure, problems associated with relocation, resettlement, refugees & environmental justice, future strategies. Study of an environmental appraisal report and EIA statement of any two projects of national importance.

References

1. Glasson,J.R.andChadwik,A.(2012).*IntroductiontoEnvironmentalImpactassessment*. RoutledgePublications.
2. Kulkarni,V.andRamachandra,T.V.(2006).*EnvironmentalManagement*.TheEnergyand ResourcesInstitute.
3. Richard,K.M.(2002).*Environmentalimpactassessment,amethodologicalperspective*. - Boston:Kluver Academic Publishers.
4. Thorpe,A.(2007).*TheDesigner'sAtlasofSustainability.*WashingtonDC:IslandPress.

Course Outcomes

CO1	Develop knowledge about basic definitions and need of EIA
CO2	Develop knowledge about process and methodology of EIA
CO3	Develop knowledge about environmental audits, management and its methodology
CO4	Analyse various assessment tests
CO5	Recognisingscenario of EIA in India with its practical implementation

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	2	2	2	2	3	-	-	-	2	2
CO2	3	-	2	2	2	2	3	-	-	-	2	2
CO3	3	-	2	2	2	2	3	-	-	-	2	2
CO4	3	-	2	2	2	2	3	-	-	-	2	2
CO5	3	-	2	2	2	2	3	-	-	-	2	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	-	2	2	2	2	3	-	-	-	2	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
8TH	BAROE801	OPEN ELECTIVE – II ApplicationofGISinUrban Planning	03	03	0	0

Objective

TounderstandabouttheapplicationofGISanditsusesinthefieldofresearchandinnovation.

Module 1

INTRODUCTION

Remotesensingfordetectionofurbanfeatures–Scaleandresolution–Scopeandlimitations–InterpretationfromAerialandsatelliteimages–Digitalimageprocessingtechniques–Image fusion – Casestudies.

Module 2

SETTLEMENT MAPPING

Classification and settlement – settlement structure – Segmentation of Built-up areas – Classificationalgorithms–Landuse/Landcovermapping–changedetection–highresolution remotesensing–casestudies.

Module 3

ANALYSIS AND PLANNING

Urbanmorphology–Housingtypology–Populationestimationfromremotesensing–Infrastructure demandanalysis–UrbanrenewalLandsuitabilityanalysis–Planformulation–Regional,Master anddetaileddevelopment-UseofremotesensingandGISinplanpreparation-casestudies.

Module 4

TRANSPORTATIONPLANNING

Mappingtransportationnetwork–Classification–Optimumroute/shortestroute–Alignment planning–Trafficandparkingstudies–casestudies.

Module 5

CURRENT TRENDS

Urban growth modelling – Expert systems in planning – 3D city models– case studies.

References

1. JulianaMaantay,JohnZiegler,JohnPickles,GISfortheUrbanEnvironment,EsriPress2006.
2. AllanBrimicombe,GISEnvironmentalModelingandEngineering,CRC;1edition2003.
3. PaulLongley,MichaelBatty,SpatialAnalysis:ModelinginaGISEnvironmentWiley,1997.
4. MichaelF.Goodchild,LouisT.Steyaert,BradleyO.Parks,CarolJohnston,DavidMaidment, MichaelCrane,SandiGlendinning,GISandEnvironmentalModeling:ProgressandResearchIssues, Wiley; 1 edition, 1996.
5. RolandFletcher,TheLimitsofSettlementGrowth:ATheoreticalOutline(NewStudiesin Archaeology)(Firstedition),CambridgeUniversityPress;2007.

Course Outcomes

CO1	Develop knowledge about Remote sensing and its application
CO2	Analyse settlement mapping and its components
CO3	Develop knowledge about analyzing and planning method of data
CO4	Demonstrate Transportation planning through GIS availed data
CO5	Analyse the current trends of urban planning using GIS

Course Articulation Matrix

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	-	3	3	2	2	3	-	-	-	2	2
CO2	3	-	3	3	2	2	3	-	-	-	2	2
CO3	3	-	3	3	2	2	3	-	-	-	2	2
CO4	3	-	3	3	2	2	3	-	-	-	2	2
CO5	3	-	3	3	2	2	3	-	-	-	2	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO	3	-	3	3	2	2	3	-	-	-	2	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
8TH	BAROE802	**OPEN ELECTIVE-II Real Estate Management**	03	03	0	0

Objective

Toacquaintthestudentswiththeissues,regulationsandfunctioningofRealofEstatemarket, economicconcepts,landacquisition,legalmattersconcerninglandandproperty.Tomakethe studentsawareaboutdifferentconceptsofrealestatedevelopmentinIndiancontext.

Module1

Typeoflandandproperty;Landuseplanning&UrbanLandManagement;Landasaresourceof UrbanDevelopment(supplyanddemandofland);BasiccomponentsofUrbanLandPolicy;Land assembly;LandPoolingtechniques;LandHolding(FreeHoldandLeaseHold).

Module 2

LandandBuildingrelatedregulations;BuildingBye-laws,RealEstatelaws;Apartments'Act,Land registrationandSocietyRegistrationAct.

Module 3

ComparisionofHousingpoliciesandRealEstatedevelopmentinIndia;MasterPlanguidelinesin relationtorealestategrowth;RealEstatemanagementconcepts.

Module 4

Introduction to real estate market; potential and challenges

- Landeconomics;Conceptofeconomics,Typesoflandholdingandtenuresystems
- Factoraffectingdemandandsupplyofhousing
- Relationshipbetweenlanduse,locationandlandvalue(Theoryoflocationandgrowth poletheory)
- Landuseconstraints,reservationsandLandacquisitionact,2013
- Landeconomicsandfeasibilityanalysisforhousingprojects
- Modelsoflanddevelopmentinrealestatemarket(Landpoolingandsharing)

Module 5

Conceptsofmixedusedevelopment;condominium;GatedCommunityandserviced apartments.

References

1. Gelbtuch, H.C., Mackmin, D. and Milgrim, M.R., Real Estate Valuation in Global Markets, Amazon Books
2. Rangwal,S.C.,ValuationofRealProperties,CharotarPublishingHouse,2003
3. Chapin,S.,andKeeble,L.,UrbanLandUsePlanning
4. UrbanDevelopmentmanagement-I.T.P.I.Journal
5. ReadingMaterialonLandEconomics-I.T.P.I.Journal

Course Outcomes

CO1	Develop knowledge about basic elements of housing, neighbourhood, community, slums and real estate market
CO2	Apply zoning regulations and sub-division techniques and computation for density, FAR, built-up area, MOS, as per development norms
CO3	Outline various housing policies and programmes.
CO4	Interpreting cause and effects housing demand and supply
CO5	Analyse different categories of housing scheme in terms of quality of life

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	-	-	2	3	-	2	-	2	2
CO2	3	-	-	-	-	2	3	-	2	-	2	2
CO3	3	-	-	-	-	2	3	-	2	-	2	2
CO4	3	-	-	-	-	2	3	-	2	-	2	2
CO5	3	-	-	-	-	2	3	-	2	-	2	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	-	-	-	-	2	3	-	2	-	2	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
8TH	BAROE803	OPEN ELECTIVE-II Building Repair and Restoration	03	03	0	0

Objective

Building construction industry is energy intensive and therefore knowledge of maintenance, restorationandretrofittingofbuildingsareimportantinthecontextofsustainabledevelopment. Need for building repair and maintenance, cause and effect of building deterioration and defects, and material, methods and techniques of maintenance, repair and restoration are covered in thecourse.

Module 1

ENVIRONMENTALIMPACTONBUILDINGS

Lifeexpectancyofdifferenttypesofbuildings–influenceofenvironmentalelementssuchasheat, moisture,precipitationandfrostonbuildings-Effectofbiologicalagentslikefungus,moss,plants, trees, algae, - termite control and prevention - chemical attack on building materials and components--Impactofpollutiononbuildings.

Module 2

DEFECTSANDSTRENGTHENINGMETHODS

Commondefectsinbuildings;Buildingfailures-Causesandeffects;Cracksinbuildings:types, classification, investigation; Measurestopreventandcontrolcommondefectsinbuilding;Maintenancephilosophy,phases ofmaintenance:routinepreventiveandcurativemaintenance;FundamentalStrengthening measure:beamstrengthening,columnstrengthening,shoring,underpinningandjacketing.

Module 3

MATERIALS FOR REPAIR

Materials for repair: special mortar and concrete, chemicals, special cements and high grade concrete,admixturesoflatestorigin;Techniquesforrepair;Surfacerepair:materialselection, surfacepreparation,rusteliminatorsandpolymerscoating;Repairofcracksinconcreteand masonry:methodsofrepair,epoxyinjection,mortarrepairforcracks:gunitingandshotcreting; Waterproofing of concreteroofs.

Module 4

RESTORATION

Introductiontoconservation-Materialsandmethodsforconservationandrestorationwork(with specificcasestudies)-Adaptivereuseofbuildingsanditsadvantages-Retrofitting(casestudies), Recyclingofbuildingcomponentsandmaterials(casestudies).

Module 5

INTRODUCTION TO CONSERVATION

Introductiontoconservation,Materialsandmethodsforconservation&restorationworkwith specific case studies, Adaptive reuse of buildings, advantages. Retrofitting, case studies, Recyclingofbuildingcomponentsandmaterialswithcasestudies.

References

1. Chandler,Ian(1992).'RepairandRenovationofModernBuildings',Mcgraw-Hill
2. Nayak,B.S.(2013).'AManualofMaintenanceEngineering',KhannaPublishers,India
3. Guha,P.K.'MaintenanceandRepairsofBuildings'NewCentralBookAgency,India.
4. DanishStandardsAssociation,(2004).'RepairofConcreteStructuretoEn1504:Aguidefor renovation of concrete structures repair materials and systems according to the EN 1504 series', Elsevier,Boston
5. Roger,G.andHall,F.(2013).'BuildingServicesHandbook',Routledge,UK.

Course Outcomes

CO1	Develop knowledge about the environmental impact of Buildings.
CO2	Develop knowledge about factors affecting strength of building, defects.
CO3	Analyze the materials and techniques of repair.
CO4	Develop knowledge about restoration and retro-fitting.
CO5	Apply techniques of conservation, its scope and case study

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	2	-	2	-	2	2	-	-	3	3
CO2	3	-	2	-	2	-	2	2	-	-	3	3
CO3	3	-	2	-	2	-	2	2	-	-	3	3
CO4	3	-	2	-	2	-	2	2	-	-	3	3
CO5	3	-	2	-	2	-	2	2	-	-	3	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	-	2	-	2	-	2	2	-	-	3	3

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
8TH	BAR08003	ARCHITECTURALDESIGN-VI	09	0	0	9

Objective

Thedesignstudioaimstoenablestudentstounderstandspacesandactivitiesinurbanspacesin thepublicdomain,wherestudentswillbeexposedtocomplexitiesofunderstandingarchitectural interventioninalargerscale.Secondly,toequipthestudentstodeveloparchitecturaldesignby contextualising and harmonizing with the built fabric and the urban environment.

1. MAJOR DESIGN PROBLEM

Designing in urban context/Designing for Public Spaces

INTENT

Tofacilitateunderstandingandconceptualisingdesigninspacesinvolvinggroupofbuildingsina public realm and having multiple stakeholders. To study all aspects of external environment, understandtheinterfacebetweenpublicandprivaterealmandexplorethemultitudeofactivities andthespacestheydefineintheurbanenvironment.Theseobservationsareexpectedtobe appliedtodesigninterventionswithinthecontextofthegivenurbansetting.

Thestudentsareexpectedtocarryoutfieldstudy,documentationofthebuiltfabricandarea analysisofagivenareawithinacity.Thestudyisrequiredtoconsideritscontext,physicalfeatures, views, orientation, volumetric analysis and figure ground characteristics, visual imageries, streetscapeandskylineanalysis,pedestrianandvehicularcirculationpattern,andutilitynetworks. To understand the relationship among, physical, socio-cultural, environmental and socioeconomicdimensionsofthebuiltenvironments,soastoidentifyopportunitiesandconstrains associated with large-scale urban interventions. Students are then expected to apply this understandingtocreatephysicalenvironmentsthroughmovementnetworks,openspaces, suggestive built form, infrastructure network in compliance with planning norms.

FOCUS AREAS

- DensityandLanduseoptimization
- Contextualisation of architecturalintervention
- Vehicular and pedestrianmovement
- Urbanaesthetics
- Socio-economic and culturalcharacteristics

ALLIED KNOWLEDGE REQUIRED

- Urbanplanningandurbandesignprinciples
- City levelservices
- Socialanthropology
- Sustainabledevelopment

EXAMPLES OF STUDIO PROJECTS

Transportation nodes like bus terminus and railway stations, water front developments, developmentinheritagezones/contextofurbanconservation,citycentre,administrativeand legislativeareas,streetscape,urbanmarkets,etc.

Note

- Studytourofone-weekdurationismandatoryforconductingcasestudyandfieldstudy relatedtotheArchitecturalDesignproject.
- EndSemesterevaluationwillbedonebyexternaljurymember(fromAcademicsor ProfessionalArchitect)otherthantheUniversityfaculty.

Reference

1. Carmona,M.,Heath,T.,Oc,T.andTiesdell,S.(2010).PublicPlacesUrbanSpaces.Oxford: ArchitecturalPress.
2. Lang, J. T. (2005). Urban Design: A Typology of Procedures and Products. Oxford: Elsevier/ArchitecturalPress.
3. Lynch,K.(1984).Goodcityform.Boston:MITPress.
4. Marshall,S.(2009).Citiesdesignandevolution.NewYork:Routledge.
5. Moughtin,C.,Cuesta,R.,Sarris,C.AndSignoretta,P.(2003).UrbanDesign-Methodsand Techniques.Oxford:ArchitecturalPress.
6. Watson,D.,Plattus,A.andShibley,R.(2003).Time-Saverstandardsforurbandesign.NewYork : McGraw Hill.
7. Whyte,W.H.(1980).Thesociallifeofsmallurbanspaces.WashingtonD.C:Conservation Foundation.

Course Outcomes

CO1	Facilitate understanding and conceptualising design in spaces involving group of buildings in a public realm
CO2	Develop knowledge about design interventions within the context of the given urban setting.
CO3	Analysing scenario through carrying out field study, documentation of the built fabric and area analysis of a given area within a city
CO4	Develop knowledge about relationship among, physical, socio-cultural, environmental and socioeconomic dimensions of the built environments.
CO5	Planning physical environments through movement networks, open spaces, suggestive built form, infrastructure network in compliance with planning norms.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	3	2	2	3	2	2	2	1	2
CO2	3	3	3	3	2	2	3	2	2	2	1	2
CO3	3	3	3	3	2	2	3	2	2	2	1	2
CO4	3	3	3	3	2	2	3	2	2	2	1	2
CO5	3	3	3	3	2	2	3	2	2	2	1	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	3	3	3	2	2	3	2	2	2	1	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
8TH	BAR08004	**Pre Thesis Dissertation**	**03**	**01**	**0**	**4**

Objective

Dissertationshallbeapre-thesisresearchonatopicofstudent'sinterestrelatedtoanyaspectof Architecture, Urban design, Landscape Architecture, Sustainable Architecture, Architectural Conservation, which the student shall subsequently take up as Thesis topic. The student will conductindepthanalysis,soastodevelopandstrengthenthetopicleadingtothearchitectural designthesis.

TheselectedtopicofeachstudentshallbeconsideredasthefirstphaseoftheDesignThesiswhere thestudentswillfinalisetheirareaofinterestandthesubsequentresearchwillactastheprimary literaturereviewfortheDesignThesis.Bytheendofthesemesteralongwiththeresearchpaper thestudentsarerequiredtopreparetheirpreliminaryproposalfortheDesignThesis,further,more specificresearchandcasestudiescanbedoneontheirrespectivetopicsduringtheprofessional trainingsemester.

Broad Course Structure

1. Introduction,overviewofsubject,ResearchMethodology,criticalreading,writing,referencing etc.
2. Lectures/seminarstoclarify/discusscommonmistakes/doubtsamongthestudents,andto discussthecommontopicsstudentswouldbedealingwith.
3. Research Proposal, including the Research Problem, Background, Aim, Objectives and Researchquestions,Panelreviewtofinalisetheresearchtopics.
4. CriticalReading/LiteratureReview,continuousassessmentandassignments.
5. Writing,ReferencingandCitationswithreviewofstagewisesubmissions.
6. Submissionofafinalpaper.

Course Outcomes

CO1	Develop knowledge about aspects of architectural research
CO2	Analysethe topics leading to the architectural design thesis.
CO3	Develop knowledge about primary literature review for the Design Thesis.
CO4	Applying critical Reading/ Literature Review, continuous assessment and assignments.
CO5	Conducting case studies.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	-	-	-	3	-	2	2	3	3	3
CO2	3	2	-	-	-	3	-	2	2	3	3	3
CO3	3	2	-	-	-	3	-	2	2	3	3	3
CO4	3	2	-	-	-	3	-	2	2	3	3	3
CO5	3	2	-	-	-	3	-	2	2	3	3	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	2	-	-	-	3	-	2	2	3	3	3

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
8th	BAR08005	**Advanced Building Technology**	**04**	**0**	**0**	**4**

Objective

Constructionindustryisverydynamicwithnewtechnologiesconstantlyreplacingtheolderones andthesametechniquesbeingadaptedfornewerapplications.Thewiderangeofmagnificent structures/buildingsdesignedbyarchitectsandtheirteamofconsultantsarephysicallyrealized throughtheseconstructionsystemsonly.Therearespecificrequirements/implicationsondesign &constructionprocessassociatedwitheachofthesetechnologies.Knowledgeofthesesystems willhelptheseto-bearchitectstoconsiderappropriateconstructiontechnologieswhiledesigning andalsoindealingwithotherprofessionalsinthefield.

- Thiscourseisdesignedtofamiliarizethestudentswithlatestconstructiontechnologiesand theirintegrationwitharchitecturaldesignsastheyhavealreadycompletedalltheirlessons inconventionalconstructionsystems.
- Constructionequipmenthasrevolutionizedourexecutionspeedssoitispertinenttodiscuss the different types of construction equipment being used currently in theconstruction industryandthevariousissuesassociatedwiththem.

Module 1:

FORMWORK SYSTEMS

- ConcreteFormwork:AnIntroduction
- IntegratedConcrete/FormworkLifeCycle
- Horizontal FormworkSystems
- Vertical FormworkSystems
- SelectionCriteriaforFormworkSystem

Students to prepare technical drawings

Module 2:

CONCRETE TECHNOLOGY

- Concrete:Past,PresentandFuture.
- ConcreteAdmixtures.
- Concreting under extremeconditions.
- Ready MixConcrete.
- Applicationspecificvarietiesofconcrete.

Students to prepare report of materials and specification

Module 3:

LONG SPAN STRUCTURES

- IntroductiontoLongSpanStructures.
- StructuralSystemsforLongSpan:theirapplicationinbuildingsandassociatedissues.
- Pre and postTensioning.
- SegmentalConstruction.
- CompositeConstruction.
- Pre-engineeredConstruction.

Students to prepare technical drawings and reports

Module 4:

HIGH RISE BUILDINGS

- EvolutionofHighRiseBuildings
- StructuralSystemsandtheirintegrationwitharchitecturaldesigns.
- ServiceInstallationsinHigh-risebuildings.
- Construction relatedissues.

Apply the systems in a given multi storied building

Module 5:

CONSTRUCTION EQUIPMENT

- EvolutionofHeavyConstructionEquipment.
- DifferenttypesofConstructionEquipment.
- EstimatingProductivity.
- Introduction to ReplacementModels.
- TheBuy,LeaseorRentDecision.
- Construction Equipment SiteSafety.

Site visit and preparation of report

Course Outcomes

CO1	Develop knowledge about formwork system.
CO2	Evaluating various concrete technology.
CO3	Analysing long span structure.
CO4	Develop knowledge about high rise buildings.
CO5	Develop knowledge about construction equipment.

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	3	3	3	3	-	-	-	2	2
CO2	3	-	-	3	3	3	3	-	-	-	2	2
CO3	3	-	-	3	3	3	3	-	-	-	2	2
CO4	3	-	-	3	3	3	3	-	-	-	2	2
CO5	3	-	-	3	3	3	3	-	-	-	2	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	-	-	3	3	3	3	-	-	-	2	2

NINTH SEMESTER
BARCH PROGRAMME

NINTH SEMESTER								
SL. NO.	**COURSE CODE**	**SUBJECTS**	**CONTACT HOURS (L-T-P)**	**CREDIT**	**SEMESTER EVALUATION (WE, IA, VV, TP)**			
SESSIONAL SUBJECTS								
1.	BAR09001	Professional Training	3-0-0	23			VV	
2.	BAR09002	Field Observation Studies	3-0-0	3			VV	
TOTAL				**26**				

DETAIL SYLLABUS
NINTH SEMESTER BARCH PROGRAMME

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
9TH	BAR09001	Professional Training	23	3	0	0

OFFICETRAINING

Thissemesterwouldcomprisecompulsorypracticalprofessionaltrainingfortheentireacademic sessionoftheNinthSemester.ThechiefArchitectinthefirmshouldberegisteredwiththeCouncil of Architecture and have a minimum of five years of practical/professional experience after her/hisgraduation.

Studentsarerequiredtobeinvolvedinallaspectsofofficeworks-conceptualdesign;presentation drawings and detail working drawings; 3 D modelling; estimation and specification of small buildings;interactionwithclients,structuralconsultantandotherbuildingservicesconsultants.The studentsarealsoexpectedtofamiliarizethemselveswithcoordinationofstructuralandservices drawing with architecturaldrawings.

SITE SUPERVISION WORK

Theaimofthistrainingistogiveexposuretothestudentsondifferentstagesofconstructionon thesiteandtolearnhowdrawingsareexecutedattheconstructionsite.Itisdesiredthatthe studentsundertakesitevisitsandunderstandconstructionpractices.

Attheendofthepracticaltraining,thestudentsarerequiredtopresentselectedworks,which barebestrepresentativeofthetrainingundergoneintheformofdrawings.Thestudentsarealso requiredtosubmitareportdescribingvariousconceptslearntduringtraining,experiencesofsite visitandestimation/costingactivitiesetc.Trainingattendancelogsheetsshallalsobesubmitted aspartofthereport.

EVALUATION

Thedetailedreportanddrawingspreparedduringpracticaltrainingbystudentswillbeevaluated throughviva-vocebyajuryconsistingofoneexternalandoneinternalfacultymember.

CO1	Demonstrate knowledge about different stages of construction
CO2	Analyze the process of designing in firms
CO3	Demonstrateestimation / costing activities
CO4	Apply basic principles of Consulting management and construction practices
CO5	Demonstrate the understanding of how drawings are executed

Course Outcomes

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	3	3	2	2	3	3	3	3	2	2
CO2	2	3	3	3	2	2	3	3	3	3	2	2
CO3	2	3	3	3	2	2	3	3	3	3	2	2
CO4	2	3	3	3	2	2	3	3	3	3	2	2
CO5	2	3	3	3	2	2	3	3	3	3	2	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

CO	2	3	3	3	2	2	3	3	3	3	2	2

SEMESTER	**COURSE CODE**	**COURSE TITLE**	**CREDIT**	**L**	**T**	**P/S**
9TH	**BAR09002**	**Field Observation Studies**	**3**	**3**	**0**	**0**

Case study and field study has to be undertaken during the period of Professional Training.

1. TechnicalStudyofanyoneofthetopicsgivenintheTrainingManual.Criticalappraisaland detailtechnicalstudyoftheselectedprojectstobedone.Thestudyistobepresentedinthe form of a report comprising drawings, photographs supported by brief analysis and observationetc.
2. Field study and Documentation of any one of the topics given in the Training Manual.The studyistobepresentedintheformofareportcomprisingdrawings,photographssupported bybriefanalysisandobservationetc.

EVALUATION

Thedetailreportanddrawingsprepareddduringpracticaltrainingbystudentswillbeevaluated throughviva-vocebyajuryconsistingofoneexternalandoneinternalfacultymember.

Course Outcomes

Course Articulation Matrix

CO1	Demonstrate knowledge Technical Study
CO2	Express the understanding of Critical appraisal
CO3	Demonstrate knowledge on Field study
CO4	Apply basic knowledge gained through critical appraisal
CO5	Demonstrate the documentation of work

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	2	-	3	3	3	3	2	2	-	2	2
CO2	3	2	-	3	3	3	3	2	2	-	2	2
CO3	3	2	-	3	3	3	3	2	2	-	2	2
CO4	3	2	-	3	3	3	3	2	2	-	2	2
CO5	3	2	-	3	3	3	3	2	2	-	2	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO	3	2	-	3	3	3	3	2	2	-	2	2

TENTH SEMESTER
BARCH PROGRAMME

TENTH SEMESTER								
SL. NO.	**COURSE CODE**	**SUBJECTS**	**CONTACT HOURS (L-T-P)**	**CREDIT**	**SEMESTER EVALUATION (WE, IA, VV, TP)**			
THEORY SUBJECTS								
1.	BAR10001	Building Economics and Project Management	3-0-0	3	WE			
SESSIONAL SUBJECTS								
1.	BAR10002	Architectural Design Thesis	0-0-18	18		IA	VV	
2.	BAR10003	Research inThesis	1-1-6	5		IA	VV	
TOTAL			**4-1-24 = 29**	**26**				

DETAIL SYLLABUS
TENTH SEMESTER BARCH PROGRAMME

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
10TH	BAR10001	Building Economics and Project Management	03	03	0	0

Objective

- To make the students aware of the effect of economics on architectural considerations, and to familiarize the students to various economic concepts that come within the purview of architecture.
- To equip students with a practical approach to implement building projects, basic knowledge about construction industry, project management techniques needed for managing and coordinating building projects in a professional manner

Module 1

GENERAL AND PROJECT ECONOMICS

- The market, demand and supply, choice, budget, consumer satisfaction, monopoly and oligopoly, choice of production technology and returns, profit maximization and cost minimization, production welfare and public good.
- Economics of building construction projects- land, labour, capital and Material. Labour intensive v/s capital intensive projects. Financing for projects, sources of capital, Agencies and Institutions influencing project economics, public private participation

Module 2

ECONOMICANALYSESOFPROJECTS

Basic concepts of Interest and Capital, prices and rentals on investment, (PV) Present Value of assets, Cost–Control, Cash-Flow Analyses, Cost–Projection, Cost–Benefit, Feasibility, Estate Investments & returns, Valuation, Law relating to properties & Buildings.
Finance and Risk management - Financial analysis of projects, Project direct and indirect costs.

Module 3

INTODUCTION TO PROJECT MANAGEMENT

Introduction to Construction Industry - Significance, objectives and functions, stakeholders, roles, responsibilities and functional relationships;
Construction projects – objectives and life cycle, existing construction practices & project management systems; Projects cale.
Project Team, organization, roles, responsibilities, Management Ethics (human aspects) in construction projects, Labour welfare, applicable labour legislations.

Module 4

PROJECTSCHEDULINGANDRESOURCESMANAGEMENT

Conceptsofprojectplanning,scheduling&controlling.
Scheduling:Definition,advantages,methodsofscheduling:Barchart,Milestonechart;
Controlling,WorkBreak-downStructure(WBS)
Project Management through Networks- Introduction, objectives, advantages, terms and definitions, types of networks, rules for drawing a network;
IntroductiontoPERT,CPM,differencebetweenPERTandCPM,Networkanalysis–forwardand backwardpasses,findingcriticalpath;
Methodsofmaterial/resourcemanagement-Projecttimereductionandoptimization,resource levelling & resourceallocation.

Module 5

PROJECTMONITORINGANDCONTROL

Construction equipment types, characteristics & applications, Quality tests for construction material and processes, Quality control inspections.
Siteorganization,Projectprogresstracking.
CrashingProjectSchedules,itsimpactontime,costandquality.SafetyinConstructionProjects.

Reference

1. Chaudhuri,S.andSen,A.(2010).*Economics*.McGrawHill.
2. Dewett,K.K.(2009).*ModernEconomicTheory*.S.ChandPublications.
3. Ferry,J.D.andBrahdon,S.P.(1994).*CostPlanningofBuildings*.BSPProfessionalBooks.
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5. Nobbs,J.andHopkins,I.(1995).*Economics:acoretext.*4thEd.London:McGraw-Hill.
6. Smell,M.*Cost–benefitAnalysis–apracticalguide*.ThomasTelfordPublishing.
7. Stone,P.A.(1976).*BuildingEconomy:DesignProductionandOrganisationasynoptic view,*2ndEd.Oxford:PergamonPress.
8. Teck,H.andHian,O.(1998).*Economics:theoryandapplications.*Taiwan:McGraw-Hill.
9. Punmia,B.C.,andKhandelwal,K.K.(2006).ProjectplanningandcontrolwithPERTandCPM. New Delhi: LaxmiPublications.
10. Wiest,J.D.,andLevy,F.K.(1982).AManagementGuidetoPERT/CPM.NewDelhi:Prentice Hall ofIndia.
11. Chandra,P.,Projects:Planning,Analysis,Selection,Financing,ImplementationandReview, McGrawHillEducation(India)PrivateLimited.
12. Mukhopadyay,S.P.,(1974),ProjectManagementforArchitect'sandCivilEngineers,IIT, Kharagpur.
13. Callahan,M.T.,Quackenbush,D.G.,&Rowings,J.E.(1992).ConstructionProjectScheduling. McGraw-Hill.
14. Chitkara,K.K.(2004).ConstructionProjectManagement:Planning,Schedulingand Controlling. Tata McGraw–HillEducation.
15. O'Brien, J. J., and Plotnick, F. L. (2009). CPM in Construction Management. McGraw-Hill Professional.
16. Nationalbuildingcodeof India,Indianstandardinstitution,New-Delhi,1970

Course Outcomes

CO1	Develop market economics and construction costs
CO2	Organise the process of economic analysis of projects
CO3	Define process of project management
CO4	Analyse resource management and project scheduling
CO5	Evaluate and monitor project quality control

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	-	-	2	1	2	1	3	3	3	2	2
CO2	3	-	-	2	1	2	1	3	3	3	2	2
CO3	3	-	-	2	1	2	1	3	3	3	2	2
CO4	3	-	-	2	1	2	1	3	3	3	2	2
CO5	3	-	-	2	1	2	1	3	3	3	2	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	-	-	2	1	2	1	3	3	3	2	2

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
10TH	BAR10002	**Architectural Design Thesis**	**18**	**0**	**0**	**18**

Objective

Each student is expected to prepare a design thesis under a department approved guide/ advisor.Thethesisshouldbeadesign-orientedprojectapprovedbythedepartment.Thethesis shouldreflecttheknowledgegainedfromtheentirecoursetakenbythestudentinalltheprevious semesters.

The topic should be related to the student's Dissertation topic. The time schedule, content presentation, format etc. as decided by the department, from time to time, shall be strictly followed.
Thescopeandextentofthethesisworkshallbesubstantialandrealizableinapplication orconceptasappropriatetotheselectedareaofwork.

Attheendofthesemestereachstudentisexpectedtosubmitalloriginaldrawingspreparedas perthedepartmentspecification,3copiesofthesisreportinthespecifiedformatandamodelto thedepartmentafterobtainingtheapprovaloftherespectiveguide/advisor.

Thedepartmentshallschedulethefinalvivavoce,whichistobeconductedbyexternaljurypanel after theThesis submission.

Module 1

SYNOPSIS

Thesynopsiswillbeabriefintroductionoftheproposedthesis/projectandhastobesubmitted bythestudentattheendofthepreviussemester.

Module 2

CASE STUDY, SITE ANALYSIS AND AREA PROGRAMMING

- **CaseStudy**

Thestudentshavetoconductliteraturestudyandcasestudies–live&literature,toformabasis for their owndesign.

- LiteratureReview:Itincludesgatheringtherelevantstandardsandotherinformation fromalltheavailablesourcesrelatedtotheirthesistopicsthatwillhelpthemduringthe laterstagesoftheirthesisprogramme.
- CaseStudies:Thestudentshavetoconductliveandliteraturestudiesofsimilarprojects. Instead of mere documentation of these projects, information must be collected about the requirements; salient design features clearly stating the positive and negativeaspectsofthedesign.Ideaofthecasestudyistoformabaseforcandidates owndesign.

- **SiteAnalysis**

The purpose of the site analysis is to record and evaluate information on the site and its surroundings,andtousethisevaluationinthedesignresponse.Thesiteanalysisshouldidentify issuesthatwillinfluencethedesignofadevelopmentinordertomakeaconsideredresponseto bothsiteopportunitiesandconstraints,toprovideagoodqualitylivingenvironment,andrespect, acknowledgeandimprovethecharacterofthearea.

- **Area Analysis andProgramme**

Thestudentsarerequiredtoprepareacomparativestatementofthevariousavailabledesign standards,areasprovidedinthevariouscasestudiesandthearearequirementsstatedinthe projectbrief,sothatthearearequirementsforthevariousfunctions/spacesfortheproposed buildingcanbefinalized.Thisareaprogrammeshouldbeanexhaustivelistandwillformthebasis ofthedesignprocesstobeundertakeninupcomingstages.

Module 3
SCHEMATICDESIGN

- Thestudentshavetoexpresstheirideasgeneratedonthebasisofthestudies(casestudies/ literature studies / area analysis) conducted so far in the form of conceptual drawings, sketches.
- Theemphasisduringthisstageshouldbeonthebasicconceptexplainingtheprincipalideas /thoughtprocess/dreamofthestudentfortheprojectintermsofplanning/builtform/ massingofdifferentcomponents,leadingtothedesign,throughsketches/3Dimages/block modelsetc.

Module 4
DESIGNFINALIZATION

- Theschematicdrawingspresentedinthepreviousmoduleneedstobedetailedoutasper thecomments/suggestionsreceivedfromtheguidesandthereviewers.
- Thedetaileddrawingsasperthefinalareaprogrammewithdueconsiderationtostructural andservicerequirementsofthebuildingneedstobepresentedatthisstage.

Module 5
PRE-FINAL DESIGN

- Thestudentsarerequiredtosubmitthefinaldrawings,views,models,etc.incorporatingthe comments received in the previous reviews, to be presented before a panel of internal / externalreviewers.
- Allthesubmittalsshouldbecompleteinallrespectsexcepttheirfinalrenderings.

Module 6
FINAL THESIS SUBMISSION

Thestudentsaresupposedtopresentallthesubmittals(drawings,model,report,etc.)complete inallrespectsasperthecommentsandsuggestionsreceivedfromthesisguideandvariousreview membersbeforethefinalreviewpanelforB.Arch.Thesis.

CourseOutcomes:
Students will be able to:

- DesignaThesisprojectresponsivetothecontextualandprogramrequirements
- Combinesthesystematic/methodologicallearningfromvariousstagesofstudyandanalysis indesignprocesstowardsculminationofaninformeddesign.
- Communicatetheideasclearlyusingwriting,verbalandvisualpresentation.

- Demonstrateself-reliancewhenworkingindependently
- Integrateideaswithdesignrequirements
- ComparedataandinformationgatheredfromPre-designresearch
- Evaluate data and information gathered from Pre-design research and summarizes the information used fordesign
- Applyvariouscodes,standardsandregulationsgoverningtheproject.
- Demonstratesynthesisofcreativityandtechnicalknowledge
- Demonstratetheabilityfordecisionmakingrequiredtoprogresstheunderstandingalready developed.
- DemonstratetheideasclearlyusingdetailedphysicalModel.

Course Outcomes

CO1	Develop the research ability and skills of writing research proposal
CO2	Analyse environment and sites
CO3	Evaluatebuilt environment
CO4	Implement Design proposals
CO5	Demonstrate skills of presentation techniques and writing thesis report

Course Articulation Matrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	3	3	3	3	2	2	1	3	3
CO2	3	3	2	3	3	3	3	2	2	1	3	3
CO3	3	3	2	3	3	3	3	2	2	1	3	3
CO4	3	3	2	3	3	3	3	2	2	1	3	3
CO5	3	3	2	3	3	3	3	2	2	1	3	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO	3	3	2	3	3	3	3	2	2	1	3	3

SEMESTER	COURSE CODE	COURSE TITLE	CREDIT	L	T	P/S
10TH	BAR10003	**Research in Thesis**	5	01	01	06

Objective

Thiscourseisaresearchablecomponentwithdesignconnectionwhichwouldhelpthestudents toacquireadepthofknowledgeabouttherequireddesigndetailsoftheirthesis.Thestudents wouldreflectthelearningofthiscoursethroughitsapplicationintheThesisProject.Theoutcome wouldbepredominantlyvaluebasedandmaybeevaluatedbasedontheapplicationindesign. Theexplorationmayincludeareport/additionalsheetsoninteriordesign/landscapedesign/ servicedetails/structuraldetails/costefficiencyofbuildingandotherrelevantlinkswiththedesign project.

Module 1
INTRODUCTION TO RESEARCH AREAS

- Toidentifyandoutlineresearchthreadsthatcouldbeexploredinthethesis
- Tocomprehendandinterprettheresearchcomponentofthethesis.
- Toselectthemostrelevantresearchcomponent.

Module 2
RESEARCH SYNOPSIS AND METHODOLOGY

- Todefineandoutlineaims,objectivesandlimitationsoftheresearcharea.
- Toillustrateappropriatemethodologyforconductingtheresearch
- Toidentifyandoutlineappropriatetoolsandmethodsforconductingtheresearch.

Module 3
SECONDARY/ PRIMARY STUDIES

- Toselectandoutlinerelevantliteraturesources.
- Tocomprehendandinferbestpracticesavailablethroughsecondarysources.
- Toconductprimarystudiesrelevanttoresearcharea.

Module 4
APPLICATION TO THESIS- STAGE I

- Tooutlinevariousparametersforanalysisrelevanttothesisproject.
- Toinferconclusionsfromanalysis.

Module 5
APPLICATION TO THESIS- STAGE II

- Torecogniseandlinkconclusionstothethesisproject.
- Todemonstratecomprehensivelytheapplicationofresearchareato thethesisproject through report/ additional sheets demonstrating concepts, innovative idea and technical details.
- Toevaluatetheimpactoftheresearchareainthestudents'specificresearchproject.

Course Outcomes

CO1	Develop ability to understand research processes and techniques
CO2	Attain skill to conduct field survey and experiments
CO3	Analyse natural and built environment
CO4	Evaluate spatial and socio-economic data
CO5	Demonstrate research findings for application in architectural thesis

Course Articulation Matrix

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	3	2	-	3	3	3	-	-	-	2	3	3
CO2	3	2	-	3	3	3	-	-	-	2	3	3
CO3	3	2	-	3	3	3	-	-	-	2	3	3
CO4	3	2	-	3	3	3	-	-	-	2	3	3
CO5	3	2	-	3	3	3	-	-	-	2	3	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High) -: No Correlation

Program Articulation Matrix row for this Course

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO	3	2	-	3	3	3	-	-	-	2	3	3