Regulations and Curriculum for Bachelor of Architecture (B.Arch) Program

Choice Based Credit System
For Batch admitted from 2018-19

(Deemed to be University under Section 3 of UGC Act, 1956)
(Placed under Category 'A' by MHRD, Govt. of India, Accredited with 'A' Grade by NAAC)
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Mangaluru – 575 018, Karnataka INDIA
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Website: www.nitte.edu.in E-mail: info@nitte.edu.in

VISION

To build a humane society through excellence in education and healthcare

MISSION

To develop
Nitte (Deemed to be University)
As a centre of excellence imparting quality education,
generating competent, skilled manpower to face the scientific and social challenges with a high degree of credibility, integrity,
ethical standards & social concern

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Nitte University

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Ref: NU/REG/S3/2014-15/754-E Date: 24-03-2015

NOTIFICATION

Subject: Regulations, Scheme and Syllabus for B.Arch Program

In exercise of the powers conferred under Rule No. R.9 of the MoA, the Academic Council in its 24th meeting held on 17-03-2015 under the agenda item No. AC/12-24/15 has been pleased to approve the regulations, scheme and syllabus pertaining to B.Arch (Bachelor of Architecture) course in Nitte Institute of Architecture.

The Regulations, scheme and syllabus shall come into force from the academic year 2015-16.

By order,
REGISTRAR

Nitte University

(Deemed University under Section 3 of UGC Act, 1956)
(Placed under Category 'A' by MHRD, Govt. of India, Accredited with 'A' Grade by NAAC)
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NU/REG/AC-NIA/2016-17/690 31.03.2017

NOTIFICATION

Sub: Modified Syllabus for B.Arch Program

In exercise of the powers conferred under Rule No. R.9 of the MoA, the Academic Council in its 31st meeting held on 14-03-2017 under the agenda item No. AC/6(2)-31/17 has been pleased to approve the modified syllabus for B.Arch (Bachelor of Architecture) Program.

By order,

REGISTRAR

NITTE
(Deemed to be University)

(Established under Section 3 of UGC Act 1956)
Placed under Category 'A' by MHRD, GoI
Accredited with 'A' Grade by NAAC

Ref: NU/REG/AC-NIA/2018-19/373 **Date: 01.12.2018**

NOTIFICATION

Sub: Changes in Regulations and Curriculum of B.Arch Course.

In exercise of the powers conferred under Rule No. R.9 of the MOA, the Academic Council in its 37th meeting held on 20-11-2018 under the agenda item no. AC/8(2)-37/18 is pleased to approve the following changes in Regulation and curriculum in B.Arch programme for the batch admitted in 2018-19 and onwards.

1. **SEE Scheme Reform**
   a. Total Marks allotted to CIE and SEE will continue to be in the ratio of 50:50. SEE evaluation marks allotted will be allotted a similar ratio between the jurors and evaluators.
2. **CIE Reform**
   a. A candidate must secure at least 50% of total marks fixed for internal assessment in particular course in order to be eligible to appear for the Semester End Examination of that course.
3. **Carry Over Reforms for batch 2018-19 onwards.**

By Order,

REGISTRAR

(Deemed to be University under section 3 of UGC Act 1956)
Placed under Category 'A' by MHRD, Govt. of India
Accredited as 'A' Grade University by NAAC
Mangaluru, Karnataka, India

Regulations and Curriculum For Bachelor of Architecture (B.Arch) Program

Choice Based Credit System

Preamble:

The Bachelor of Architecture (B.Arch) Program was started in the year 2015-16 by Nitte (Deemed to be University) with the vision of building a learning campus that supports creative exploration and nurtures the journey of students towards a sustainable architectural practice.

The five year Bachelor in Architecture program is approved by the Council of Architecture (CoA) as well as All India Council for Technical Education (AICTE). The school of Architecture has been envisioned as a centre for excellence in tropical architecture with partners across the globe, and plans to offer under graduate and post graduate degree programs in urban planning, conservation, interior design, arts, and product design in the near future.

The progressive curriculum was developed by academic and professional entities from around the world and has been designed to integratehands-on practical training with theory based education. Design excellence is encouraged through rigorous theoretical training, experiential learning, critical thinking, innovative pedagogy, craft and skill-building, dialogue and collaboration.

The programme hopes to lead a new generation of holistic professionals who work with a deeper understanding of architecture by bringing together meaningful insights of experiential learning from both academia and professional practice.

The regulations for this course are formulated as under.

1. Introduction:

1.1. These regulations shall be called Nitte (Deemed to be University) Regulations for Bachelor of Architecture (B.Arch) program and govern the policies and procedures including selection, admission, imparting of instructions, conduct of examinations, evaluation and certification of candidate's performance and all amendments there to, leading to the award of Bachelor of Architecture (B.Arch) degree. The regulations shall come into effect from the academic year 2018-19 and is applicable to the batch admitted from 2018-19 and onwards.

1.2. This set of regulations is in conformance to the stipulation, norms and regulations laid down by the Council of Architecture – Minimum Standards of Architectural Education – 2008" and shall be binding on all the candidates undergoing the said degree program.

1.3. These regulations may be modified from time to time as mandated by the statutes of the University and the Council of Architecture (CoA).

1.4. This set of regulations may evolve and get refined or updated or amended or modified or changed through appropriate approvals from the Academic Council or the Board of Management from time to time and shall be binding on all parties concerned including the Candidates, Faculty, Staff, Departments, and Institution Authorities.

1.5. All disputes arising from this set of regulations shall be addressed to the Board of Management. The decision of the Board of Management is final and binding on all parties concerned. Further, any legal disputes arising out of this set of regulations shall be limited to jurisdiction of Courts of Mangalore only.

2. Definitions:

Unless the context otherwise requires,

- *Academic year* means two consecutive (one odd + one even) semesters.
- *Audit Course* means course/s aimed at supplementing a candidate's knowledge and /or skills. These will be reflected in the grade card but shall not be taken into account in determining the candidate's performance in the semester. However, it is mandatory that a candidate passes the audit course to be eligible for the award of the degree.

- *BoM* means Board of Management of Nitte (Deemed to be University)
- *BoS* means Board of Studies in Architecture
- *CoA* means Council of Architecture
- *College/Institution* means Nitte Institute of Architecture
- *Course* means a subject or a paper. A course may comprise lectures/ tutorials/ laboratory work/ field work/ outreach activities/ project work/ vocational training/viva/ seminars/ term papers/assignments/ presentations/ self-study etc. or a combination of some of these.
- *CIE* means Continuous Internal Evaluation
- *Credit* means a unit by which the course work is measured. It determines the number of hours of instruction required per week. One credit is equivalent to one hour of teaching (lecture), or one and a half studio hours, or two hours of workshop, tutorial practical training per week.
- *Credit Based Semester System (CBSS):* means a system wherein the requirement for awarding a degree (or diploma or certificate) prescribed in terms of number of credits to be completed by the candidates.
- *Cumulative Grade Point Average (CGPA):* means a measure of the overall cumulative performance of a candidate all ten semesters out together. The CGPA is the ratio of total credit points secured by a candidate in various courses in all semesters and the sum of the total credits of all courses in all the semesters. It is expressed up to two decimal places.
- *Department* means Department of Architecture.
- *Grade Point* means a numerical weight allotted to each letter grade on a 10-point scale.
- *He* includes both genders He and She; similarly his and /or him, himself includes her, as well in all cases.
- *Head of the Institution* means the Dean / Principal / Director of the College (Nitte Institute of Architecture)
- *Head of the Department* means a full-time faculty appointed /nominated by the Head of the Institution / University for managing the Department and authorized to and responsible for the implementation of the rules and procedures pertaining to the Department.
- *Letter Grade:* It is an index of the performance of a candidate in a said course. Grades are denoted by letters O, S, A+, A, B+, B, C, F and I.
- *Program* means an educational program leading to award of a Degree

(B.Arch)

- *Regulations* means this set of academic regulations
- *SEE* means Semester End Examinations
- *Semester Grade Point Average (SGPA)* means a measure of performance of work done in a semester. It is ratio of total credit points secured by a candidate in various courses registered in a semester and the total course credits taken during that semester. It shall be expressed up to two decimal places.
- *University* means Nitte (Deemed to be University).

3. Duration of the program:

3.1 The duration of the B. Arch program shall be 5 academic years (10semesters) including internship, and 3 special study courses in the interim summer months.

3.2 The program is framed as a two stage process – Stage 1 consisting of the first 3 academic years (semesters 1 to 6) and Stage 2 consisting of 2 years (semesters 7 to 10).

4. Medium of Instruction and Examinations:

The Medium of Instruction and Examination shall be English.

5. Maximum period for completion of the Program:

The maximum period for completion of Bachelor of Architecture (B.Arch) program is ten (10) academic years.

6. Eligibility for Admission:

6.1. No candidate shall be admitted to the Bachelor of Architecture (B.Arch) Program until he/she has attained 17 years of age on or before 31st December of the admission year

and

has passed 2 years PUC examination of PUE Board, Karnataka or an equivalent examination of any other approved Board or University with not less than 50% marks in aggregate with Mathematics as one of the subjects of examination OR 10+3 Diploma (any stream) recognized by Central/ State Governments with 50% aggregate marks. OR International Baccalaureate Diploma, after 10 years of schooling, with not less than

50% marks in aggregate and with Mathematics as compulsory subject of examination

and

has scored a minimum of 40% marks in the National Aptitude Test in Architecture (NATA) conducted in the year of admission.

6.2. For SC/ST candidates the minimum percentage of marks shall be a pass with 45% of the aggregate marks in the qualifying examination and a minimum of 40% marks in the National Aptitude Test in Architecture (NATA) conducted in the year of admission

6.3. Foreign Nationals and candidates who have qualified from a Foreign University/Board should obtain permission from Nitte (Deemed to be University) prior to the admission for equivalence of the qualification.

7. Selection of Eligible Candidates:

Selection to the B.Arch program shall be based on the basis of combined merit obtained in the qualifying examination and the NATA in the ratio of 50:50.

8. Withdrawal – Temporary and Permanent:

8.1. **Temporary:**

8.1.1. A candidate who has been admitted to the program may be permitted to withdraw temporarily for a period of six months or more up to one year on the grounds of prolonged illness, grave calamity in the family, etc. provided:

a. He applies stating the reason of withdrawal with supporting documents and endorsement by parent/guardian.

b. The Institution is satisfied that the candidate is likely to complete his requirement of the degree within maximum time specified.

c. There are no outstanding dues or demands with the department, library, hostel, Institution, etc.

8.1.2. The tuition fee for the subsequent year may be collected in advance based on the severity of the case before giving approval for any such temporary withdrawal.

8.1.3. Scholarship holders are bound by the appropriate rules applicable

8.1.4. The decision of the Institution/University regarding withdrawal of

a candidate is final and binding.

8.2. **Permanent:**

8.2.1. A candidate who withdraws admission before closing date of admission for the academic session is eligible for the refund of the deposit only. The fees once paid will not be refunded on any account.

8.2.2. Once the admission for the year is closed and if a candidate wants to leave the Institution, he will be permitted to do so and take the Transfer Certificate from the Institution /University, if required, only after remitting the tuition fees for the remaining years.

8.2.3. Those candidates who have received any scholarship/stipend/other forms of assistance from the Institution shall repay all such amounts in addition to those mentioned in the clause above.

8.2.4. The decision of the Institution/University regarding withdrawal of a candidate is final and binding.

9. Conduct and Discipline:

9.1. Candidates shall conduct themselves within and outside the premises of the Institution in a manner befitting a student of a professional education institution.

9.2. As per the order of Honourable Supreme Court of India, ragging in any form is considered as a criminal offence and is banned. Any form of ragging will be severely dealt with.

9.3. The following act of omission and/or commission shall constitute gross violation of the code of conduct and are liable to invoke disciplinary measures:

9.3.1. Ragging as defined and described by the Supreme Court/Government.

9.3.2. Lack of courtesy and decorum, indecent behaviour anywhere within or outside the campus.

9.3.3. Wilful damage or stealthy removal of any property/belongings of the Institution/Hostel or of fellow students/citizens.

9.3.4. Possession, consumption or distribution of alcoholic drinks or any kind of hallucinogenic drugs.

9.3.5. Mutilation or unauthorized possession of library books.

9.3.6. Noisy or unseemly behaviour, disturbing studies of fellow students.
9.3.7. Plagiarism of any nature.
9.3.8. Hacking of computer systems (such as entering into other person's domain without prior permission, manipulation and/or damage to the computer hardware and software or any other cybercrime, etc.)
9.3.9. Any other act of gross indiscipline as decided by the Board of Management from time to time.

9.4. Commensurate with the gravity of offense, the punishment may be: reprimand, fine, expulsion from the hostel, debarment from an examination, disallowing the use of certain facilities of the Institution, rustication for a specific period or even outright expulsion from the institute, or even handing over the case to appropriate law enforcement authorities or the judiciary, as required by the circumstances.

9.5. For any offence committed in - (i) a hostel, (ii) a department (iii) a class room, and (iv) elsewhere, the Chief Warden, the Head of the Department/ Head of the Institution/ Authorities of the University respectively, shall have the authority to reprimand or impose fine. Elsewhere, the Chief Warden, the Head of the Department and the Dean (Student Affairs), respectively, shall have the authority to reprimand or impose fine.

9.6. All cases involving punishment other than reprimand shall be reported to the Vice- Chancellor.

9.7. Cases of adoption of unfair means and/or any malpractice in an examination shall be reported to the Controller of Examinations for taking appropriate action.

10. Graduation Requirements:

Candidate shall be declared eligible for the award of the degree if he has:

- Fulfilled the degree requirements.
- No dues to the University, Institution, Departments, Hostels, Library, etc.
- No disciplinary action pending against him.

The award of the degree must be recommended by the Board of Management.

11. Convocation:

Degrees will be awarded in person to all the eligible candidates who have graduated during the preceding academic year at the annual convocation. For

eligible candidates who are unable to attend the convocation, degree will be sent by post. Candidates are required to apply for the convocation along-with prescribed fee within the specified date, after satisfactory completion of all degree requirements.

12. Structure of the program:

The program is structured on Credit Based System and Continuous Evaluation following the semester pattern. A candidate shall have earned a total of 234 credits to be eligible for the award of B.Arch degree of the University.

The Program consists of the following Courses:

Sl. No.	Core Courses	Foundation Courses	Electives
1.	Foundation Studio	Computer Applications in Architecture	**Stage 1 Electives*-** Refer next table
2.	Architectural Graphics	Dissertation and Research Techniques	**Stage 2 Electives**** - Refer next table
3.	Architectural Graphics (Computing)	Humanities	
4.	Visual Arts	Ecology	
5.	Building Construction and Materials	Creative Expression Workshop	
6.	Architectural Design Studio	Art Appreciation	
7.	Working Drawing Studio	Constitution of India	
8.	History of Architecture	Urban Studio	
9.	History of Architecture and Urbanism	Structures Workshop	
10.	Structures	Human Rights, Gender Equity & Environmental Studies	
11.	Urban Housing Studio		
12.	Environmental Design Studio	Internship	

13.	Water and Waste Systems	Co-operative Learning	
14.	Survey and Levelling	Workshop	
15.	Theory of Design	Field Trip	
16.	Electrical and Lighting Systems	Contemporary Architecture & Theory	
17.	Climatology and Building Physics	Urban Design	
18.	Mechanical Systems	Landscape Design	
19.	Specification		
20.	Quantities & Estimation		
21.	Building Codes		
22.	Professional Practice		
23.	Project Management & Building Economics		
24.	Capstone Project		

Sl.No.	Stage 1 Electives*	Stage 2 Electives**
1.	Architectural Journalism	LEED Lab – 1
2.	Architectural Photography	LEED Lab – 2
3.	Art in Architecture	Housing
4.	Critical Thinking	Emerging Technology
5.	Digital Architecture	Interior Design
6.	Facilities Planning	Construction Management
7.	Energy Efficient Architecture	Disaster Management
8.	Construction Systems	Life cycle Costing and Analysis
9.	Passive Design	Building Commissioning

10.	Expert Systems Advanced Computing	Integrated Systems Management
11.	Contemporary Architecture and Theory-1	Charettes and Participatory Planning
12.	Smart Materials and Structures	Theatre/Film Set Design
13.	Visual Communication	Intelligent Buildings
14.	Sustainable Architecture	Design and Building Projects
15.	Energy Efficient Architecture	Advanced Building Materials
16.	Steel in Architectural Design	Advanced Structures
17.	Environmental Planning and Design	Tall buildings
18.	Building Automation Systems	Remote Sensing & GIS
19.	Tropical Architecture – 1	Bio-mimicry
20.	Tropical Architecture – 2	Finance and Engineering integration
21.		Contemporary Architecture and Theory 2
22.		Integrated Design Process
23.		Building performance Simulation

13. Courses of Study & Training and Scheme of Examination:

SEMESTER 1 (Commencement of Stage 1)

Courses of Study and Training							Scheme of Examination						
Sl.No.	Name of Courses	Course Format	Credits : Contact hours	Credits	No of Teaching Hours / Week		Marks			SEE Evaluation			
					Studio / Practical	Lecture	Total Marks (CIE+SEE)	CIE	SEE	Portfolio/Viva*		Written	
										Int.	Ext.	Marks	Duration of Exam
1	Foundation Studio - 1	Studio	1:1.5	6	9	-	600	300	300	150	150	-	N/A
2	Architectural Graphics - 1	Studio	1:1.5	4	6	-	400	200	200	100	100	-	N/A
3	Building Construction and Materials - 1	Studio	1:1.5	4	4	2	400	200	200	50	50	100	4 hrs.
4	Visual Arts - 1	Studio	1:1.5	4	6	-	400	200	200	100	100	-	N/A
5	History of Architecture - 1	Lecture	1:1	3	-	3	300	150	150	25	25	100	3 hrs.
6	Structures -1	Lecture	1:1	3	-	3	300	150	150	75	75	-	N/A
Total				**24**	**25**	**08**	**2400**						
7	Workshop - 1	Workshop		Audit	6		150	150	-	-	-	-	
8	Ecology	Lecture		Audit		2	50	50	-	-	-	-	
Total					**06**	**02**	**200**						

Note:

*Evaluation of Portfolios through jury presentation / term paper / assignment / seminar.

*Written exam for Building Construction and Materials – 1 will comprise of a theory paper and a drawing paper.

*Audit courses shall be evaluated by college level examinations and shall be held before the commencement of the University examinations. A pass in the course

(50% of the maximum allotted marks) is compulsory in order to be eligible for the award of degree. Failed candidates shall appear for the examination in the subsequent semester. Failing in audit courses shall not be considered as an attempt. These marks shall not be considered for the award of class. These courses have to be passed before the candidate appears for the tenth semester examinations.

SEMESTER 2

Courses of Study and Training							Scheme of Examination						
Sl.No.	Name of Courses	Course Format	Credits : Contact hours	Credit	No of Teaching Hours / Week		Marks			SEE Evaluation			
					Studio / Practical	Lecture	Total Marks (CIE+SEE)	CIE	SEE	Portfolio/Viva*		Written	
										Int.	Ext.	Marks	Duration of Exam
1.	Foundation Studio - 2	Studio	1:1.5	4	6	-	600	300	300	150	150	-	N/A
2.	Architectural Graphics - 2	Studio	1:1.5	3	5	-	300	150	150	75	75	-	N/A
3.	Building Construction and Materials - 2	Studio	1:1.5	4	4	2	400	200	200	100	100	100	4 hrs.
4.	Visual Arts - 2	Studio	1:1.5	4	6	-	400	200	200	100	100	-	N/A
5.	History of Architecture and Urbanism - 1	Lecture	1:1	2	-	2	200	100	100	-	-	100	3 hrs.
6.	Theory of Design - 1	Lecture	1:1	2	-	2	200	100	100	50	50	-	N/A
7.	Structures - 2	Lecture	1:1	3	-	3	300	150	150	75	75	100	3 hrs.
8.	Survey and Levelling	Studio	1:1.5	2	3	-	200	100	100	50	50	-	N/A
Total				**24**	**24**	**9**	**2600**						
9.	Creative Expression Workshop	Workshop	-	Audit	2	-	100	100					
10.	Field Trip	Field trip	-	Audit		-	100	100					
Total					**02**		**200**						

Note:

*Evaluation of Portfolios through jury presentation / term paper / assignment / seminar.

*Written exam for Building Construction and Materials – 2 will comprise of a theory paper and a drawing paper.

* Surveying and Levelling will be a practical exam / viva

*Audit courses shall be evaluated by college level examinations and shall be held before the commencement of the University examinations. A pass in the course

(50% of the maximum allotted marks) is compulsory in order to be eligible for the award of degree. Failed candidates shall appear for the examination in the subsequent semester. Failing in audit courses shall not be considered as an attempt. These marks shall not be considered for the award of class. These courses have to be passed before the candidate appears for the tenth semester examinations.

OPTIONAL 1ST YEAR SUMMER

Courses of Study and Training							Scheme of Examination						
Sl.No.	Name of Courses	Course Format	Credits : Contact hours	Credits	No of Teaching Hours / Week		Marks			SEE Evaluation			
					Studio / Practical	CIE	Total Marks (CIE+SEE)	CIE	SEE	Portfolio/Viva*		Written	
										Int.	Ext.	Marks	Duration of Exam
1	Special Study	Internship / Workshop / Independent Study / Research	1:2	4	8		400	200	200	100	100		N/A
				4	**8**	**0**	**400**	**200**	**200**	**100**	**100**		

***Evaluation of Portfolios through jury presentation / term paper / employer evaluation/ seminar / jury panel.**

SEMESTER 3

Courses of Study and Training							Scheme of Examination						
Sl.No.	Name of Courses	Course Format	Credits : Contact hours	Credits	No of Teaching Hours / Week		Marks			SEE Evaluation			
					Studio / Practical	Lecture	Total Marks (CIE+SEE)	CIE	SEE	Portfolio/Viva*		Written	
										Int.	Ext.	Marks	Duration of Exam
1.	Architectural Design Studio - 1	Studio	1:1.5	4	6	-	400	200	200	100	100	-	N/A
2.	Architectural Graphics (Computing) - 1	Studio	1:1.5	4	6	-	400	200	200	100	100	-	N/A
3.	Building Construction and Materials - 3	Studio	1:1.5	4	4	2	400	200	200	100	100	100	4 hrs.
4.	History of Architecture and Urbanism - 2	Lecture	1:1	3	-	3	300	150	150	25	25	100	3 hrs.
5.	Theory of Design - 2	Lecture	1:1	2	-	2	200	100	100	50	50	-	N/A
6.	Structures - 3	Lecture	1:1	3	-	3	300	150	150	25	25	100	3 hrs.
7.	Climatology and Building Physics	Lecture	1:1	2	-	2	200	100	100	-	-	100	3 hrs.
8.	Art Appreciation	Lecture	1:1	2		2	200	100	100	50	50		N/A
Total				**24**	**16**	**14**	**2400**						
9.	Humanities	Lecture		Audit		2	100	100	-	-	-	-	-
10.	Elective*	Workshop		Audit	3		100	100	-	-	-	-	-
Total					**03**	**02**	**200**						

Note:

*Evaluation of Portfolios through jury presentation / term paper / assignment / seminar.

*Written exam for Building Construction and Materials – 3 will comprise of a theory paper and a drawing paper.

*Audit courses shall be evaluated by college level examinations and shall be held before the commencement of the University examinations. A pass in the course

(50% of the maximum allotted marks) is compulsory in order to be eligible for the award of degree. Failed candidates shall appear for the examination in the subsequent semester. Failing in audit courses shall not be considered as an attempt. These marks shall not be considered for the award of class. These courses have to be passed before the candidate appears for the tenth semester examinations.

****Electives:**

Architectural Journalism	Art in Architecture	Visual Communication
Architectural Photography	Passive Design	Smart Materials and Structures

Semester 4

Courses of Study and Training							Scheme of Examination						
Sl.No.	Name of Courses	Course Format	Credits : Contact hours	Credit	No of Teaching Hours / Week		Marks			SEE Evaluation			
					Studio / Practical	Lecture	Total Marks (CIE+SEE)	CIE	SEE	Portfolio/Viva*		Written	
										Int.	Ext.	Marks	Duration of Exam
1.	Architectural Design Studio - 2	Studio	1:1.5	6	9	-	600	300	300	150	150		N/A
2.	Architectural Graphics (Computing) - 2	Studio	1:1.5	4	6	-	400	200	200	100	100		N/A
3.	Building Construction and Materials - 4	Studio	1:1.5	2	3	-	200	100	100	50	50		N/A
4.	History of Architecture and Urbanism - 3	Lecture	1:1	3	-	3	300	150	150	25	25	100	3 hrs.
5.	Theory of Design - 3	Lecture	1:1	2	-	2	200	100	100	50	50		N/A
6.	Structures - 4	Lecture	1:1	4	-	4	400	200	200	50	50	100	3 hrs.
7.	Water and Waste Systems	Lecture	1:1	3	-	3	300	150	150	25	25	100	3 hrs.
Total				**24**	**18**	**12**	**2400**						
8.	Constitution of India	Lecture		Audit		2	100	100					
9.	Elective**	Lecture		Audit	3	-	100	100					
10.	Field Trip	Field trip		Audit			100	100					
Total					**03**	**02**	**300**						

Note:

*Evaluation of Portfolios through jury presentation / term paper / assignment / seminar.

*Evaluation of Building Construction and Materials – 4 will be through portfolio/viva evaluation.

* Audit courses shall be evaluated by college level examinations and shall be held before the commencement of the University examinations. A pass in the course

(50% of the maximum allotted marks) is compulsory in order to be eligible for the award of degree. Failed candidates shall appear for the examination in the subsequent semester. Failing in audit courses shall not be considered as an attempt. These marks shall not be considered for the award of class. These courses have to be passed before the candidate appears for the tenth semester examinations.

****Electives:**

Critical Thinking	Construction Systems	Building Automation Systems
Digital Architecture	Sustainable Architecture	Energy Efficient Architecture

OPTIONAL 2ND YEAR SUMMER

Courses of Study and Training							Scheme of Examination						
Sl.No.	Name of Courses	Course Format	Credits : Contact hours	Credits	No of Teaching Hours / Week		Marks			SEE Evaluation			
					Studio / Practical	CIE	Total Marks (CIE+SEE)	CIE	SEE	Portfolio/Viva*		Written	
										Int.	Ext.	Marks	Duration of Exam
1	Special Study	Internship / Workshop / Independent Study / Research	1:2	4	8		400	200	200	100	100		N/A
				4	8	0	400	200	200	100	100		

***Evaluation of Portfolios through jury presentation / term paper / employer evaluation/ seminar / jury panel.**

SEMESTER 5

Courses of Study and Training							Scheme of Examination						
Sl.No.	Name of Courses	Course Format	Credits : Contact hours	Credit	No of Teaching Hours / Week		Marks			SEE Evaluation			
					Studio / Practical	Lecture	Total Marks (CIE+SEE)	CIE	SEE	Portfolio/Viva*		Written	
										Int.	Ext.	Marks	Duration of Exam
1	Architectural Design Studio - 3	Studio	1:1.5	4	6	-	400	200	200	100	100	-	N/A
2	Working Drawing Studio	Studio	1:1.5	4	6	-	400	200	200	100	100	-	N/A
3	Theory of Design - 4	Lecture	1:1	2	-	2	200	100	100	50	50	-	N/A
4	Structures - 5	Lecture	1:1	4	-	4	400	200	200	50	50	100	3 hrs.
5	Quantities and Estimation	Lecture	1:1	3	-	3	300	150	150	25	25	100	3 hrs.
6	Specification	Lecture	1:1	2	-	2	200	100	100	-	-	100	3 hrs.
7	Electrical and Lighting Systems	Lecture	1:1	3	-	3	300	150	150	25	25	100	3 hrs.
8	Building code	Lecture	1:1	2	-	2	200	100	100	50	50		N/A
Total				**24**	**12**	**16**	**2400**						
9	Human Rights, Gender Equity and Environmental Studies	Lecture		Audit	-	2	100	100	-	-	-	-	-
10	Elective**	Workshop		Audit	3		100	100	-	-	-	-	-
11	Elective**	Lecture		Audit		2	100	100	-	-	-	-	-
Total					**03**	**04**	**300**		-	-	-	-	-

Note:

*Evaluation of Portfolios through jury presentation / term paper / assignment / seminar.

* Audit courses shall be evaluated by college level examinations and shall be held before the commencement of the University examinations. A pass in the course

(50% of the maximum allotted marks) is compulsory in order to be eligible for the award of degree. Failed candidates shall appear for the examination in the subsequent semester. Failing in audit courses shall not be considered as an attempt. These marks shall not be considered for the award of class. These courses have to be passed before the candidate appears for the tenth semester examinations.

****Electives:**

Tropical Architecture – 1	Contemporary Architecture and Theory – 1	Expert Systems Advanced Computing
Steel in Architectural Design	Environmental Planning and Design	Facilities Planning

Note: Candidates opting for "Co-operative Learning" in the 6th semester shall attend a 'Co-op Prep' course during the 5th semester.

SEMESTER 6: CO-OP (Completion of Stage 1)

Courses of Study and Training							Scheme of Examination						
Sl.No.	Name of Courses	Course Format	Credits : Contact hours	Credits	No of Teaching Hours / Week		Marks			SEE Evaluation			
					Studio / Practical	Lecture	Total Marks (CIE+SEE)	CIE	SEE	Portfolio/Viva*		Written	
										Int.	Ext.	Marks	Duration of Exam
1	Computer Applications in Architecture	Studio	1:1.5	2	3	-	200	100	100	50	50	-	N/A
2	Co-operative learning	Studio	1:2	14	28	-	1400	700	700	350	350	-	N/A
3	Structures Workshop -1	Lecture	1:1	2		2	200	100	100	50	50	-	N/A
Total				**18**	**31**	**02**	**1800**						
4	Elective ** (Documentation)	Studio		Audit	4	-	100	100	50	-	-	-	-
Total					**04**	-	**100**						

*Evaluation of Portfolios through jury presentation / term paper / assignment / seminar.

**** Electives related to documentation of Tropical Architecture in any form with advisor approval (Tropical Architecture – 2)**

* Audit courses shall be evaluated by college level examinations and shall be held before the commencement of the University examinations. A pass in the course

(50% of the maximum allotted marks) is compulsory in order to be eligible for the award of degree. Failed candidates shall appear for the examination in the subsequent semester. Failing in audit courses shall not be considered as an attempt. These marks shall not be considered for the award of class. These courses have to be passed before the candidate appears for the tenth semester examinations.

OPTIONAL 3RD YEAR SUMMER

Courses of Study and Training							Scheme of Examination						
Sl.No.	Name of Courses	Course Format	Credits : Contact hours	Credits	No of Teaching Hours / Week		Marks			SEE Evaluation			
					Studio / Practical	CIE	Total Marks (CIE+SEE)	CIE	SEE	Portfolio/Viva*		Written	
										Int.	Ext.	Marks	Duration of Exam
1	Special Study	Internship / Workshop / Independent Study / Research	1:2	4	8		400	200	200	100	100		N/A
				4	8	0	400	200	200	100	100		

***Evaluation of Portfolios through jury presentation / term paper / employer evaluation/ seminar / jury panel.**

SEMESTER 7 (Commencement of Stage 2)

Courses of Study and Training							Scheme of Examination						
Sl.No.	Name of Courses	Course Format	Credits : Contact hours	Credit	No of Teaching Hours / Week		Marks			SEE Evaluation			
					Studio / Practical	Lecture	Total Marks (CIE+SEE)	CIE	SEE	Portfolio/Viva*		Written	
										Int.	Ext.	Marks	Duration of Exam
1	Urban Studio	Studio	1:1.5	9	12	-	900	450	450	200	250	-	N/A
2	Building Construction and Materials - 5	Studio	1:1.5	2	4	-	200	100	100	50	50	-	N/A
3	Urban Design	Lecture	1:1	2	-	2	200	100	100	50	50	-	N/A
4	Structures Workshop - 2	Lecture	1:1	3	-	3	300	150	150	75	75	-	N/A
5	Elective**	Lecture	1:1	2	-	2	200	100	100	50	50	-	N/A
6	Elective**	Lecture	1:1	2	-	2	200	100	100	50	50	-	N/A
Total				**20**	**16**	**09**	**2000**						
7	Field Trip	Field Trip		Audit			100	100	-	-	-	-	-
Total							**100**						

*Evaluation of Portfolios through jury presentation / term paper / assignment / seminar.

*Audit courses shall be evaluated by college level examinations and shall be held before the commencement of the University examinations. A pass in the course

(50% of the maximum allotted marks) is compulsory in order to be eligible for the award of degree. Failed candidates shall appear for the examination in the subsequent semester. Failing in audit courses shall not be considered as an attempt. These marks shall not be considered for the award of class. These courses have to be passed before the candidate appears for the tenth semester examinations.

****Electives:**

LEED Lab – 1	Theatre/Film Set Design	Interior Design
Emerging Technologies	Bio Mimicry	Advanced Building Materials
Housing	Construction Management	Charettes and Participatory Planning

Note: 'Urban Studio' is designed to be a travelling studio with location based on availability of live urban projects

SEMESTER 8

Courses of Study and Training							Scheme of Examination						
Sl.No.	Name of Courses	Course Format	Credits : Contact hours	Credits	No of Teaching Hours / Week		Marks			SEE Evaluation			
					Studio / Practical	Lecture	Total Marks (CIE+SEE)	CIE	SEE	Portfolio/Viva*		Written	
										Int.	Ext.	Marks	Duration of Exam
1	Urban Housing Studio	Studio	1:1.5	6	9	-	600	300	300	150	150	-	N/A
2	Environmental Design Studio	Studio	1:1.5	4	6	-	400	200	200	100	100	-	N/A
3	Building Construction and Materials - 6	Studio	1:1.5	2	3	-	200	100	100	50	50	-	N/A
4	Dissertation and Research Techniques	Workshop	1:2	2	4	-	200	100	100	50	50	-	N/A
5	Landscape Design	Lecture	1:1	2	-	2	200	100	100	-	-	100	3 hrs.
6	Mechanical systems	Lecture	1:1	3	-	3	300	150	150	25	25	100	3 hrs.
7	Project Management and Building Economics	Lecture	1:1	3	-	3	300	150	150	75	75	-	N/A
8	Elective**	Lecture	1:1	2		2	200	100	100	50	50	-	N/A
Total				**24**	**22**	**10**	**2400**	-					
9	Field Trip	Field Trip		Audit	-		100	100	-	-	-	-	-
Total							**100**						

*Evaluation of Portfolios through jury presentation / term paper / assignment / seminar.

*Audit courses shall be evaluated by college level examinations and shall be held before the commencement of the University examinations. A pass in the course

(50% of the maximum allotted marks) is compulsory in order to be eligible for the award of degree. Failed candidates shall appear for the examination in the subsequent semester. Failing in audit courses shall not be considered as an attempt. These marks shall not be considered for the award of class. These courses have to be passed before the candidate appears for the tenth semester examinations.

****Electives:**

LEED Lab – 1	LEED Lab – 2	Advanced Structures	Intelligent Buildings
Building Commissioning		Integrated Design Process	Contemporary Architecture and Theory – 2

OPTIONAL 4TH YEAR SUMMER

Courses of Study and Training							Scheme of Examination						
Sl.No.	Name of Courses	Course Format	Credits : Contact hours	Credits	No of Teaching Hours / Week		Marks			SEE Evaluation			
					Studio / Practical	CIE	Total Marks (CIE+SEE)	CIE	SEE	Portfolio/Viva*		Written	
										Int.	Ext.	Marks	Duration of Exam
1	Special Study	Internship / Workshop / Independent Study / Research	1:2	4	8		400	200	200	100	100		N/A
				4	8	0	400	200	200	100	100		

***Evaluation of Portfolios through jury presentation / term paper / employer evaluation/ seminar / jury panel.**

SEMESTER 9: INTERNSHIP

Courses of Study and Training							Scheme of Examination						
Sl.No.	Name of Courses	Course Format	Credits : Contact hours	Credits	No of Teaching Hours / Week		Marks			SEE Evaluation			
					Studio / Practical	Lecture	Total Marks (CIE+SEE)	CIE	SEE	Portfolio/Viva*		Written	
										Int.	Ext.	Marks	Duration of Exam
1	Internship	Internship	1:2	18	36		1800	900	900	450	450	-	N/A
Total				**18**	**36**	**0**	**1800**						

SEMESTER 10 (Completion of Stage 2)

Courses of Study and Training							Scheme of Examination						
Sl.No.	Name of Courses	Course Format	Credits : Contact hours	Credits	No of Teaching Hours / Week		Marks			SEE Evaluation			
					Studio / Practical	Lecture	Total Marks (CIE+SEE)	CIE	SEE	Portfolio/Viva*		Written	
										Int.	Ext.	Marks	Duration of Exam
1	Capstone Project	Studio	1:1.5	12	18	-	1200	600	600	300	300	-	N/A
2	Professional Practice	Lecture	1:1	3	-	3	300	150	150	25	25	100	3 hrs.
3	Elective **	Lecture	1:1	4	-	4	400	200	200	100	100	-	N/A
4	Elective**	Seminar	1:1	3	-	3	300	150	150	75	75	-	N/A
		Total		**22**	**18**	**10**	**2200**						

*Evaluation of the Capstone Project will take place as a Jury presentation / Seminar.
*Portfolios evaluated through jury presentation / seminar / term paper.

****Electives:**

LEED Lab – 2	Integrated Systems Management	Finance and Engineering Integration
Life cycle Costing and Analysis	Building Performance Simulation	Design and Build Projects
Tall buildings	Disaster Management	Remote Sensing and GIS

13.1 **Co-op Education, Internship/Practical training, and Special Study Courses:**

As a partial fulfilment of the requirements of the B.Arch program a candidate is required to complete Co-operative Learning, Internship or Practical training, and Special study courses.

13.1.1 **Co-operative Education:**

Cooperative education is experiential learning beyond the classroom that balances full-timework experience with academics which is adequately supervised and evaluated, and discipline related.

13.1.1.1. Students gain practical experience in their chosen field, acquire an understanding of the world of work, integrate theory and practice, and have the opportunity to further develop professional and interpersonal skills.

13.1.1.2. Students in the sixth semester will use the cooperative education model as Integrated learning pattern semester and do a "Co-operative learning" course.

13.1.1.3. Candidates opting for "Co-operative learning" in the 6th semester shall attend a 'Co-op Prep' course during the 5th semester.

13.1.2 **Internship/ Practical training:**

Students will have to undergo at least one-hundred working days of internship in the ninth semester as per the norms laid by the Council of Architecture, India in an approved firm established not less than five years with a registered architect.

13.1.3 **Special Study Courses:**

To fulfil the requirements of the B.Arch program a candidate is required to complete 12 credits of Special Study courses in addition to the 222 credits mandated by the program.

13.1.3.1 Such courses may be offered by the institution itself either during the semester or during vacations in workshop or lecture format.

13.1.3.2 Students taking up special studies in other forms should seek approval of the institution.

13.1.3.3 A candidate taking up Special Study Courses in summer will be graded and marks reflected in the LAST semester marks sheet.

13.2 **Electives:**

13.2.1 A minimum number of ten candidates shall be required to offer and conduct an elective course.

13.2.2 Electives shall be offered based at the discretion of the institution.

13.3 **Course Format:**

Course format refers to the way a course is taught, delivered or learned. Lecture and Studio formats are the most common. Other formats include workshop, independent study, research, internship, seminar, and field trip.

13.3.1 **Lecture:**

Lecture usually involves an intense, direct and focused presentation of concepts and learning of a specific course of study.

13.3.2 **Studio:**

Studio is one in which hands-on instruction in received in various courses involving drawing/sketching/skill like Design, Building Construction & Materials, Visual Arts and Graphics.

13.3.3 **Workshop:**

Workshop usually involves hands-on work toward development of a skill. Workshops also allow discussion, interaction, presentation and debate on a given topic.

13.3.4 **Independent Study:**

Independent study is directed study undertaken by the candidate with guidance from the faculty/ instructor for specific number of credits. Candidates may pursue a topic of interest that does not necessarily fit into the curriculum.

13.3.5 **Research:**

Research requires a candidate to spend time surveying, investigating and evaluating a field of knowledge that culminates in a paper where the candidate presents his own interpretation, evaluation, or argument about a subject to thoughtfully offer a unique perspective on the issue.

13.3.6 **Internship:**

Internship involves professional job training.

13.3.7 **Seminar:**

Seminar is an intense study of a specific topic that could culminate in term papers, presentations.

13.3.8 **Field trip:**

Field trip is travel away from the class environment to observe, explore, study and experience places first hand.

14. Attendance

14.1 A candidate shall study in the Institution for the entire period as a full time student. No candidate should register for any other degree examination conducted by this University or any other University in India or abroad during the period of study.

14.2 Each semester shall be taken as a unit for the purpose of calculating attendance.

14.3 A candidate who has put in a minimum of 80% of attendance in the theory and practical/studio/workshop etc separately and who has fulfilled other requirements of the program shall be permitted to appear for University examinations.

14.4 A candidate having shortage of attendance shall not be eligible to answer the university examination and more to the higher semester.

15. Examination and Assessment:

There shall be a University examination at the end of each semester.

15.1 **Scheme of Examination:**

Evaluation is based on formative evaluation (Continuous Internal Evaluation) and summative evaluation (Semester End Examination).

15.1.1 **Continuous Internal Evaluation (CIE)**

CIE is calculated on the basis of sessional examinations and assignments, seminars etc. There shall be three sessional examinations and the average of the best two shall be considered for calculating the internal assessment. In order to get the benefit of 'best two', a candidate is required to answer all the three sectionals, failing which the average of the three shall be taken.

A candidate must secure at least 50% of total marks fixed for internal assessment in particular course in order to be eligible to appear for the Semester End Examination of that course.

15.1.2 **Semester End Examination (SEE):**

A candidate who satisfies the requirements of attendance, progress and conduct shall be eligible to appear for the university

examinations. There shall be a University Examination at the end of each semester.

To be eligible to appear for University examination a candidate should fulfill all the following conditions.

a. undergone satisfactorily the approved program of study in the course/courses for the prescribed duration;
b. 80% attendance separately in theory and in practical/Studio/ workshop, in each course;
c. shall have the minimum attendance requirement in all courses of that semester for the first appearance;
d. secure at least 50% of total marks fixed for internal assessment in a particular course ;
e. fulfil any other requirement that may be prescribed by the University from time to time

15.2. **Assessment Procedure:**

The academic performance is assessed on the basis of both continuous internal evaluation (CIE) assessment and semester end examination (SEE) in each semester. CIE: SEE weightage will be in the ratio of 50:50.

It is mandatory for a candidate to appear for the semester-end examination / supplementary examination in each of the prescribed courses.

In case of project work the final evaluation will be based on the content of the report/portfolio, presentation by the candidate and a viva-voce examination. If the presented work is not satisfactory the candidate will be given grade F (Fails) and shall continue the project work and appear for assessment in the next semester.

15.3 **Criteria for Pass:**

A candidate is declared to have passed in a course, if he secures not less than 50% in the aggregate, i.e. total CIE and SEE put together, provided he secures a minimum of 50% of the marks separately in the Continuous Internal Evaluation (CIE), Semester End Examination (SEE) and External Examination (EE) fixed for the course.

A candidate who fails in theory or in practical examination in a course shall appear only for that part of the examination or for both theory and

practicals as the case may be in that course in the subsequent examination.

16. Academic Performance Evaluation:

16.1 Grading System:

The performance of a candidate shall be evaluated according to a Letter Grading System, based on the both CIE and SEE, provided he passes CIE,SEE and EE separately. The letter grades (O, S, A, B, C & F) indicate the level of academic achievement assessed on a 10 point scale (0 to 10).

Marks Range (%)	Grade Point	Letter Grade	Descriptor	Classification	CGPA
90 & above	10	O	Outstanding	I Class with	9.00 and above
80-89	9	S	Excellent	Distinction	8.00- 8.99
75-79	8	A+	Very Good		7.50-7.99
65-74	7	A	Good	I Class	6.50-7.49
60-64	6	B	Average	II Class	6.00-6.49
50-59	5	C	Pass		5.00-5.99
Below 50	0	F	Fails	Fails	Less than 5
Below 50	0	I	Absent		

16.1.1 A candidate shall be considered to have completed a course successfully and earned the credits assigned, if he secures an acceptable letter grade in the range O-C. Letter grade ‘F’ in any course implies failure in that course and no credit is earned.

16.1.2 A candidate having satisfactory attendance at classes and meeting the passing standard at CIE in a course but remained absent from SEE shall be awarded ‘I’ grade in that course.

16.2 **Grade Point Averages:**

The overall performance of a candidate will be indicated by Grade Point Average (GPA). For each course grade points will be awarded as per a letter grading system.

Semester Grade Point Average (SGPA) is computed as follows:

$$SGPA = \frac{\sum [(\text{course credit}) \times (\text{Grade point})] \text{ for all courses with Letter grades, including F}}{\sum [(\text{course credits})] \text{ for all courses with Letter grades, including F}}$$

Cumulative Grade Point Average (CGPA) is computed as follows:

$$CGPA = \frac{\sum [(\text{course credit}) \times (\text{Grade point})] \text{ for all courses for all semesters with, Letter grades excluding F}}{\sum [(\text{course credits})] \text{ for all courses for all semesters with Letter grades, excluding F}}$$

16.3 **Conversion of Grades into Percentage:**

Formula for conversion of GPA into percentage:
CGPA earned X10 = Percentage of marks scored
Illustration: (CGPA Earned 8.18 X 10) = 81.80 %

16.4 **Award of Class:**

The candidate, who has passed all the courses prescribed, shall be declared to have passed the program. Class will be awarded only to those who pass the entire examination in the first attempt and on the basis of the aggregate of marks scored in individual semester.

- A candidate who secures GPA ≥ 7.50 and above in first attempt shall be declared to have passed in 'First Class with Distinction'.
- A candidate who secures GPA ≥ 6.50 or more but less than 7.50 in the first attempt shall be declared to have passed in 'First Class'.
- A candidate who secures GPA ≥ 5.00 or more but less than 6.50 in the first attempt shall be declared to have passed in 'Second Class'.

Candidates who pass the examinations in more than one attempt shall be declared as passed in 'Pass' class irrespective of the percentage of marks secured.

- An attempt means the appearance of a candidate for one or more courses either in part or full in a particular examination.
- A candidate who fails in main examination and passes one or more subjects or all subjects in the supplementary examination is not eligible for award of class or distinction. Passing in supplementary examination by such candidates shall be considered as attempt.
- If a candidate submits application for appearing for the regular examination but does not appear for any of the courses/subjects in the regular University examination, he can appear for supplementary examination provided other conditions such as attendance requirement, internal assessment marks, etc. are fulfilled and his appearing in the supplementary examination shall be considered as the first attempt.
- Candidates who pass the subjects in the supplementary examinations are not eligible for the award of Gold Medal or Merit Certificate.

16.5 **Carry over:**

A candidate who has appeared for all the subjects of a particular semester in the University examinations but failed in one or more courses of that semester can avail carry-over benefit subject to following conditions:

a. Architectural design studios will require pre-requisites in order to proceed from one studio level to another. Candidate will not be permitted to continue with higher studios if they do not successfully complete previous studios. Hence, passing in the following courses is mandatory for progression to next higher semester:
   i. To progress from Semester I to Semester II, candidate should successfully pass in Foundation Studio-1.
   ii. To progress from Semester II to Semester III, candidate should successfully pass in Foundation Studio-2
   iii. To progress from Semester III to Semester IV, candidate should successfully pass in Architectural Design Studio-1.
   iv. To progress from Semester IV to Semester V, candidate should successfully pass in Architectural Design Studio-2.
   v. To progress from Semester V to Semester VI, candidate should

successfully pass in Architectural Design Studio-3.

vi. To progress from Semester VI to Semester VII, candidate should successfully pass in all courses from Semester I to Semester VI.

vii. To progress from Semester VII to Semester VIII, candidate should successfully pass in Urban Studio.

viii. To progress from Semester VIII to Semester IX, candidate should successfully pass in Urban Housing Studio and Environmental Design Studio.

b. Progression from odd semester to even semester: A Candidate may carry forward any number of courses (other than the core design studio course for that semester specified in above). However, all backlog courses need to be completed for progression from Odd Semester IX to Even Semester X.

c. Progression from even semester to odd semester: A Candidate may carry forward up to a total of four courses from all preceding semesters (other than the core design studio courses specified above) when progressing from an even semester to an odd semester. However, all backlog courses need to be completed for progression from Even Semester VI (End of Stage I of the program) to Odd Semester VII.

16.6 **Rules for Grace Marks:**

Grace marks upto 1% of the maximum total marks in the examination subject to a maximum of 5 marks shall be awarded to the failed course(s), provided on award of grace marks the candidate passes in that course(s)/ examination. There shall be no provision to award grace marks for improvement of class

16.7 **Re-totalling:**

Re-totalling of marks is permitted only for theory papers. The University, on application within the stipulated time and remittance of a prescribed fee, shall permit a recounting of marks for the course/s applied. The marks obtained after re-totalling shall be the final marks awarded.

17. Supplementary Examinations:

Supplementary examination shall be conducted by the university for the benefit of unsuccessful candidates. Supplementary examinations will be conducted within six weeks/six months from the date of announcement of results.

- A candidate detained for lack of attendance, internal assessment marks will be barred from appearing in any one or all course/s for the supplementary examination.
- A candidate dropping from appearance in any or all subjects /courses at regular examination is disallowed from taking dropped subject(s)/course(s) at the supplementary examinations.
- If a candidate submits application for appearing for the examination but does not appear for any of the subjects in the university examination, he can appear for supplementary examination provided other conditions such as attendance requirement, internal assessment marks, etc. are fulfilled.
- A candidate who is promoted to the next higher class as per carry over regulations (except where apex bodies do not permit), if he clears the lower year/semester/phase examinations in the main examination is allowed to appear for the higher class examination during supplementary examinations provided other conditions such as attendance requirement, internal assessment marks, etc. are fulfilled.

A candidate permitted to appear for the supplementary examination can improve his internal assessment marks before he takes the supplementary examination by subjecting himself to internal assessment procedure as practiced in the college.

18. Award of Merit Certificates:

Merit Certificates will be awarded on the basis of overall CGPA of I to X semester examinations. Further, only those candidates who have completed the program and fulfilled all the requirements in the minimum number of years prescribed (i.e. five years) and who have passed each semester in the first attempt are only eligible for the award of Merit Certificates.

*****

SYLLABUS

B.Arch
Nitte Institute of Architecture

Programme Outcomes:

At the end of the program, graduates will be able to...

1. Conceptualise, Analyse, Innovate, Design and Realize the built environment within the practice of Architecture
2. Comprehend constructability and economics with technical aspects of design, systems, structure, materials and integrate that knowledge to their services
3. Take an informed approach towards design by being sensitive to the environment and society
4. Comprehend context and critically analyze built-abstract relationship with social, political, economic, cultural and environmental factors
5. Communicate and represent using wide range of media that include writing, investigating, speaking, drawing, computing and model making skills both individually and collaboratively.
6. Manage diverse roles by advocating and acting legally with ethical and critical approach for betterment of the client and society.

SEMESTER 1

Sl.No.	Name of Courses	Course Format	Credits: Contact hours	Credits	No of Teaching Hours / Week	
					Studio / Practical	Lecture
1	**Foundation Studio - 1**	Studio	1:1.5	6	**9**	
2	**Architectural Graphics - 1**	Studio	1:1.5	4	**6**	
3	**Building Construction & Materials -1**	Studio	1:1.5	4	**4**	**2**
4	**Visual Arts - 1**	Studio	1:1.5	4	**6**	
5	**History of Architecture - 1**	Lecture	1:1	3		**3**
6	**Structures -1**	Lecture	1:1	3		**3**
7	**Workshop - 1**	Workshop		Audit	**6**	
8	**Ecology**	Lecture		Audit		**2**
	Total			24	**31**	**10**

Semester 1
FOUNDATION STUDIO-1

Course Code	15BAR1.1
Contact hours per week	9
Format	Studio
Method of assessment	Portfolio + Jury

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Interpret inter - relationship of form, structure and materials in nature

CO2: Design as a conceptual discipline directed at the analysis, interpretation, synthesis, and transformation of the physical environment

Learning Objective:

To understand the interrelationship of form, structure and materials in nature. Introduction to design as a conceptual discipline directed at the analysis, interpretation, synthesis, and transformation of the physical environment. Investigation and development of an understanding of design through a study of nature and man. Explorations conducted through drawings, sketches/ abstractions, models/sculptures and installations.

Learning Outcome:

- **Knowledge:** To understand the design concepts and its process of evolution. Emphasis would be on exploration of spatial concepts through observation and experience of phenomena.
- **Skill:** To understand the forces or ideologies that shape form and their organizational pattern.
- **Attitude:** The student will gain insight into the interrelationship of architectural space to form, structure, materials with nature as a contextual setting.

References:

1. Patterns in Nature by Peter S Stevens
2. Geometry in Nature by John Blackwood
3. Time Saver Standards for Architectural Design Data by John Hanock
4. Architectural Graphic Standards by Ramsay and Sleeper
5. Drawing on the right side of the brain by Betty Edwards

Semester 1
ARCHITECTURAL GRAPHICS-1

Course Code	15BAR1.2
Contact hours per week	5
Format	Studio
Method of assessment	Portfolio

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Express fundamental techniques of architectural drawings.

Learning Objective:
To introduce the students to the fundamental techniques of architectural drawings. Establish the graphic standards and drawing conventions of the architectural profession.

Topical Outline:
- General introduction of drafting fundamentals, drafting equipment and materials. Architectural drafting conventions, drawing set up, drafting techniques, line work, line types, line weights, line quality. Practice in lettering - single stroke letters - uppercase, lowercase, vertical and inclined letters.
- Scales: Construction of Plain Scales and their uses in practice. How to use the different standard scales like 1:100, 1:200, 1:50 etc.
- Introduction to plane geometry and exercises in construction of lines and angles. Construction of Polygons, Inscribing and describing of Polygons. Construction of ellipse, parabola, hyperbola.
- First angle projections of Points and Lines, Projection of Planes, Projection of Solids. Simple exercises to understand the concept of interpenetration of different solids.
- Three dimensional representation, Isometric and Axonometric projections of architectural elements.

References:

1. Architectural Graphics, fourth Edition, by Francis D.K. Ching
2. Design Drawing by Francis D.K. Ching
3. Engineering Drawing by N. D. Bhat
4. Geometrical Drawing for Arts Students by I. H. Morris
5. Engineering Drawing Vol I & II by K. R. Gopalkrishna

Semester 1
BUILDING CONSTRUCTION & MATERIALS-1

Course Code	15BAR1.3
Contact hours per week	4 / 2
Format	Studio / Lecture
Method of assessment	Portfolio / Written

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Describe processes of building construction, the components of buildings, and the materials, skills and equipment used in shaping them

CO2: Deduce possibilities in construction and processes in building frameworks to be applied in design

Learning Objective:

To introduce the students to the process of building construction, the components of buildings, and the materials, skills and equipment used in shaping them. Emphasis is on familiarization by direct handling and observation.

Historical evolution of building materials and different construction technologies. Introduction to primary building elements- walls, foundations and roofs. Addressing the basic building materials and their manufacturing processes and properties. Introducing the concept of life cycle of materials, energy consumed in their extraction, processing and transportation; environmental impact of the same to be in tandem with the Architectural Design Studio with the focus on learning from nature.

Learning Outcome

- **Knowledge:** To understand the evolution of construction techniques, technologies and materials.
- **Skill:** To articulate the use of basic building materials and details.
- **Attitude:** The student will be aware of the possibilities in construction and processes in building frameworks to be applied in design.

Topical Outline:

UNIT 1: Building Construction:

1. Wall construction using stabilized burnt brick and stone.
2. Introduction to brick bonding, foundation details in stone and brick masonry
3. Wall details up to plinth level.
4. Timber joinery details

UNIT 2: Building Materials:

1. Earth: Origin, composition, Physical and chemical properties and its utilization
2. Natural stones: Origin, Extraction, Processing, Classification, properties and utilization pattern
3. Brick: Manufacturing process, Standard engineering properties, Classification and utilization
4. Timber: Origin, Classification, Extraction, Processing, Engineering properties and its use in building
5. Specific studies on local material resources: Laterite, Bamboo and cane

References:

1. Building Construction by W.B. Mackay
2. Construction Technology by Chudley
3. Construction of Buildings by Barry
4. Constructing Architecture by Andrea Deplazes

Semester 1
VISUAL ARTS-1

Course Code	15BAR1.4
Contact hours per week	6
Format	Studio
Method of assessment	Portfolio

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Recognise elements such as Line, Shape, Tone, Texture, Light and Shade by regular indoor and outdoor exercise

CO2: Compare natural and man-made objects and systems, through ideation, free exploration, and development of personal skills and attitudes

Learning Objective:
Encourage a critical orientation to design thinking and action. By "critical", it means that everything must be open to enquiry and alternative viewpoint. By "design thinking and action" it means that the process of observation and study of natural and man-made objects and systems, ideation, free exploration, and development of personal skills and attitudes.

Learning: Explorations in tone, texture, light, and abstractions. Emphasis on indoor and outdoor sketching. This studio can be in tandem with the Design Studio-AD1, through emphasis on nature in sketching and abstractions.

Learning Outcome:
- **Knowledge:** Discovering the fundamentals of lines, shapes, textures, colour theory and composition principles.
- **Skill:** To develop an ability to think in visual terms and obtain a command over the visual medium
- **Attitude:** Inculcate an artistic orientation to enable a transition from their purely scientific background to developing artistic skills

Semester 1
HISTORY OF ARCHITECTURE-1

Course Code	15BAR1.5
Contact hours per week	3
Format	Lecture
Method of assessment	Written

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Describe the evolution of architecture and the influential factors affecting it.

CO2: Comprehend the stylistic and societal aspects of spatial configurations and typologies and apply it in the design programme

Learning Objective:
To arouse a sense of curiosity, sharpen the powers of observation of an individual and emphasize on the importance of timelessness of architecture. Students shall undertake a chronological study of world architecture with emphasis on the Indian sub-continent and a comparison of the different stages of developments in India and other parts of the world. The architectural study should link with the social and technological developments of civilizations, geographical, climatic and geological factors, materials and structures, etc. The course shall include sketching and understanding of historical buildings, historical analysis and measured drawings.

Learning Outcome:
- **Knowledge:** To understand the evolution of architecture and the influential factors affecting it.
- **Skill:** To comprehend the stylistic and societal aspects of spatial configurations and typologies and apply it in the design programme.
- **Attitude:** Developing the fundamental understanding of the materiality, evolution of building typology and structural systems.

Topical Outline:

Critical appreciation of the culture and architecture of early civilizations from the following phases and periods:

- Pre-historic world- Primitive man to the river valley cultures - Indus, Tigris and Euphrates, Nile
- Pre-classical Aryan, Vedic and Epic Age
- Jain and Buddhist period
- The history of the built environment as a social and cultural expression from the earliest to the Greek civilization.

References:

1. Indian Architecture, Buddhist and Hindu period by Brown Percy
2. Architecture of India, Buddhist and Hindu by Satish Grover
3. History of Architecture by Sir Bannister Fletcher

Semester 1
STRUCTURES-1

Course Code	15BAR1.6
Contact hours per week	3
Format	Lecture
Method of assessment	Portfolio

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Determine principles of structural systems as integral part of architecture

Learning Objective:
To familiarize the students with the principles of structures and emphasize on seeing structures as an integral part of architecture which contributes towards shaping a space. The theory of structures will closely follow the Architectural Design Studio.

Learning Outcome:
- **Knowledge:** An introduction of structural concepts through a study of examples in nature as well as in building materials.
- **Skill:** Application of the structural configurations as required in the design studio exercise.
- **Attitude:** Understanding of fundamental principles in structural systems and mechanics with an integration of architectural design intent.

Topical Outline:

STRUCTURAL REQUIREMENTS	Equilibrium-Stability-Strength-Safety-Serviceability-Durability-Economy Aesthetics-Optimal Structures
LOADS-FORCES-STRESSES-EFFECTS	Dead load-Live load-Wind-Quake-Snow-Thermal and Settlement-Gradually applied load-Suddenly applied

	load-Impact and Dynamic loads
MATERIALS	Properties of structural materials, Constants and Safety Factors, Conventional-Natural-Artificial, Composite and Smart
BASIC STRESS STATES	Simple Tension, Compression, Bending, Shear & Torsion
TENSION & COMPRESSION STRUCTURES	Cables, Trusses, Arches, Space Trusses
FLEXURE BEAMS	Cantilever, Simply supported, Propped Cantilever, Continuous, Fixed, Bending Stresses, Shear Stresses and Deflections
FRAMES AND ARCHES	Lintel and Post, Simple single bay-Single storeyed frame, Multi-Bay-Multi Storeyed Frame, Cable Frames and Arches
STRUCTURAL CONFIGURATION	Conceptualization, Quantitative and Qualitative assessment of accomplishment of load flow through configuration, Integration of structure with architecture.

References:

1. Dictionary of Architectural and Building Technology by Henry J. Cowan
2. Engineering Mechanics by RK Bansal and Sanjay Bansal
3. Engineering Mechanics by Ferdinand L Singer
4. Structures In Architecture by Mario Salvadori and Robert Heller
5. Structures by Daniel Schodek

Semester 1
WORKSHOP-1

Course Code	15BAR1.7
Contact hours per week	6
Format	Workshop
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Deduce Hands-on work toward development of a skill represented through discussion, interaction, presentation and debate on a given topic

Learning Objective:

The institute emphasizes on a hands-on approach and one of the ways this is done effectively in developing hand skills. Weekends are allotted for such practical projects.

This has resulted in a stimulating perspective of the architectural program that has widened to incorporate practicality together with the study of theoretical courses and studio-oriented drawing work.

Learning Outcome:

- **Knowledge:** Experiencing hands-on skills like for example carpentry, weaving, pottery and cane work in a workshop format.
- **Skill:** Develop hand skills and understand material properties.
- **Attitude:** Workshop usually involves hands-on work toward development of a skill. Workshops also allow discussion, interaction, presentation and debate on a given topic.

Semester 1
ECOLOGY

Course Code	15BAR1.8
Contact hours per week	2
Format	Lecture / Project / Workshop
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Describe the structure and function of ecosystem and the role played by humans

Learning Objective:
To create awareness to understand the importance of ecosystem and to sensitize for its conservation

Learning Outcome:
- **Knowledge:** To understand the structure and function of ecosystem and the role played by humans
- **Skill:** To analyse the effects of human intervention in ecosystem
- **Attitude:** Awareness for conservation and preservation of ecosystem.

Topical Outline:
The course will cover Humanities as a means of understanding and interpreting architecture and to study critical aspects of art history, design and architectural theory.
- **UNIT 1:** Structural Ecology: Terminology, Ecosystem and settlements, Types and components, Biomes, Succession, Equilibrium

- **UNIT 2:** Functional Ecology: Nutrient cycles, Energy flow, Ecological Pyramids, Bio magnification

- **UNIT 3:** Human Ecology: Role of society in maintenance of ecosystem, population density, environmental quality, ecological footprint

- **UNIT 4:** Miscellaneous: Sustainable Development, Urban heat Island, Overview of Environmental Impact Assessment, Best Practises in Ecology, Eco-architecture

References:

1. Ian McHarg, “Design with nature”
2. Eugene Odum, “Fundamentals of Ecology”
3. Bjørn Berge, Chris Butters and Filip Henley, “The Ecology of Building Materials”

SEMESTER 2

Sl.No.	Name of Courses	Course Format	Credits: Contact hours	Credits	No of Teaching Hours / Week	
					Studio / Practical	Lecture
1	**Foundation Studio - 2**	Studio	1:1.5	4	6	-
2	**Architectural Graphics - 2**	Studio	1:1.5	3	5	-
3	**Building Construction & Materials - 2**	Studio	1:1.5	4	4	2
4	**Visual Arts - 2**	Studio	1:1.5	4	6	
5	**History of Architecture & Urbanism - 1**	Lecture	1:1	2	-	2
6	**Theory of Design - 1**	Lecture	1:1	2	-	2
7	**Structures - 2**	Lecture	1:1	3	-	3
8	**Survey and Levelling**	Studio	1:1.5	2	3	-
9	**Creative Expression Workshop**	Workshop		Audit	2	-
10	**Field Trip**	Field trip		Audit		-
	Total			**24**	**26**	**9**

Semester 2
FOUNDATION STUDIO-2

Course Code	15BAR2.1
Contact hours per week	6
Format	Studio
Method of assessment	Portfolio + Jury

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Interpret basic space-form types and its primary determinants

CO2: Identify building types in their abstract form and explore fundamental concepts of proportion, scale, geometry, circulation, spatial expression, frame of reference and the user

Learning Objective:
To introduce students to basic space-form types and its primary determinants, identify building types in their abstract form and explore fundamental concepts of proportion, scale, geometry, circulation, spatial expression, frame of reference and the user.

Learning Outcome:
- **Knowledge:** Stretch limits of imagination and break away from the traditional preconceived notions of 'Buildings'; Explore unchartered territories and create personal expression.
- **Skill:** Ability to use drawings and physical models to conceive, organize and develop habitable, three-dimensional space.
- **Attitude:** Exploration of principles of design to develop the process of formation.

Topical Outline:
Study of basic **SPACE-FORM TYPES** to include -
- **UNIT 1: Point:** Concept of point in space. Project may be based in public or private domains. Concepts of intangibility, purity of expression and formal

expressions of a POINT would be explored.

- **UNIT 2: Point as Space:** Concept of Space as a point within the larger domain. Idea of users within a public domain would be introduced.

- **UNIT 3**: **Space as Personal Expression:** This type will attempt at a personalized expression which is User specific. Concept of a 'Protective Envelope' housing basic functions, private domain with a public component would be explored.

- **UNIT 4: Circulation Space:** This type will attempt at understanding of space as a connecting element between two points. Concepts of TIME and SCALE would be explored through 3-dimensionally challenging exercises.

- **UNIT 5: Inhabited Space:** The last section of this semester would explore combining the previous exercises and exploring a certain PROCESS to form an inhabited space. Concepts of POINT, SPACE, EXPRESSION, USER, FUNCTION, ENVELOPE, CIRCULATION would be addressed in combination with each other. This section would be given a greater emphasis in terms of project duration to arrive at a fairly articulated outcome which shall be represented through the use of representational techniques explored in the other courses.

Semester 2
ARCHITECTURAL GRAPHICS-2

Course Code	15BAR2.2
Contact hours per week	5
Format	Studio
Method of assessment	Portfolio

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Express fundamental techniques of architectural drawings and enhancement of visualization and presentation skills

CO2: Integrate appropriate techniques & methods of graphics into representation of ideas, concepts, analysis and architectural notions.

Learning Objective:

Introduction to fundamental techniques of architectural drawings and enhancement of visualization and presentation skills; Integration of appropriate techniques & methods of graphics into representation of ideas, concepts, analysis and architectural notions.

Learning Outcome:

- **Knowledge:** Exploration of three-dimensional Architectural drawings, techniques and enhancement of visualization skills using manual drawing and computer visualization tools.
- **Skill:** Understanding projection of solids, development of surfaces, perspectives and sciography.
- **Attitude:** Confidence to use manual drawing techniques with understanding of computer visualization as a tool for validation.

Topical Outline:

- **UNIT 1: Development of Surfaces:** Development of surfaces of cubes, prisms, cylinders, pyramids, cones and spheres.

- **UNIT 2: Solid Geometry:** Construction of section, Intersection and interpenetration of solid.

- **UNIT 3: Principles of perspective drawing:** and varying visual effects of three-dimensional objects. Introduction to one-point, two-point, and three-point perspective drawings.
  Construction of perspective drawings of building elements and building forms; Sketching of freehand perspective drawing and out-door sketching.

- **UNIT 4: Principles of Sciography:** Study and understanding of light, shade and shadow; Graphical representation; Standardization of direction of light and graphical representation methods; Space of light and shadow, shadow patterns. Construction of shadow patterns of planes and solids in different positions, different shapes and their combinations; Construction of shadow patterns for perspective views and free hand perspective sketches

Computer visualization: Computer visualization programs will be used to help the student understand manual drawings done in the studio – Google Sketchup, Adobe Illustrator, Adobe Photoshop, AutoCad.

References:

1. Robert W. Gill, Rendering with pen and ink, Thames and Hudson, London, 2011
2. Francis Ching, Architectural Graphics, John Wiley & Sons,Inc. New York, 2015.
3. N.D.Bhatt, Elementary Engineering Drawing (Plane and Solid Geometry), Charotar Publishing House, India, 2014.
4. Francis, Ching; Drawing a creative process, John Wiley & Sons, 199011.
5. McMorrough, Julia; Drawing for Architects, Rockport Publishers, 2015
6. GopalKrishna, K.R; Engineering Drawing, Vol. 1-2, Subhash Stores, Bangalore,2014.

Semester 2
BUILDING CONSTRUCTION AND MATERIALS-2

Course Code	15BAR2.3
Contact hours per week	4 / 2
Format	Studio / Lecture
Method of assessment	Portfolio / Written

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Describe construction details of various components of a small single-storied building.

Learning Objective:
To familiarize the students with construction details of various components of a small single-storied building.

Learning Outcome:
- **Knowledge:** Students will learn about building systems, and how these systems assist in the expression of a design concept.
- **Skill:** Knowledge of building components and their specifications.
- **Attitude:** Students will develop a fundamental understanding of materiality in construction systems and techniques, dimensions and intrinsic qualities that influence the design process.

Topical Outline:
- **UNIT 1:** Arches, Lintels and Sills: Construction methods
  1. ARCHES: Flat Arch, Semi-Circular Arch, Segmental Arch, Equilateral Arch, Corbelled Arch, Moorish Arch, Drop Arch
  2. LINTELS AND SILLS: Stone, Brick

- **UNIT 2:** Types of doors: Construction details of single and double-leaf doors in timber, Flush Door, Panelled Door, Glazed Door, Ledged, Battened & Braced Door, Venetian & Panelled Door, Fly-proof Door

- **UNIT 3:** Types of windows: Construction details of wooden windows, Casement Window, Louvered Window, Ventilator

- **UNIT 4:** Construction of Sloped Roof with Timber Truss systems (Tiles & Batten)
  1. TYPES of SLOPED ROOFS: Lean-to, Gabled, Hipped
  2. TIMBER TRUSS SYSTEMS: King-Post, Queen-Post

- **UNIT 5:** Flooring: Construction details of different types of flooring (PCC, Terrazzo, Wooden)

- **UNIT 6: Building Materials:**
  1. Damp-proofing & Water-proofing- mechanism and materials
  2. Lime – properties (raw materials), extraction, manufacturing and its applications in buildings
  3. Gypsum – Manufacturing and its applications
  4. Cement – Raw materials, extraction, manufacturing, types of cement, properties and application of cement
  5. Mortars – lime mortar, cement mortar and composite mortar

References:

1. McKay, G.B. Building Construction, Pearson, New Delhi, Fifth Edition, 2014.
2. Singh G. Building Construction and Material, Standard Book House, Fifteenth Edition, 2015.
3. Duggal, S.K. Building Materials, New Age International Publishers, Fourth Edition, 2015 RP.
4. Chudley R., Building Construction Handbook, England, Ninth Edition, 2013.
5. Rangwala S C. Engineering Materials, Charotar Publishing Hse, Forty-Second Edition, 2015.
6. Punmia,B.C., Building Construction, Laxmi Publications, Tenth Edition, 2014 RP.
7. Kumar, S. Building Materials, Standard Publishers, Twentieth Edition, 2015 RP.

Semester 2
VISUAL ARTS-2

Course Code	15BAR2.4
Contact hours per week	6
Format	Studio
Method of assessment	Portfolio

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Identify various mediums of visual communication to represent spatial concepts

CO2: Apply visual techniques as design tools and translate ideas between distinct mediums

Learning Objective:
An exploration of various mediums of visual communication not just to express or represent spatial concepts but to use them as design tools and translate ideas between distinct mediums, communicating it effectively through visual techniques.

Learning Outcome:
- **Knowledge:** To develop familiarity with different modes of use of expression and techniques.
- **Skill:** To equip students with visual techniques and sharpen their skills to work with a combination of different mediums in order to think, explore and express oneself effectively.
- **Attitude:** THINK VISUALLY and extend Design Skills by being able to engage with ideas and concepts and discover, identify and articulate original experiences creatively.

Topical Outline:
- **UNIT 1: Mediums:** A series of short exercises each handling a combination of distinct mediums. Skills developed in the preceding semester would be augmented through the exploration of more complex dimensions- Photography,

Video, spatial Installations, etc. These tasks would be interspersed with presentations by visiting artists, experts.

- **UNIT 2: Creative Rethinking:** Reviewing studio work and relating to its concept and mediums used and creatively developing new forms of communication. Concept of Semantics would be introduced and explored through various mediums like Collage, 'Comic Strips'.

- **UNIT 3: Creative Thinking:** Development ideas explored in studio work through the use of appropriate mediums to enable the students to articulate their thoughts in a more refined manner. Attempt would be made to express certain intangible concepts like Humour, Surprise, Suspense, Fear, Uncanny, etc. through Visual Representations.

References:

1. Fletcher, Alan; The Art of Looking Sideways, Phaidon, 2001
2. Pallasma, Juhani; The Eyes of the Skin, John Wiley & Sons, 2012.
3. Laseau, Paul; Graphic Thinking for Architect& Designer, John Wiley & Sons, 2001.
4. Lupton, Ellen; Skin, Princeton Architectural Press, 2000.

Semester 2
HISTORY OF ARCHITECTURE AND URBANISM-1

Course Code	15BAR2.5
Contact hours per week	2
Format	Lecture
Method of assessment	Written

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Describe the sequential course and influences of historical events on architecture

CO2: Study building types, subjective theories and applications through concepts and exercises

Learning Objective:
To understand the sequential course and influences of historical events on architecture and study of building types, subjective theories and applications through concepts and exercises.

Learning Outcome:
- **Knowledge:** Comprehensive view about the role of the architect and architecture in society.
- **Skill:** Creating awareness to understand buildings from multiple points of view; and thereby foster critical discussion of architecture across scale and time.
- **Attitude:** Comparative study of a building type across cultures and time periods enables appreciation of the same.

Topical Outline:
- **GLOBAL HISTORY – PART 1**
  The importance of timelessness of architecture shall be emphasized. Students shall undertake a chronological study of world architecture.

- **UNIT 1: Roman:** Introduction to the founding of Rome, Evolution of republican states, Tuscan & Composite orders, Construction techniques. Overview of City Planning and characteristics of civic spaces such as Forums, Basilicas, Markets. Building Typologies with examples – Dwellings, The Colloseum; The Thermae of Caracalla; The Pantheon, The Circus Maximus, Aqueducts, Triumphal Arches and Pillars, Tombs. Roman Roads. Introduction to Roman Art.

- **UNIT 2: Early Christian & Byzantine, Romanesque and Gothic Architecture:**
  Early Christian & Byzantine: Birth and spread of Christianity. Evolution of church forms. Factors influencing Architecture. Building examples -St. Hagia Sophia, Constantinople; St. Vitale, Ravenna Romanesque: Study of evolution of Romanesque architecture with respect to changes in church plans, Elevation features, techniques of construction and structural systems- Pisa cathedral complex. Architectural Character, Campaniles. Tower of Pisa, Notre Dame La Grande.
  Gothic: Detailed studies of Gothic Cathedral of Medieval European towns with reference to Architectural characteristics and their comparison to Romanesque period- Notre Dame. Abbey Church of Saint-Denis, Chartres Cathedral, Reims Cathedral

- **UNIT 3: Islamic Architecture in India and Abroad:**
  Islamic Architecture Globally: Pre-Islamic World, Muhammad and the birth of Islam, Islam after the death of Muhammad, he Caliphates and their extent, Islamic Art and Architecture chronology- Early Period, Medieval Period & Later Period, Building Typology-Mosques, madrasas, tombs, etc. Fundamental Art Forms- Calligraphy, Arabesque and Geometry, Mosque Architecture Types and features, Mosque Architectural features, Use of Domes and Arches as architectural elements.

  Indo-Islamic Architecture: Advent of Islam and its influence in India leading to Indo-Islamic Style, Pattern of development- Arabs invaders, Turkish invaders & the Delhi Sultanate and The Mughal Dynasty, Art and Architecture during the Delhi Sultanate period with examples, Art and Architecture during the Mughal period with examples, Provincial Architecture – evolution and brief history of

various provincial states, Mosque and Tomb architecture with examples.

- **UNIT 4: Renaissance & Baroque**
  Renaissance – Introduction to the basis of Renaissance Movement and its effect on the built environment. Study of the works of Architects of Early Renaissance and High Renaissance
  Italian Renaissance: The idea of rebirth and revival of Art, Architectural character during Early & High renaissance, Baroque, Rococo and Neo-Classical building examples - St. Peters, Rome; Palazzo Ricarrdi, Florence- The Following as examples - Brunelleschi - 'The Dome' of Florence Cathedral; St. Lorenzo, (Florence)-Andrea Palladio - The Basilica (Vicenza); Villa Capra (Vicenza)-Michaelangelo - Laurentian Library (St Lorenzo, Florence).

  French And English Renaissance: Outline the architectural character of French & English Renaissance - St. Paul's Cathedral; Chateau De Chambord; The Louvre, Paris-Study of the life and contribution of the following Architects in brief:- Sir Christopher Wren - The Sheldonian Theatre (Oxford); St. Paul's Cathedral (London)-Inigo Jones - Queen's House (Greenwich) Baroque – Introduction to the basis of Baroque or Rococo Movement and its effect on the built environment. Characteristics of Piazza of St. Peter. Study of works briefly of Architects of Baroque period such as Bernini and Borromini.

References:

1. Fletcher, Sir Bannister;A History of Architecture, CBS Publishers & Distributers Pvt. Ltd. New Delhi, 1999.
2. Kostof, Spiro; A history of Architecture - Settings and Rituals, Oxford University Press London 2010.
3. Brown, Percy; Indian Architecture (Islamic Period) CBS Publishers & Distributers Pvt. Ltd. 2014.
4. Grover, Sathish; Islamic Architecture in India (Islamic), VikasCBS Publishers & Distributers Pvt. Ltd., New Delhi, 2002.
5. Tadgell, Christopher; The West, Routledge Taylor and Francis Group 2009.
6. Frampton, Kenneth; Modern Architecture, A Critical History, Thames and Hudson, 2014 RP.
7. Gideon, Siegfried; Space, Time and Architecture: The Growth of a New Tradition, Harvard University Press,2008.
8. Pevsner, Nikolaus; An Outline of European Architecture, Gibbs Smith, 2009.
9. Ching, Francis DK, Jarzombek, Mark, Prakash, Vikramaditya; A Global history of architecture, Second Edition, John Wiley & Sons, Inc, 2011

Semester 2
THEORY OF DESIGN-1

Course Code	15BAR2.6
Contact hours per week	2
Format	Lecture
Method of assessment	Portfolio

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Analyse the concept of architectural theory as an analytical tool for investigating specific intrinsic qualities and underlying ideas within a built-environment

Learning Objective:
To understand the concept of architectural theory as an analytical tool for investigating specific intrinsic qualities and underlying ideas within a built-environment.

Learning Outcome:

- **Knowledge:** An overview of the theoretical concepts and approaches in the built environment.
- **Skill:** Ability to comprehend Form-Space concepts objectively. Ability to understand abstraction and distinguish between the various 'dimensions' that are embodied within Form-Space.
- **Attitude:** Being able to look at one's own work critically and reflect on it objectively.

Topical Outline:
The course would cover FOUR PARTS –

- **UNIT 1: Space-Form Relationship:** A series of presentations each handling a set of concepts with their corresponding examples in the natural or built environments.
  1. Primary Elements - (Point, Line, Plane, Volume, Shape, Solids)
  2. Form Types - (Regular, Subtractive) and its Articulation

3. Form and Space
4. Organizations and Relationships
5. Circulation
6. Proportion and Scale

- **UNIT 2: Understanding of Theory**
  1. Architectural theory as an analytical tool and its relation to architectural practice.
  2. Concept of architectural typology (as a classification system) and a building 'type' (as a group having certain specific common characteristics).
  3. Analysis of Exemplary Buildings based on points covered in Stage – 1

- **UNIT 3: Application**
  1. Critical analysis of individual houses.

- **UNIT 4: Critical Viewpoint**
  1. Critical analysis of designs explored in the Foundation Studio - 2 exercises.

References:

1. Francis Ching. Architecture: Form, Space, and Order, John Wiley & Sons, Inc. New Jersey 2015.
2. Roger H. Clark and Michael Pause. Precedents in Architecture: Analytic Diagrams, Formative Ideas, and Partis, NJ: John Wiley & Sons, 2012

Semester 2
STRUCTURES - 2

Course Code	15BAR2.7
Contact hours per week	3
Format	Lecture
Method of assessment	Portfolio / Written

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Describe various structural systems for buildings by conducting relevant experiments on individual components of the structure

Learning Objective:
Overview of various structural systems for buildings by conducting relevant experiments on individual components of the structure.

Learning Outcome:
- **Knowledge:** To understand the various structural systems and their mechanics.
- **Skill:** To apply basic knowledge of structural elements of buildings.
- **Attitude:** Exposure to very fundamental understanding of various structural elements and their synergy.

Topical Outline:
Introduction to the following topics as an overview –
- **UNIT 1: Structural systems and their layout:** Structural requirements of equilibrium, strength, stiffness and stability
  Load paths and load transfer, Gravity and lateral loads

- **UNIT 2: Masonry Structures:** Classification, materials used, factors influencing the compressive strength of masonry, load distribution.

- **UNIT 3: Conventionally-reinforced Concrete Structural Systems:**
  Materials used, types of beams, columns, slabs, effective lengths, advantages

and disadvantages.

- **UNIT 4: Pre-stressed Concrete Structural Systems:** Materials used, pre-tensioning and post-tensioning methods, advantages and disadvantages over RCC.

- **UNIT 5: Steel Structural Systems:** Steel sections, types of steel structures, types of connections – bolting, welding and riveting, advantages and disadvantages of steel structures

- **UNIT 6: Foundation Systems:** Types of foundations, bearing capacity, settlements, factors deciding the depth of foundation

References:

1. D. Schodek and M. Bechthold, Structures, Pearson, Seventh Edition, 2014
2. Edward Allen and Joseph Iano The Architect's Studio Companion, John Wiley & Sons, fifth edition, 2007
3. Fuller Moore, Understanding Structures, McGraw Hill, 1998

Semester 2
SURVEY AND LEVELLING

Course Code	15BAR2.8
Contact hours per week	3
Format	Studio
Method of assessment	Practical / Viva

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Develop the knowledge and skills related to surveying and levelling principles and practice

Learning Objective:
To develop the knowledge and skills related to surveying and levelling principles and practice.

Learning Outcome:
- **Knowledge:** The principles of elementary plane surveying.
- **Skill:** To be equipped with required skills and techniques to understand and document site topography.
- **Attitude:** To understand the setting out procedures for buildings.

Topical Outline:
- **UNIT 1: Surveying:** Definition, classification, principles of surveying, character of work, shrunk scale.

- **UNIT 2: Chain Survey:** Instruments used, Types of chain, Instruments for ranging, setting out angles, erecting perpendiculars.

- **UNIT 3: Field Work:** Chain triangulation, recording and plotting, errors in survey.

- **UNIT 4: Plane table survey:** Plane table and accessories. Methods of plane table survey, Radiation, Intersection, traversing and resection, field problems.

- **UNIT 5: Levelling:** Definition, classification, booking and reduction of levels, longer levelling, errors

- **UNIT 6: Theodolite:** Study of instruments, definition of different terms, temporary adjustments, uses, measuring horizontal and vertical angles, method of repetition, extension lines

- **UNIT 7: Contouring:** Characteristics of contours, direct and indirect methods of contouring, interpolation, uses of contours, setting out works such as centre lines of a building, grade forsewer, centre line of a bridge.

References:

1. Punmia, PC; Surveying Vol I; Laxmi Publications, 2016
2. Kanetkar and Kulkarni Surveying and Levelling (Part-1), Pune Vidyarthu Griha Prakashan, Pune,2014
3. Clark David, Plane Surveying Vol. 1, CBS Publishers & Distributers Pvt. Ltd., New Delhi 2014

Semester 2
CREATIVE EXPRESSION WORKSHOP

Course Code	15BAR2.9
Contact hours per week	2
Format	Studio
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Identify, reassess, and assimilate information through various sources, empower opinion and react meaningfully across different mediums through analyses of theories and subjects integral to communication and thinking in design, architecture and practice

Learning Objective:
To identify, reassess, and assimilate information through various sources, empower opinion and react meaningfully across different mediums through analyses of theories and subjects integral to communication and thinking in design, architecture and practice.

Learning Outcome:
- **Knowledge:** Understand the sociological and physical contexts of the built environment.
- **Skill:** Use analytical tools to develop opinions and communication ideas on design thinking.
- **Attitude:** Assimilate information and develop an individual vocabulary in representations and ideas in architecture.

Topical Outline:

- **UNIT 1: Understanding & Exploring Patterns of Communication:** An introductory presentation on the idea of expression in architecture and its practice. Through a set of exercises, identifying of information sources familiar

to the students and analysing them to understand their methods of communication.

- **UNIT 2: Evaluation of Information Sources:** A set of presentations that will dwell on existing frameworks of communication in architecture and design thinking. The presentations will conclude with an exercise that develops a conceptual idea based on the student's understanding of a certain communication module using the resources available to them.

- **UNIT 3: Critical Reading & Exposure:**
  1. Individual Assessment & Development: Reading material on relevant topics customised to ability.
  2. Group Engagement: Research, interact with subject experts and deliberate on specific topics and discussions will be framed to seek contradicting or favouring views as a group.
  3. Travel assignment

- **UNIT 4: Analyses of Information & Forming Approach & Philosophy:**
  Each student researches on and reacts to one contemporary building of his or her choice based on the premise of topics, keywords or significant issues in current disciplinary thinking. Format: Papers or Presentations.

- **UNIT 5: Representation: Architecture in Communication:** Defined by individual and group exercises, the culminating week will explore students' interpretations of a larger idea – a small exhibit, may be as a part of a college festival or a semester-end programme with representations in diverse formats (posters, models/installations, murals, films, photographs) by the students.

Semester 2
FIELD TRIP

Course Code	15BAR2.10
Contact hours per week	-
Format	Study Trip
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Document a settlement in detail with including its planning, zoning, typical house, lifestyle, culture, and construction techniques

Learning Objective:

Study of a settlement in detail with including its planning, zoning, typical house, lifestyle, culture, and construction techniques.

Learning Outcome:

- **Knowledge:** Supervised study tours gain insight into how different contexts engage with and apply various forms of architecture, through interaction with communities, documentation and mapping exercises.
- **Skill:** Skills will be developed for interventions which reflect context-responsive concepts and understanding of critical analysis of the built environment.
- **Attitude:** Outside of the classroom, the course challenges and extends student perceptions of how societies engage with architecture and its applied forms.

Topical Outline:

- **UNIT 1:** Study: Identifying a region and studying various physical and socio-cultural aspects.

- **UNIT 2: Documentation:** Mapping of existing fabric, settlements, rural environments and landscapes.

- **UNIT 3: Analysis: Representation Modules:**
  1. Introduction of Place
  2. Detailed Analysis: Location, Climate, History, and Dominating Socio-Cultural Factors such as Beliefs, Customs, Economy, Food & Family Structure.

SUMMER 1
OPTIONAL 1ST YEAR SUMMER PROGRAM

COURSES OF STUDY & TRAINING						
Sl.No.	**Name of Courses**	**Course Format**	**Credits: Contact hours**	**Credits**	**No of Teaching Hours / Week**	
					Studio / Practical	**Lecture**
1	**Special Study**	Internship / Workshop / Independent Study / Research	1:2	4	**8**	**-**
Total				**4**	**8**	**0**

The Summer Programs focus on experiential learning beyond classroom, to balances full time work experience with academics. It can be conducted in form of Internship, Workshop, Field Trips, Independent Study or Research. Relevance to the design studio in the subsequent semesters to be explored.

Summer 1
(A) SPECIAL STUDY: SITE ANALYSIS

Course Code	15BAR2.11
Contact hours per week	6
Format	Workshop
Method of assessment	Portfolio

Learning Objective:
To visit sites of national and international significance and study historic and contemporary architecture selected on the premise of their design studio and identification of a site for semester 3 and 5.

Learning Outcome:
- **Knowledge:** First-hand experience of the architectural objective and the various dimensions embodied within the site.
- **Skill:** Understand site relationships and perform analysis that can be summarized in scaled drawings and constructed models.
- **Attitude:** Observations drawn from site studies are directly implemented within the design process of the subsequent semester.

Topical Outline:
- **UNIT 1: Study Trip (1 Week):** Study trip to semi-urban, Tier 3 cities having a strong traditional housing fabric and urban tissue; Study of socio-cultural aspects.

- **UNIT 2: Documentation (1 Week):** Documentation of existing housing type, neighbourhood; Documentation of an institutional building and immediate site context.

- **UNIT 3: Preparation for Design Project (2 Weeks):** Site analysis, site drawings including context, street elevations and mapping informal activities, and site models to appropriate scale.

Summer 1
(B) SPECIAL STUDY: GLOBAL HISTORY

Course Code	15BAR2.11
Contact hours per week	2
Format	Workshop
Method of assessment	Portfolio

Learning Objective:
Introduction to subsequence chronological historical events and their influences on architecture and understanding of its evolution, study of building types, subjective theories and applications through concepts and exercises.

Learning Outcome:
- **Knowledge:** Comprehensive view about the role of the architect and architecture in society.
- **Skill:** Creating awareness to understand buildings from multiple points of view; and thereby foster critical discussion of architecture across scale and time.
- **Attitude:** Comparative study of a building type across cultures and time periods enables appreciation of the same.

Topical Outline:
- **UNIT 1: Indian Hindu Architecture:** Study of evolution of Hindu architecture, rock-cut and structural forms and comparison of temple forms in various regions of India.

- **UNIT 2: Neo-Classical and Structural Rationalism:** Introduction to the beginning of modern architecture through Neoclassicism in the 18th century.

- **UNIT 3: Industrial Revolution, Modernism:** Introduction to Industrial revolution and its impact on new towns.

- **UNIT 4: Critical Regionalism + Post Modernism:** Post modernism; Historic revivalism; Critical regionalism; De-constructivism

- **UNIT 5: Contemporary Architecture – 1:** Works and ideas of contemporary practices in India, China and Japan.

- **UNIT 6: Contemporary Architecture – 2:** De-constructivism, Parametric and Environmentally-friendly - Works and ideas of contemporary practices.

References:

1. A History of Architecture: Fletcher, Sir Bannister
2. A history of Architecture - Settings and Rituals: Kostof, Spiro
3. Indian Architecture (Islamic Period): Brown, Percy
4. Islamic Architecture in India (Islamic): Grover, Sathish
5. The West: Tadgell, Christopher
6. Modern Architecture, A Critical History: Frampton, Kenneth
7. Space, Time and Architecture: The Growth of a New Tradition: Gideon, Siegfried
8. An Outline of European Architecture: Pevsner, Nikolaus
9. A Global history of architecture: Ching, Francis DK, Jarzombek, Mark, Prakash, Vikramaditya

SEMESTER 3

COURSES OF STUDY & TRAINING						
Sl. No.	**Name of Courses**	**Course Format**	**Credits: Contact hours**	**Credits**	**No of Teaching Hours / Week**	
					Studio / Practical	**Lecture**
1	**Architectural Design Studio- 1**	Studio	1:1.5	4	6	-
2	**Architectural Graphics (Computing)- 1**	**Studio**	1:1.5	4	6	
3	**Building Construction & Materials- 3**	**Studio**	1:1.5	4	4	2
4	**History of Architecture & Urbanism - 2**	**Lecture**	1:1	3		3
5	**Theory of Design - 2**	**Lecture**	1:1	2		2
6	**Structures - 3**	**Lecture**	1:1	3		3
7	**Climatology & Building Physics**	**Lecture**	1:1	2		2
8	**Physics Art Appreciation**	**Lecture**	1:1	2		2
9	**Humanities**	**Lecture**		Audit		2
10	**Elective***	**Workshop**		Audit	3	
Total				**24**	**19**	**16**
	***Electives semester 3:**					

Architectural Journalism
Architectural Photography
Art in Architecture
Passive Design
Visual Communication
Smart Materials and Structures

Semester 3
ARCHITECTURAL DESIGN STUDIO-1

Course Code	15BAR3.1
Contact hours per week	6
Format	Studio
Method of assessment	Portfolio + Jury

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Decipher the role of Institutional Buildings within a Society and explore the connections of the built environment with its surroundings within the Semi-Urban fabric.

CO2: Gain an understanding of the design PROCESS and create a built-environment through a Structured Architectural Design Method.

Learning Objective:

To gain an understanding of the design PROCESS within a Structured Architectural Design Method. With an introduction to the role of Institutional Buildings within a Society, students will explore the connections of the built environment with its surroundings within the Semi-Urban fabric. Manifestation of an Architectural Language while catering to its core function is explored along with the concept of Place-Making, Public as well as Private domains, Formal Interpretation of the Program. The studio is conducted as a VERTICAL studio with the SEM 5 students, wherein the same project is presented to both and they are expected to work together as one large group resulting into common discussions and presentations.

Learning Outcome:

- **Knowledge:** A thorough understanding of creating a built-environment through a Structured Method.
- **Skill:** Gaining insight into the various possibilities that could be explored beyond the scope of their given exercise owing to the exposure to concepts undertaken by the SEM-5.

- **Attitude:** Ability to participate and compare their designs with those evolved by the SEM-5 students and gain a critical insight on the various methods and processes of Form-making.

Topical Outline:

Introduction: Design Language is expected to be formulated by the Studio-in-charge (in accordance with the scale of the project, program and existing site conditions.This should be based on the existing typology of the studied region in Summer- Study trip). Two distinct Languages to be considered and presented by the Studio-in-charge - ideally belonging to two distinct structural systems - Load Bearing System and Post and Beam construction or a combination of both. Two groups of students would be formed, each exploring one of these distinct LANGUAGES. The course is divided into 2 projects -

- **UNIT 1: Formal Exploration:** In the first part the students will engage in a series of abstract exploratory FORM-MAKING exercises with the PRESCRIBED LANGUAGE. Various configurations would evolve w.r.t. distinct conditions given below, irrespective of the actual SITE. The aim is to allow the students to directly engage with the system more freely, to understand the potential of it while responding to a large spectrum of external conditions. Students can explore specific conditions in isolation or in combination with each other to arrive at a deeper understanding of the SCOPE and LIMITATIONS of the available LANGUAGE. Abstract 3D models of the system at a specific scale should be encouraged, so that a comparative study can be undertaken at the end of the exercise. These would also serve as readily available references for the subsequent project.
  1. TOPOGRAPHY (For eg. FLAT, CONTOURED (gradual, steep), PARTLY SUBTERRENEAN…)
  2. SCALE- varying the number (within a range) of available MODULES.
  3. VERTICAL STACKING - (For eg. SINGLE STOREY, DOUBLE, G+2, 1& HALF)
  4. CONDITION - (For eg. NARROW, EDGE, BRIDGE, CONTAINED)

- **UNIT 2: Design Project:** This is undertaken together with the students of the 5th Sem. Possible Programs could be - School, Community Places, Panchayat

Complex, Market, etc. While the students are exposed to the workings of the senior students and urged to discuss together, focus of the Studio for this SEM students will be on -

1. Concept of 'MODULE', 'LANGUAGE' and Ordering Principles - Symmetry, Rhythm, etc.
2. Circulation, Structure, Natural Light, Fenestrations, Roof Form.
3. Developing the skill to represent designs as Diagrams, Abstractions, Block models, Collages, etc.
4. Possibility of adding public functions by the student to the given program.

Semester 3
ARCHITECTURAL GRAPHICS (COMPUTING)-1

Course Code	15BAR3.2
Contact hours per week	5
Format	Studio
Method of assessment	Portfolio

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Express fundamental techniques and application of Computer Aided drawings in architectural profession

Learning Objective:

To understand the use of computing and computation across various creative domains. Computation refers to any type of calculation that follows a well-defined model understood and expressed as, for example, an algorithm, or a protocol. The study of computation is paramount to the discipline of computer science. In design-oriented disciplines, uses of computers & computational logics have been prominent as progressions in technology are made as a fast pace. It is imperative of creative disciplines to match the pace of evolution of computing & related technologies. Graphics are integral to representation of ideas, concepts, analysis or architectural notions. Use of appropriate techniques & methodologies becomes significant here.

Learning Outcome:

- **Knowledge:** Architecture Graphics equips the students to understand the elements of a building as well as the application of technology and construction as part of the design process.
- **Skill:** Three tiers of software would be investigated by students to start building up a skill set for architectural graphic representation via computing tools / methods

  Tier 1: Sketchup, AutoCad3D, Revit

  Tier 2: Lumion, Keyshot, Vray, Flamingo

  Tier 3: Grasshopper, Processing

- **Attitude:** The students will be well-versed with software and technologies and the aptitude to provide the minimum information necessary to construct buildings

Topical Outline:
The studio is structured with a mix of theoretical & practical understanding of computation & computer-related applications for creative disciplines, prominently architecture & design.

The topics of discussion would include, but not limited to:

Coding Generative
Art Generative
Design
Algorithmic
Design Vector
Graphics
Animation
Visualization In 2D &3D,
Imaging

The studio will encourage students to choose 2-3 varied techniques / methods of representing an architectural design (an on-going design studio project can be undertaken) and draw a comparative between the methods. Project of multiple scales will be investigated for an appropriate graphic representation of intent and space.

Semester 3
BUILDING CONSTRUCTION & MATERIALS-3

Course Code	15BAR3.3
Contact hours per week	6 (4+2)
Format	Studio / Lecture
Method of assessment	Portfolio / Written

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Equip the students with the knowledge of various materials and techniques used in the Load-bearing and Post-Beam method of constructions

CO2: Deduce possibilities in construction and processes in building frameworks to be applied in design

Learning Objective:
To equip the students with the knowledge of various materials and techniques used in the Load-bearing and Post-Beam method of constructions

Learning Outcome:
- **Knowledge:** Examining the critical role of materials and methods for the design and construction of buildings. The approach is to study the stability of buildings and materials using load-bearing systems and post-beam construction systems and combinations thereof.
- **Skill:** An understanding of construction details, systems and planning.
- **Attitude:** Ability to identify and develop details and specifications for their design studio projects.

Topical Outline:
- **UNIT 1: Load bearing Construction and Materials:**
  1. Introduction to the nature and characteristics of LOAD BEARING wall construction, its advantages and limitations.
  2. Introduction and detailed understanding of masonry roof construction– Jack

Arch and Madras Terrace.
3. Construction details of various spanning elements like VAULT, DOMES.

- **UNIT 2: Post-Beam Construction and Materials:**
  1. Introduction and detailed drawing of post-beam construction using timber

- **UNIT 3: Building Materials:**
  1. Concrete –Introduction, Properties, Production, Workability and Applications of concrete.
  2. Polymeric materials – Introduction to Polymeric materials like Resins, Plastics and Rubber; their Properties and Applications.
- DESIGN PROJECT:
  1. DETAILS and SPECIFICATIONS to be developed for the ARCHITECTURAL STUDIO PROJECT and presented simultaneously with the FINAL Studio Presentations.

References:

1. Barry, Wiley, "The Construction of Buildings", Vol. 1-2, 2001.
2. McKay, G.B. Building Construction, Pearson, New Delhi, Fifth Edition, 2014.
3. "Building Construction Illustrated", Francis D.K. Ching, John Wiley & Sons, 2011.
4. Chudley R., Building Construction Handbook, England, Ninth Edition, 2013.
5. Singh G. Building Construction and Material, Standard Book House, Fifteenth Edition, 2015.
6. Duggal, S.K. Building Materials, New Age International Publishers, Fourth Edition, 2015 RP.
7. Rangwala S C. Engineering Materials. Charotar Publishing House, Forty-Second Edition, 2015.
8. Punmia, B.C., Building Construction, Laxmi Publications, Tenth Edition, 2014 RP.
9. Kumar, S. Building Materials, Standard Publishers, Twentieth Edition, 2015 RP.

Semester 3
HISTORY OF ARCHITECTURE AND URBANISM-2

Course Code	15BAR3.4
Contact hours per week	2
Format	Lecture
Method of assessment	Portfolio / Written

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Understand the built environment (buildings and environments, including cities, in the context of the cultural and civilization's history) – how it is created, what it means to the people who make it, what it tells us about history, and how it responds to ideas, desires, and needs of people living at a particular time.

CO2: Explores both the material aspects of architecture (structure, design, technology, etc.) as well as the intellectual and social conditions that bring it into being.

Learning Objective:

A global-oriented survey of the history of architecture from an analytical point of view leading to an understanding of the typology of the design program in the next semester. It is concerned with understanding the built environment (buildings and environments, including cities, in the context of the cultural and civilization's history) – how it is created, what it means to the people who make it, what it tells us about history, and how it responds to ideas, desires, and needs of people living at a particular time. It explores both the material aspects of architecture (structure, design, technology, etc.) as well as the intellectual and social conditions that bring it into being.

Learning Outcome:

- **Knowledge:** Students would get a much more comprehensive view about the role of the building program and its manifestation in society.

- **Skill:** Due to a comparative study of a Building type across cultures and time periods the student is able to arrive at the core understanding of the Type and its application in the design program.
- **Attitude:** The student will develop an awareness to understand a building from multiple points of view; and thereby fostering critical discussion of architecture across scales and time.

Topical Outline:

- **UNIT 1: Historical survey of institutional building types:** This part would deal with critical analysis of specific building types connected to socio-cultural institutions. By using a comparative method, we will discover how architects/cultures in different epochs and diverse cultures struggled with similar or divergent theoretical concepts, thereby 'bringing into sharper focus the critical distinctions that reflect the time and place of their making'. The 'types' listed below are not mutually exclusive.

1. **Places of worship / sacred places**
   (**Temples:** Angkor Wat, The Temple of Hephaestus, Temple of Karnak, Meenakshi Amman Temple, Matri Mandir, Kailash Temple, Tori Ise Shrine

   Mosques: Masqid al-Haram, Great mosque of Djenne, Jami Masjid-New Delhi, Sarkhej Roza, Sancaklar Mosque, Bait-Ur-Rouf, Selim Mosque

   Churches: St Basil's Cathedral-Moscow, St. Peter's Basilica (old and new)-Rome, Sagrada Familia, Riola Parish Church, The Chapel of Notre Dame du Haut, Salvacao Church-Mumbai, Church of the Light-Ibaraki, Unity Temple)

2. **Places of commerce and learning**
   (**Commerce:** Bank of England, Mill owner's Association, Chrysler Building, CCTV Tower, HSBC Building, Grand Bazaar-Istanbul, Petronas towers)

   Libraries: Winn Memorial Public Library, Stockholm Public Library, Parliament Library-Delhi, Seattle Central Library, TU Delft Library, Bibliotheca Alexandria.

Museums: Altes Museum-Berlin, Rijksmuseum-Amsterdam, Nationalgalerie-Berlin, Gandhi Ashram museum, Guggenheim Museum-Bilbao, Jewish Museum-Berlin, Centre Pompidou-Paris, Kimbell Art Museum, Jawahar Kala Kendra-Jaipur)

3. **Places of administration and memory**
(**Tombs and Cemeteries:** Tower of Silence, Aswinikumar Crematorium, Humayun's Tomb, Lenin Mausoleum, Gubbio cemetery, Ibrahim Rauza, Pyramids of Giza)

Memorials: Arch of Constantine, Arc De Triomphe, Gateway of India, Gateway Arch, Jewish Monument-Berlin, Taj Mahal, Vietnam Memorial-Washington)

Civic + Palaces: Palace of Versailles, Forbidden city, Fatehpur Sikhri, Capitol Complex-Chandigarh, National Assembly Building-Dhaka, Vidhan Sabha-Bophal)

4. **Places of control**
(**Towers:** Tower of Hercules, Galata Tower, Towers of Bologna, Belem Tower, Tower of Babel, Qutub Minar- New Delhi

Forts: Great Wall of China, Krak des Chevaliers, Chittorgarh Fort, Jaisalmer Fort, Bourtange star fort

Prisons: New Gate Prison-London, Bastille-Paris, Jeremy Bentham (Panopticon), Metropolitan Correctional Center-Chicago, New State Prison-East Jutland)

5. **Places of performance and communion**
(Theatre: Theatre of Ephesus, Theatre of Pompey, Colosseum-Rome, Sydney Opera House, Bird's Nest-Beijing, Jawaharlal Nehru Stadium-New Delhi

Gardens: Rashtrapati Bhavan Mughal Gardens, Gardens by the Bay, Garden of Five Senses, Versailles Garden, Yuyuan Garden-Shanghai.

Baths: Baths of Diocletian, Killic Ali PasaHamam, Chand Baori, Mohenjodaro Bath, Therme Vals, Queens Bath Hampi, Trenton Bath House)

- **UNIT 2: Individual Study:** The study would deal with critical analysis of specific institutional Buildings, selected by one student each. The student would be required to conduct a basic background research on the building and the architect and analyse it based on relevant historical factors explicating the character of that Building through the lens of history.

Note: List to be chosen by the permanent faculty based on the specific course design.

References:

1. A History of Architecture: Sir Banister Fletcher
2. A World History of Architecture: Michael Fazio
3. The History of Architecture in India, Christopher Tadgell, Phaidon
4. Architecture in India since 1990: Rahul Mehrotra
5. Modern Architecture since 1900: William J. R. Curtis
6. Architecture Form, Space & Order: Francis D.K. Ching, Wiley

Semester 3
THEORY OF DESIGN-2

Course Code	15BAR3.5
Contact hours per week	2
Format	Lecture
Method of assessment	Portfolio

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Explore various determinants and methods of organizing elements of architecture to arrive at certain expressions.

CO2: Develop analytical tools but also engages the students in reflecting critically on their own work.

Learning Objective:
To understand the various determinants and methods of organizing elements of architecture to arrive at certain expressions. This course not only tries to develop analytical tools but also engages the students in reflecting critically on their own work.

Learning Outcome:
- **Knowledge:** Introduction to organising elements and principles of architecture.
- **Skill:** Ability to comprehend theoretical concepts objectively; to understand abstraction and distinguish between the various 'dimensions' that are embodied within the Form-Space.
- **Attitude:** Being able to look at one's own work critically and reflect on it objectively.

Topical Outline:
The main content will concentrate on the inter-relationship between plan types and programmes, organization, order, cultural expressions, institutional elements, fenestrations and broader principles in the spatial matrix.

- **UNIT 1: Space-Form Relationship:** Exploring a set of concepts with their corresponding examples in the natural or built environments.
  1. Proportioning Systems
  2. Modular
  3. Scale - Human + Visual
  4. Ordering Principles
  5. Axis, Symmetry, Hierarchy
  6. Datum, Rhythm, Repetition
  7. Transformation

- **UNIT 2: Understanding of Theory:** Analysis of Exemplary Buildings based on points covered in Stage – 1

- **UNIT 3: Application:** To deal with critical analysis of the individual buildings taken up by each student as part of the History of Architecture and Urbanism -2 course. This could be conducted as series of presentations made individually by each student explicating the character of that House through the lens of ORDERING PRINCIPLES addressed in UNIT I of this course.

- **UNIT 4: Critical Viewpoint:** Critical analysis of the designs explored in the ARCHITECTURAL DESIGN STUDIO to be conducted as series of presentations made individually by each student. Objective criticisms by peers and general discussions amongst the students are encouraged.

References:

1. Francis D. K. Ching. Architecture: Form, Space, and Order.
2. Roger H. Clark and Michael Pause. Precedents in Architecture: Analytic Diagrams, Formative Ideas, and Partis, NJ: John Wiley & Sons, 2012
3. Details of Modern Architecture: Edward of Ford 1 & 2
4. Why Architecture Matters: Paul Goldberger, 2009

Semester 3
STRUCTURES-3

Course Code	15BAR3.6
Contact hours per week	3
Format	Lecture
Method of assessment	Portfolio / Written

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Deduce various analysis concepts and use of those concepts in design

CO2: Determine various structural design methods and importance of limit state method in designing RCC beams, columns and slabs under various conditions.

CO3: Provide exposure to basic designing of masonry structures and IS 456-2000, and to make aware importance of reinforcement detailing of RCC structural elements.

Learning Objective:
To understand various analysis concepts and use of those concepts in design and to understand various structural design methods, importance of limit state method and use of limit state method for the design of concrete beams, columns and slabs under various conditions. To provide exposure to basic designing of masonry structures and IS 456-2000, and to make aware importance of reinforcement detailing of RCC structural elements.

Learning Outcome:
- **Knowledge:** Understand concepts of various RCC design methods and IS codal provisions. Ability to design simple RC beams, columns and slabs by applying the design concepts; ability to understand masonry design concepts for various types of structures
- **Skill:** Exposure to reinforcement detailing and curtailment concept.
- **Attitude:** Exposure to various methods of analysis and design.

Topical Outline:

Introduction to the following topics as an overview –

- **UNIT 1:** Statically determinate and indeterminate structures
- **UNIT 2:** Methods for structural analysis
- **UNIT 3:** Design philosophy – limit state, working stress methods etc.
- **UNIT 4:** Design of RCC beams (singly and doubly reinforced, flanged) only methodology and design concepts
- **UNIT 5:** Design of RCC columns – only methodology and design concepts
- **UNIT 6:** Design of RCC slabs – one way and two way – only methodology and design concepts
- **UNIT 7:** Design of masonry structures (only generalised concept and various methods)
- **UNIT 8:** Reinforcement detailing for reinforced cement concrete structures.

References:

1. Punmia B C and AK Jain “Strength of Materials and theory of Structures”, Vol 2 Laxmi Publications, New Delhi, 2010.
2. Vaidyanathan R and Perumal P, “Comprehensive Structural Analysis Vol I and II”, Laxmi Publications, New Delhi, 2010.
3. T S Thandavamoorthy, “Structural Analysis”, Oxford University Press, New Delhi, 2011.
4. K U Muthu, M.Vijayanand etal; “Basic Structural Analysis”, I K International Publisher, New Delhi, 2011.
5. K U Muthu, M.Vijayanand etal; “Indeterminate Structural Analysis”, I K International Publisher, New Delhi , 2014

Semester 3
CLIMATOLOGY AND BUILDING PHYSICS

Course Code	15BAR3.7
Contact hours per week	2
Format	Lecture
Method of assessment	Written

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Integrate and utilise the climate and its impacts in architectural design by understanding the basic and fundamental concepts of climatic design and elaborating the climatic design to site, surrounding and at building level.

CO2: Understand the benefits of incorporating climatic features into the design and making their concepts robust in terms of harnessing sun, wind and light for better human comfort.

Learning Objective:

To integrate and utilise the climate and its impacts in architectural design by understanding the basic and fundamental concepts of climatic design and elaborating the climatic design to site, surrounding and at building level. The main objective is to inform the students of the benefits of incorporating climatic features into the design and making their concepts robust in terms of harnessing sun, wind and light for better human comfort. It is also intended to introduce fundamental building physics as an important aspect of designing buildings to understand the physical properties and performance phenomena of the buildings in terms of heat, light, acoustics and energy.

Learning Outcome:

- **Knowledge:** To gain the knowledge of climate, its effect and building physics in the design of buildings.
- **Skill:** To understand elementary principles of climatic design as an important aspect in design of spaces.
- **Attitude:** Ability to implement understanding and systems to achieve better

human comfort and user experience in the design studio.

Topical Outline:

- **UNIT 1: Study:** Global climatic factors, Classification of the Koppen climatic system, Tropical climate, elements of climate, sun diagrams, orientations, wind rose diagrams, psychometric charts, site climate, thermal comfort, principles of thermal design, thermal transmittance, heat control and air movement, solar radiation, solar protection, windows, glazing and shading devices, lighting principles.

- **UNIT 2: Application:**

  1. Architectural Design Studio:

  Specific Concepts could be studied in more detail, which are relevant to the selected site for the Architectural Design Studio.

  Architectural Features responding to the Climate specific to the site could be developed – with respect to sun, wind, light and rain, thermal and comfort.

  2. Summer Trip:

  Existing documented elements (of the studied building types within the Summer Documentation program) could be analysed with respect to climatology.

References:

1. Manual of tropical housing by Otto Koenigsberger
2. Introduction to architectural science: the basis of sustainable design by S.V. Szokolay
3. SUN, WIND and LIGHT by G.Z. Brown.

Semester 3
ART APPRECIATION

Course Code	15BAR3.8
Contact hours per week	2
Format	Lecture
Method of assessment	Portfolio

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Focus on the principles of art history and some other aspects of visual culture, examining and explaining the methods of production, conventions both of representation and of the reading of image and space.

Learning Objective:
To focus on the principles of art history and some other aspects of visual culture, examining and explaining the methods of production, conventions both of representation and of the reading of image and space. The subject will largely be foundational and will touch upon studies of elements, medium methods and cultural connections used in modern movements.

Learning Outcome:
- **Knowledge:** Foundation for a broad survey of development of Modern Art.
- **Skill:** Within specialised exercises, the students will explore basic elements and theoretical & applicable perspectives of the visual language objects and techniques.
- **Attitude:** To understand how the analysis can permeate from one visual discipline to the other.

Topical Outline:

- **UNIT 1:** Introduction to History, Theory and Evolutions of the Arts and Modern Thought After Renaissance to Present: A visual comprehensive overview of the modern art field. It traces the trends and influences in painting, sculpture,

photography and architecture from the mid-nineteenth century to the present day. The focus will be on -

1. Understanding the origins of modern art and studying its various movements. (Origins, Abstract Expressionism, Early Photography, Realism, and Impressionism, Post-Impressionism, Art Nouveau, Cubism, Colour and Form, Bauhaus and Teaching of Modernism)
2. Providing an analysis of artworks based on formal and contextual elements.
3. Recognizing the influences of social conditions on modern art.

- **UNIT 2:** History, Theory and Evolution Of The Indian Arts Formative Years: Traditions and Methodology, Early Indian Artists

- **UNIT 3:** Post-Independence, Contemporary Explorations in The Indian Context.
  1. Abstraction, Minimalism, and Figurative Painting
  2. Modern Art in India
  3. Contemporary Artists& their Works

- **UNIT 4: Explorations:** Studying certain movements and working on parallel exercises. (Optionally combined with a Design Studio exercise and develop a similar vocabulary around it.)
  Exercises could be of two variants:
  1. Descriptive/ Analysis: An objective or subjective take on a work of art– its physical attributes, and formal construction.
  2. Meanings &Contexts: An articulation the political, social, cultural, and aesthetic themes and issues that artists examine in their work and which helps to understand the work. Or constructing a narrative / interpretation of the artwork.

References:

1. History of Modern Art:Elizabeth Mansfield and H. Harvard Arnason, 2010
2. Indian Art: Vidya Dehejia, 1997
3. Art and Visual Culture in India: Gayatri Sinha, 2009

Semester 3
HUMANITIES

Course Code	15BAR3.9
Contact hours per week	2
Format	Lecture
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Study subjects that emphasize the abilities of reasoning and thinking in all areas of knowledge, in social accomplishments, and in the arts contributing to Humanities and how it informs creativity

Learning Objective:
To study subjects that emphasize the abilities of reasoning and thinking in all areas of knowledge, in social accomplishments, and in the arts contributing to Humanities and how it informs creativity (but is not creativity itself). Its influence in shaping both the built form and the discourses around it and is a legitimate field of intellectual enquiry in its own right for the Architect to undertake on his/her own.

Learning Outcome:
- **Knowledge:** This course is to be designed as a springing board to further enquiry, possibly lifelong that the student will undertake on his/her own. The objective of this course is to introduce the students to the Humanities as a whole.
- **Skill:** To allow the development of their own intellectual rubric within which one will integrate and assimilate what they will learn in future semesters. To develop sensitivity for the social dynamics and cultural and technological movements that inform life on earth and to engage in meaningful dialogues with peers and society at large about the same. To evolve architectural decision making from a right/ wrong binary choice to the posing of a rigorous dialectical that takes into consideration all the various forces at play in the world.
- **Attitude:** To help students develop a well-rounded architectural persona/ identity as informed thinkers and humanists.

Topical Outline:

The course will look into the Humanities as a means of understanding and interpreting the aesthetics and poetics of architecture and may look into critical aspects of art history, design and architectural theory.

- **UNIT 1:** Introduction: A study of the basic principles of the Humanities covering (but not limited to) the following disciplines: sociology, anthropology, environmental and cognitive psychology, culture, urbanism, and architectural theory and criticism. (Excluding History as a separate discipline but including discussions of history in the context of the afore mentioned subjects.)

- **UNIT 2:** Study of Eastern and Western philosophy: A basis for understanding the concept of 'the Architect as a Humanist' and for broadening the discussion to ethics in architecture and the ethics of environmental sustainability.

- **UNIT 3: Impact of Technology:** A discussion on the impact of technology, the Digital Age and globalization on architecture. It will help one understand Architecture as both a "science" and an "art" and discuss the pitfalls of taking a reductionist (one or the other) approach to the arts and sciences.

References:

To be added by the faculty-in-charge.

Semester 3
ARCHITECTURAL JOURNALISM (ELECTIVE)

Course Code	15BAR3.10
Contact hours per week	3
Format	Lecture
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Analyse recent historical and contemporary examples of written and journalistic criticism of architecture, including selected writings by Indian and overseas critics

Learning Objective:
Analysis of recent historical and contemporary examples of written and journalistic criticism of architecture, including selected writings by Indian and overseas critics

Learning Outcome:
- **Knowledge:** Analysis of major critical themes, thematic categories in architectural writing over the past three centuries.
- **Skill:** Skills will be developed for structuring architectural journals, writing descriptive and analytical reports, editing write ups; Photo journalism, book reviews, page compositions and printing process.
- **Attitude:** Works of Indian and international writers and critics will be presented and discussed. Seminars on Indian architectural writers, journalists and critics.

Topical outline and References to be decided on by the faculty in charge, based on the specific course design.

Semester 3
ARCHITECTURAL PHOTOGRAPHY (ELECTIVE)

Course Code	15BAR3.11
Contact hours per week	3
Format	Lecture/Seminar
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Understand the contributions of photography to enhancing the aesthetics of architecture and to develop proficiency in this art using modern photographic techniques.

Learning Objective:
To understand the contributions of photography to enhancing the aesthetics of architecture and to develop proficiency in this art using modern photographic techniques.

Learning Outcome:

Knowledge:

Study of the equipment, processes, and procedures necessary for the photography of building exteriors and interiors, dusk/night and night architectural landscapes, and construction progress. Students will use primarily digital SLR format.

Skill:

- Comprehensive understanding of architectural lighting.
- Heightened sensitivity to light and how it strengthens architectural design
- Ability to use High Dynamic Range (HDR): multiple exposures to create dramatic architecture/interior images without additional professional lighting.
- Control of Parallax (Free Transform Procedure) to correct distortion and perspective so buildings do not look like they are leaning to one side or falling back.

- Intermediate ability to photograph architectural models and small products, including a studio set up with studio lighting and possibly strobe lighting.
- Use of most Single Lens Reflex (SLR) digital camera functions, including: shooting raw, processing in Adobe Bridge and Photoshop CS6, batch processing, organization, colour temperature, exposure/ histograms, colour management (curves/levels).
- Knowledge of how to do a monitor calibration.

Attitude: The Photography Class is a seminar, workshop, individual practice and research educational experience. Student participation is essential and expected.

Topical outline and References to be decided on by the faculty in charge, based on the specific course design.

Semester 3
ART IN ARCHITECTURE (ELECTIVE)

Course Code	15BAR3.12
Contact hours per week	2
Format	Lecture/Workshop/ Field Trip
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Describe the importance of art and aesthetics in architecture its symbiotic relationship and application of different art forms.

Learning Objective:
The overview of role of art in the history of world architecture and the symbiotic relationship of art in architecture. Brief history of world art and different isms of art. Influence of art and artists on architecture. Artist – Architects in history. Paintings to murals – art as body of architecture. History of Indian art and influences on architecture. Ethnic/tribal art and architecture.

Learning Outcome:
- **Knowledge:** Understanding the importance of art and aesthetics in architecture its symbiotic relationship and application of different art forms.
- **Skill:** This will give students an opportunity to develop their skills in a subject they may opt, to make their career in future. In depth study in this Electives will prepare the technical base of the students.
- **Attitude:** Demonstrate an understanding of Art Criticism including the description, analyses, interpretation and evaluation of a given work. To understand the influence of contextual and cultural factors of Art in Architecture.

Topical outline and References to be decided on by the faculty in charge, based on the specific course design.

Semester 3
PASSIVE DESIGN (ELECTIVE)

Course Code	15BAR3.13
Contact hours per week	3
Format	Workshop
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Develop greater understanding of climate responsive architecture to be able to arrive at design solutions for creating spaces which provide thermal comfort to the occupants without the use of mechanical systems.

Learning Objective:
Greater understanding of climate responsive architecture to be able to arrive at design solutions for creating spaces which provide thermal comfort to the occupants without the use of mechanical systems.

Learning Outcome:
- **Knowledge:** Importance and application of passive systems in climate responsive architecture.
- **Skill:** Climate responsive design strategies using passive systems.
- **Attitude:** Primary importance given to passive design strategies while designing for thermal comfort of occupants.

Topical outline and References to be decided on by the faculty in charge, based on the specific course design.

Semester 3
VISUAL COMMUNCATION (ELECTIVE)

Course Code	15BAR3.14
Contact hours per week	3
Format	Lecture / Workshop
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Explore different techniques of visual communication related to design and architecture

Learning Objective:
To explore different techniques of visual communication related to design and architecture. Using different tools and means for presenting architectural projects.

Learning Outcome:
- **Knowledge:** understand the possibilities of communication tools for preparing presentations and communicating ideas and concept.
- **Skill:** Develop the ability to use different presentation techniques and tools to visually communicate design ideas and presentations.
- **Attitude:** Experiment with different techniques to gain understanding of their possibilities and qualities.

Topical outline and References to be decided on by the faculty in charge, based on the specific course design.

Semester 3
SMART MATERIALS AND STRUCTURES (ELECTIVE)

Course Code	15BAR3.15
Contact hours per week	2
Format	Lecture/Field trip
Method of assessment	Written/Portfolio

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Understand the future of smart materials and structures that is wide open. Understanding and controlling the composition and microstructure of any new materials are the ultimate objectives of research in this field, and is crucial to the production of good smart material.

CO2: Enhance the understanding of nanostructural materials and their use as a complex materials and structures in buildings.

Learning Objective:

Smart Materials and Structures (SMS) is a multi-disciplinary subject that explores the creation and utilization of novel forms of materials. This elective deals with the development of new materials and active composite systems, derived using theoretical predictions to complex structural systems, which generate new capabilities by incorporating enabling new smart material. The theoretical predictions are usually accompanied with experimental verification, characterizing the performance of new structures and materials.

Learning Outcome:

- **Knowledge:**
  The future of smart materials and structures is wide open. Understanding and controlling the composition and microstructure of any new materials are the ultimate objectives of research in this field, and is crucial to the production of good smart materials. This subject will enhance the understanding of nanostructural materials and their use as a complex materials and structures in buildings.

- **Skill:**
  This technology gives promise of optimum responses to highly complex problem areas by, for example, providing early warning of the problems or adapting the response to cope with unforeseen conditions, thus enhancing the survivability of the system and improving its life cycle.

- **Attitude:**
  Smart materials have all the possible potentials to fulfill maximum requirements of the changing trend which will ultimately result in the practical feasibility of smart materials in architecture.

Topic outline and References to be decided on by the faculty in charge, based on the specific course design.

SEMESTER 4

COURSES OF STUDY & TRAINING						
Sl. No.	Name of Courses	Course Format	Credits : Contact hours	Credits	No of Teaching Hours / Week	
					Studio / Practical	Lecture
1	**Architectural Design Studio-2**	Studio	1:1.5	6	9	
2	**Architectural Graphics (Computing) - 2**	Studio	1:1.5	4	6	
3	**Building Construction & Materials- 4**	Studio	1:1.5	2	3	
4	**History of Architecture & Urbanism - 3**	Lecture	1:1	3		3
5	**Theory of Design - 3**	Lecture	1:1	2		2
6	**Structures - 4**	Lecture	1:1	4		4
7	**Water & Waste Systems**	Lecture	1:1	3		3
8	**Constitution Of India**	Lecture		Audit		2
9	**Elective***	Lecture		Audit	3	
10	**Field Trip**	Field trip		Audit		
	Total			**24**	**21**	**14**

***Electives semester 4**
Critical Thinking
Digital Architecture
Construction Systems
Sustainable Architecture
Building Automation Systems
Energy Efficient Architecture

Semester 4
ARCHITECTURAL DESIGN STUDIO-2

Course Code	15BAR4.1
Contact hours per week	9
Format	Studio
Method of assessment	Portfolio + Jury

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Describe role of Housing within a society, exploring its connections with its surroundings within an Urban fabric.

CO2: Explore Vertical Structures (up to G+3) and innovative ways of stacking. Climatic Response, Public/ Private Spaces, Open Space and Shared Amenities, exploring concept of Place-Making, Public as well as Private Domains.

Learning Objective:

Understanding the role of Housing within a society, exploring its connections with its surroundings within an Urban fabric. Evolution of an Architectural Language while catering to its core function. Attempt at Evolving a Housing Type from a given set program while catering to certain defined Urban concerns. Exploring Vertical Structures (up to G+3) and innovative ways of Stacking. Climatic Response, Public/Private Spaces, Open Space and Shared Amenities, exploring concept of Place-Making, Public as well as Private Domains. Identifying and addressing all the stakeholders.

Learning Outcome:

- **Knowledge:** A thorough understanding of creating a Housing Fabric through a Structured Method.
- **Skill:** The students will understand the core concepts of community living and explore the relation of the built environment to the existing socio-cultural factors, local materials and techniques of construction through innovative ideas.

- **Attitude:** The students will be able to participate and compare their designs with those evolved by the SEM-8 students and gain a critical insight on the various issues and processes pertaining to Housing and into the various possibilities that could be explored beyond the scope of their given exercise.

Topical Outline:

Initially 2 distinct Housing Modules are expected to be formulated by the Studio-in-charge in accordance with the scale of the project, program and existing site conditions. Two distinct languages to be considered and presented by the Studio-in-charge - ideally belonging to two distinct structural systems - Load Bearing System + Post and Beam System and Framed System. Two groups of students would be formed, each exploring one of these distinct languages. The course is divided into 2 projects:

- **UNIT 1: FORMAL EXPLORATION:**

  In the first part the students will engage in a series of abstract exploratory Configurations with the PRESCRIBED Modules. Various configurations would be evolved with respect to distinct conditions given below, irrespective of the actual SITE. The aim is to allow the students to directly engage with the system more freely, to understand the potential of it while responding to a large spectrum of external conditions. Students can explore specific conditions in isolation or in combination with each other to arrive at a deeper understanding of the SCOPE and LIMITATIONS of the available LANGUAGE. Abstract 3D models of the system at a specific scale should be encouraged, so that a Comparative Study can be undertaken at the end of the exercise. These would also serve as readily available references for the subsequent project.

  1. TOPOGRAPHY - such as Flat, Contoured (Gradual, Steep), Partly Subterranean
  2. SCALE - Unit, Cluster and Neighbourhood
  3. VERTICAL STACKING - Single-storeyed, Double-storeyed, G+2 and1 & Half storeyed.
  4. CONDITION - such as Independent, Row Houses and Clustered

- **UNIT 2: DESIGN PROJECT:**
  This is undertaken together with the students of the 8th Semester. While the students are exposed to the workings of the senior students and urged to discuss together, focus of the Studio for this semester students will be on -
  1. Developing multiple variants of the TYPE to address specific conditions.
  2. Introduction to the concept of a UNIT, CLUSTER and COMMUNITY.
  3. Concept of SINGLE UNIT and its MULTIPLICATION, ORDERING, PATTERNS AND VARIATIONS.
  4. Exploring the range of PRIVATE and PUBLIC DOMAINS.
  5. Critical response to SOCIO-CULTURAL aspects of the community.
  6. Exploration of ORGANIC vs. PLANNED CONFIGURATIONS.
  7. Response to CLIMATE, MATERIAL and STRUCTURE.

References:

1. Holistic Housing. Concepts, Design Strategies and Processes: Hans Drexler, 2012
2. The Housing Design Handbook: A Guide to Good Practice: David Levitt, 2010
3. The Urban Housing Handbook: Shaping The Fabric of Our Cities: Eric Firley, Caroline Stahl
4. Housing Design: A Manual: Bernard Leupen, 2008
5. Housing and Urbanisation: Charles Correa, 1999

Semester 4
ARCHITECTURAL GRAPHICS (COMPUTING)-2

Course Code	15BAR4.2
Contact hours per week	6
Format	Studio
Method of assessment	Portfolio

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Deduce the concepts and techniques of Building Information Modelling (BIM) and introduce the students to the use of BIM software.

Learning Objective:
To understand and familiarize the concepts and techniques of Building Information Modelling (BIM) and introduce the students to the use of BIM software.

Learning Outcome:
- **Knowledge:** Equips the students to understand the elements of a building as well as the application of technology and construction by the use of BIM software.
- **Skill:** Ability to work with BIM software
- **Attitude:** The students will be well-versed with software and technologies and the aptitude to provide the minimum information necessary to construct buildings.

Topical Outline:
The studio is structured with a mix of theoretical & practical understanding of BIM applications for architects and the use of BIM software. The students will have hands on experience developing a project in a BIM software.

Semester 4
BUILDING CONSTRUCTION AND MATERIALS-4

Course Code	15BAR4.3
Contact hours per week	3
Format	Studio
Method of assessment	Portfolio

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Expand and Deepen the knowledge and skills on constructional aspects of CONCRETE and STEEL and its application in various components of a building.

CO 2: Comprehend and make correct analyses of and detail specifications for buildings.

Learning Objective:
Expanding and Deepening the knowledge and skills of the students on constructional aspects of CONCRETE and STEEL and its application in various components of a building.

Learning Outcome:
- **Knowledge:** Acquaintance with material qualities and methods of construction using concrete and steel.
- **Skill:** Understanding of aspects such as structural systems, finishes and detailing.
- **Attitude:** The students would be able to comprehend and make correct analyses of and detail specifications for buildings.

Topical Outline:
- **UNIT 1: Concrete:**
  1. Introduction to the concept of framed structures in R.C.C.
  2. Types of formwork (shuttering) for concrete, scaffolding, shoring, on duping etc.
  3. Foundations in R.C.C. - construction details for various types of foundation.
  4. Construction details for RCC framed structures with infill walls of brick and various cement concrete products, including hollow blocks, light weights,

and concrete blocks.
5. Introduction to various types of R.C.C. staircases with respect to their uses
6. Cantilevered construction in RCC such as canopies and projections.

- **UNIT 2: Steel:**
  1. Introduction to structural steel sections, grillage foundation and framed construction. Detailed studies such as characteristics of structural steel sections, methods of jointing and its applications as structural members in different parts of buildings.
  2. Types of industrialized doors and windows-sliding, revolving, collapsible, rolling shutters, steel, aluminium and composite sections. Detailed drawings and construction details of various types of doors and windows in Steel and Aluminium.

- **UNIT 3: Building Materials:**
  1. **Ferrous & Non-Ferrous Metals**
     Introduction, Properties and Applications of Ferrous metals like Iron, Steel and Alloy Steel and Non-Ferrous metals such as Aluminium, Copper, Zinc, Lead, Tin and Nickel.
  2. **Paints, Enamels and Varnishes**
     Characteristics of Oil-based and Water-based Paints, their Preparation and Applications.

Note: Possibility of integration with architectural studio project to be explored.

References:

1. McKay, G.B. Building Construction, Pearson, New Delhi, Fifth Edition, 2014.
2. Singh G. Building Construction and Material, Standard Book House, Fifteenth Edition, 2015.
3. Duggal, S.K. Building Materials, New Age International Publishers, Fourth Edition, 2015 RP.
4. Chudley R., Building Construction Handbook, England, Ninth Edition, 2013.
5. Rangwala S C. Engineering Materials, Charotar Publishing Hse, Forty-Second Edition, 2015.
6. Punmia, B. C., Building Construction, Laxmi Publications, Tenth Edition, 2014 RP.
7. Kumar, S. Building Materials, Standard Publishers, Twentieth Edition, 2015 RP.

Semester 4
HISTORY OF ARCHITECTURE & URBANISM-3

Course Code	15BAR4.4
Contact hours per week	3
Format	Lecture
Method of assessment	Portfolio / Written

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Understand the evolution of Dwelling and Emergence of DISTINCT HOUSE TYPES in various regions as a manifestation of Cultural, Social, Climatic, Political, Topographical and Collaborative Factors

CO2: Obtain a comprehensive view about the EVOLUTION OF HOUSING and its MANIFESTATIONS in society.

Learning Objective:

This course would deal with the evolution of Dwelling and Emergence of DISTINCT HOUSE TYPES in various regions as a manifestation of Cultural, Social, Climatic, Political, Topographical and Collaborative Factors.

Learning Outcome:

- **Knowledge:** To obtain a comprehensive view about the EVOLUTION OF HOUSING and its MANIFESTATIONS in society.
- **Skill:** Creating AWARENESS of understanding a building from multiple points of view; and thereby fostering CRITICAL DISCUSSION of Architecture across scale and time.
- **Attitude:** Due to a comparative study of a mutually inclusive Housing Types across cultures and time periods, through focusing on specific criteria, the student will be able to distinguish and understand the importance of various factors which play a role in determining the architecture of community housing.

Topical Outline:

UNIT 1:

HISTORICAL SURVEY OF HOUSING TYPES: By using a comparative method, we will discover how Architects and Communities in different epochs and diverse cultures struggled with appropriate housing strategies within various conditions, thereby 'bringing into sharper focus the critical distinctions that reflect the time and place of their making'. The TYPES listed below are not mutually exclusive.

1. Region and Climate

Tropical: Architecture of Malay vernacular: Culture, Climate, Architectural features, materials, construction techniques; Colonial goa – building techniques and typologies

Desert: Jaisalmer: Traditional Housing – Aspects wrt region, culture, climate, materials; Bunga Housing Kutch - Aspects wrt region, culture, climate, materials, earthquake resistance

Delta: Nipa Hut stilt houses from Philippines, The delta houses of Bangladesh

Extreme: Cold and Dry : Vernacular housing at Ladakh – Topography, Climate, Materials and resources, users lifestyle, construction technology, Culture and traditions

Cold and humid: Ikra housing Assam - Topography, Climate, Materials and resources, users lifestyle, construction technology, Culture and traditions

2. Topography / Physical Conditions

Flat: Canal houses Amsterdam The Netherlands, Hofje van Nieuwhuizen The Hague The Netherlands, City of Ur from Mesopotomian Civilization

Contoured: The Himalayan settlements, Settlement at Santorini (Cycladic Architecture)

Subterranean: Settlements of Derinkuyu and Kandovan, Material, lifestyle and architectural reference

Aquatic: Houseboats Amsterdam The Netherlands, Uros floating Islands Titacaca lake Peru, Stilt houses Inle Lake Myanmar

3. Function

Nomadic: Tepee(Tipi) houses, Mongolian yurts (Ger)

Markets and Trade: Shop houses at Singapore, Grand Bazaar Istanbul

Industrial: Chawls at Mumbai, Housing conditions at England during Industrial Revolution

4. Socio-cultural

Muslim/Islamic: Courtyard Houses of Syria, Bohra houses at Gujarat
Vaastu/Hindu: Chettinad houses, Agraharam housing
Christianity: San Gimignano, Christian porch houses at Goa, Colonial French houses at Pondicherry
Social Housing: EWS, Gated Unite d'Habitation - Le Corbusier

5. Process

Modular: Habitat 67, Capsule tower Japan, Bay Housing, Atlantic
Organic: Casa Milla – Antonio Gaudi, Xerophyte tower
Incremental: Aranya, Belapur, IFFCO
Mass Housing: Asiad village – Raj Rewal, Bijlmer Amsterdam

UNIT 2: INDIVIDUAL STUDY:

This part would deal with critical ANALYSIS of specific TRADITIONAL HOUSING TYPES, each selected individually by a student. The student would be required to conduct a basic background research on the building and the various relevant factors explicating the character and evolution of that FABRIC.

References:

1. A Timeless Way of Building: Christopher Alexander, 1979
2. A Pattern Language: Christopher Alexander, 1977
3. Architecture Without Architects: Bernard Rudofsky, 1964
4. 6,000 Years of Housing: Norbert Schoenauer, 1981

Semester 4
THEORY OF DESIGN-3

Course Code	15BAR4.5
Contact hours per week	2
Format	Lecture
Method of assessment	Portfolio

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Investigate pattern of house and housing in various context and analyse influences of housing in society as a cultural product.

CO2: Study the existence of certain building elements that recur within housing communities and their role in creating a healthy environment conducive to diverse needs of its inhabitants.

Learning Objective:

To Investigate the role of Architecture as a cultural product linked to a variety of external influences that shape the built and natural environment. Students will observe and study the existence of certain building elements that recur within housing communities and their role in creating a healthy environment conducive to diverse needs of its inhabitants. These patterns are studied individually as well in combination with each other at various scales to understand various housing type and manners in which they give rise to unique urban tissues.

Learning Outcome:

- **Knowledge:** The student will be introduced to the nuances and factors such as Planning Systems and Socio-Cultural influences that shape architecture.
- **Skill:** Developing Spatial Strategies and generating clusters and types.
- **Attitude:** The students will develop an extended and focused study on dwelling units within the broader themes of the course.

Topical Outline:

- **UNIT 1: PATTERN TYPES - FROM PATTERN LANGUAGE:** A series of presentations each handling a set of concepts with their corresponding examples in the natural or built environments.
  1. Types of clusters (Row Houses, House Cluster, Work Communities, etc)
  2. Community + Common Spaces (Cafes, Town Halls, Markets, Bus Stops, etc)
  3. Circulation + In between Spaces (Pedestrian Zones, Arcades, Paths, Building Edge, Seats, Activity Pockets, etc)
  4. SPATIAL CONFIGURATIONS& GRAMMAR (Geometry, Rules, Flexibility, Formal Order)
  5. Building Elements (Entrance, Courtyards, Roofs, Staircase, Windows, View, Kitchen, Lounge, Interior Details, etc)
  6. Response to Nature (Natural Light, Vegetation, etc)
  7. STRUCTURE (Materials, Walls, Roof, Columns, etc)

- **UNIT 2: UNDERSTANDING OF THEORY:** Analysis of Exemplary HOUSING COMMUNITIES based on points covered in UNIT 1.

- **UNIT 3: APPLICATION:** This part would deal with CRITICALANALYSIS of the individual DESIGNED CONTEMPORARY HOUSING COMMUNITIES. This could be conducted as series of presentations made individually by each student explicating the character of that House through the lens of ORDERING PRINCIPLES addressed in UNIT 1.

- **UNIT 4: CRITICAL VIEWPOINT:** This part would deal with critical analysis of the designs explored in the DESIGN STUDIO. This could be conducted as series of presentations made individually by each student looking at the designs developed in the ARCHITECTURAL STUDIO. Objective Criticism by peers and general discussions amongst the students are encouraged.

References:

1. A Pattern Language: Christopher Alexander 1977
2. A Timeless Way of Building: Christopher Alexander, 1979
3. Architecture Without Architects: Bernard Rudofsky, 1964
4. Notes on the Synthesis of Form, Christopher Alexander, 1964
5. The Nature of Order:, Christopher Alexander,2003

Semester 4
STRUCTURES - 4

Course Code	15BAR4.6
Contact hours per week	4
Format	Lecture
Method of assessment	Portfolio / Written

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Understand the Design of Reinforced Concrete Structures with emphasis on Limit State Method.

CO 2: Analyse and design of basic structural elements.

CO 3: Understand basic earthquake design concepts.

Learning Objective:
The students should be able to understand the Design of Reinforced Concrete Structures with emphasis on Limit State Method and students should be able to analyse and design of basic structural elements. Understanding of basic earthquake design concepts.

Learning Outcome:
- **Knowledge:** Understand the basic concept and methods of RCC structures.
- **Skill:** Students will be able to get an idea of designing the reinforced concrete structures.
- **Attitude:** Exposure to the limit state of design.

Topical Outline:
- **UNIT 1: Design Philosophy:** Concept of Elastic method, ultimate load method and limit state method –Limit State philosophy - IS code provisions – Load and Load combinations –Stress and strain relationship of reinforcing steel and concrete.

- **UNIT 2: Limit state design of Beams:** Analysis and Design of Singly and Doubly reinforced beam sand Analysis of T- beam.

- **UNIT 3: Limit state design of Slabs:** Design of one way simply supported and continuous slab. Design of Two-way rectangular slab subjected to uniformly distributed load for various boundary conditions, Design of stair case (dog-legged).

- **UNIT 4: Limit state design of Columns:** Design of short axially loaded RC columns, RC Columns with uniaxial moment.

- **UNIT 5: Limit state design of Footings:** Loads on foundation, types of footing, Design of axially loaded square footing.

References:

1. Unnikrishna Pillai, S., Devadas Menon, "Reinforced Concrete Design", Tata McGraw-Hill Publishing Company Ltd., New Delhi. 2006
2. Varghese, P.C., "Limit State Design of Reinforced Concrete" (Second Edition), Prentice Hall of India, Pvt. Ltd., New Delhi. 2006
3. Krishna Raju, N., "Design of Reinforced Concrete Structures", CBS Publishers &Distributors, New Delhi 2010
4. Gambhir M.L., "Fundamentals of Reinforced concrete design", Prentice Hall of India, Pvt. Ltd., New Delhi 2006.

Semester 4
WATER AND WASTE SYSTEMS

Course Code	15BAR4.7
Contact hours per week	3
Format	Lecture
Method of assessment	Portfolio / Written

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Describe building services of water supply, sanitation and their integration with architectural design.

CO2: Incorporate the knowledge of essential Water Supply and Waste Management techniques into Architectural Design

Learning Objective:
To impart knowledge required for understanding the building services of water supply, sanitation and their integration with architectural design.

Learning Outcome:

- **Knowledge:** To Understand the integration of Water Supply and Waste Management System in Architectural Design
- **Skill:** Incorporate the knowledge of essential water and waste management techniques into architectural design.
- **Attitude:** Application of the techniques into construction practices

Topical Outline:

- **UNIT 1: Collection from source and preparation:**
  1. Introduction to sources of water supply, Quantitative and Qualitative aspects, Impurities.
  2. Purification of water and overall operations involved: Plain sedimentation, sedimentation with coagulation (Only Theory - Method to be discussed and design not included), Filtration- Slow Sand Filtration and Rapid Sand

Filters, Pressure filters (Only Theory - Method to be discussed and design not included)
3. Hardness of water and Softening of water
4. Sources of Water Pollution and Preventive measures

- **UNIT 2: Supply and distribution of water:**
  1. Public water distribution and methods of Layout of Distribution.
  2. Pipes and Pipe Fittings and Centrifugal pumps
  3. Domestic Water Supply system- water meter, sump, over-head tank
  4. Types of Plumbing Systems - Single stack, one pipe and two pipe
  5. Water supply for multi-storey buildings, Fire hydrants and Solar Heating Systems

- **UNIT 3: Sewage and Sanitation:**
  1. Sanitation - Introduction, purpose and importance.
  2. Types of refuse, Collection and Disposal
  3. Separate, combined and partially separate systems - their advantages and disadvantages
  4. Sanitary requirements of buildings, types of pipes and Sanitary fittings
  5. Inspection chamber, manhole and traps used in the Plumbing System
  6. Septic tank, Soak pit, House drainage system & layout
  7. Understanding of various sewage treatment processes
  8. Rural sanitation

References:

1. Rangwala, S.C., Water Supply and Sanitary Engineering
2. Garg, S.K, Environmental Engineering (Vol. I & II)

Semester 4
CONSTITUTION OF INDIA

Course Code	15BAR4.8
Contact hours per week	2
Format	Lecture
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Provide basic information about the Indian constitution, to identify the Role of an Individual and Ethical Responsibility towards society and to understand Human Rights and its implications.

Learning Objective:
To provide basic information about the Indian constitution, to identify the Role of an Individual and Ethical Responsibility towards society and to understand Human Rights and its implications.

Learning Outcome:
- **Knowledge:** Provides general knowledge and legal literacy
- **Skill:** To understand State and Central Policies, fundamental duties, the Electoral Process and the special provisions. To understand the powers and functions of Municipalities, Panchayats and Co-operative Societies, and have Awareness about basic Human Rights in India.

Topical Outline:
- **UNIT – 1**
  1. **Constitution of India**
     - An introduction to Indian Polity
     - Meaning and importance of Constitution
     - Making of the Indian constitution – The Constituent Assembly
     - Salient features of the Indian Constitution
     - Preamble of the Indian Constitution and its significance

2. **Fundamental Rights and Directive Principles**

- Fundamental Rights
- Directive Principles of the State Policy
- Fundamental Duties

- **UNIT – 2**

1. **Government of the Union.**

- The Union Executive- the President and the Vice-President- The Council of Ministers and the Prime Minister
- The Union Legislature - The Parliament- The Lok Sabha and the Rajya Sabha, composite Powers and functions
- Important Committees -Privileges
- the Role of the Speaker

2. **Government of the States.**

The Governor- The Council of Ministers and the Chief Minister
The State Legislature- composition powers and functions

3. **Democratic decentralization or Panchayath Raj in India**

- **UNIT – 3**

1. **Federalism in India**

- Federal Features Indian federalism, Centre-State relations- distribution of legislative powers, Administrative and financial relations between the Union and the States
- The Finance Commission, The Planning Commission, National Development
- Council Military Features

2. **The Judiciary**

- The Supreme Court – Organization, Jurisdiction and Role
- The High Court – Organization, Jurisdiction and Role
- Judicial Review, Judicial activism, Independence of Judiciary in India

- **UNIT – 4**
  - Electoral Process in India – Election Commission, Organization and Functions
  - Local Governments – Rural and Urban – Organization, Powers and Role

References:

1. D.D. Basu: Introduction to the Constitution of India, S C Sarkar & Sons, Kolkatta
2. M V Pylee: An Introduction to the Constitution of India, Vikas Publishing House Pvt. Ltd, 2009
3. Granville Austin: The Indian Constitution. The Cornerstone of a Nation, Oxford University Press, New Delhi, 1966
4. C K Jain (ed): Constitution of India in Precept and Practice, Lok Sabha Secretariat, New Delhi
5. V.N. Shukla: Constitution of India, Jain Book Depot, New Delhi
6. Granville Austin: The working of a Democratic Constitution: The Indian Experience, New Delhi, Oxford University Press, New Delhi 1999

Semester 4
FIELD TRIP

Course Code	15BAR4.9
Contact hours per week	-
Format	Study tour
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Understand the role of Housing within a Society and explore its connections with its surroundings within an Urban fabric with respect to a particular settlement/region/ city.

Learning Objective:
Understanding the role of Housing within a Society. Exploring its connections with its surroundings within an Urban fabric with respect to a particular settlement/region/ city.

Learning Outcome:
- **Knowledge:** Supervised study tours gain insight into how different contexts engage with and apply various forms of architecture, through interaction with communities, documentation and mapping exercises.
- **Skill:** Skills will be developed for interventions which reflect context-responsive concepts and understanding of critical analysis of the built environment.
- **Attitude:** Outside of the classroom, the course challenges and extends student perceptions of how societies engage with architecture and its applied forms.

Topical Outline:
- **UNIT 1: Study:** Identifying a region and studying various physical and socio-cultural aspects.

- **UNIT 2: Documentation:** Mapping of existing fabric, settlements

- **UNIT 3: Analysis:** Representation Modules:
  1. Introduction of Place
  2. Detailed Analysis:-Location, Climate, Socio-Cultural Factors, Infrastructure

Semester 4
CRITICAL THINKING (ELECTIVE)

Course Code	15BAR4.10
Contact hours per week	3
Format	Lecture/Seminar
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Contribute to a deep understanding of contemporary architecture knowledge and culture – its arguments, debates and practices.

CO 2: Experiment and engage with methods and tools of analysis, forms of research and modes of writing.

Learning Objective:

To contribute to a deep understanding of contemporary architecture knowledge and culture – its arguments, debates and practices.

To help the students experiment and engage with methods and tools of analysis, forms of research and modes of writing.

Learning Outcome:

Knowledge:

- demonstrate knowledge of modern and contemporary architecture in its built form, but also its projects, arguments and debates
- demonstrate critical understanding of the discourses on modernism, modernity and the contemporary; how these discourses have been constructed and variously interpreted
- relate cultural objectives to forms of architectural practice and design speculation, to connect built – architectural and urban - form with a wider cultural and political context

Skill:

- Read critically in order to evaluate complex arguments and theories as well as their relation to design practices
- Present conclusions and interpretations about that reading in an informative and well organized oral presentation
- write a well-structured essay makes an argument clearly and effectively, presents original ideas and conclusions, and uses standard style for referencing

Attitude: Organised around seminars, lectures, debates, events and writing assignments.

Topical outline and References to be decided on by the faculty in charge, based on the specific course design.

Semester 4
DIGITAL ARCHITECTURE (ELECTIVE)

Course Code	15BAR4.11
Contact hours per week	3
Format	Workshop
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Develop a conceptual design skills massing of architecture using computer and digital (parametric) composition. Focusing only on the modelling aspect of forms (not the materials and lighting).

Learning Objective:
Develop a conceptual design skills massing of architecture using computer and digital (parametric) composition. Focusing only on the modelling aspect of forms (not the materials and lighting).

Learning Outcome:
- **Knowledge:** To understand various digital software tools design processes (parametric and generative), architectural visualization, advanced construction, and building automation.
- **Skill:** To familiarise students with basics of Grasshopper software
- **Attitude:** To open up various avenues in lateral fields like Emergent architecture, management Information systems, film industry, animation and simulation.

Topical outline and References to be decided on by the faculty in charge, based on the specific course design.

Semester 4
CONSTRUCTION SYSTEMS (ELECTIVE)

Course Code	15BAR4.12
Contact hours per week	3
Format	Workshop
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Describe construction methods and systems and familiarize them with the materials and building technology used in modern construction.

Learning Objective:
To expose students to advanced construction methods and systems and familiarise them with the materials and building technology used in modern construction.

Learning Outcome:
- **Knowledge:** To grasp the relation between construction materials and their applicability to different types of structures (based on function, form and use).
- **Skill:** Understanding of developing a design using appropriate modern construction methods and systems.
- **Attitude:** To understand the sequences in the entire construction process and apply building code guidelines,

Topical outline and References to be decided on by the faculty in charge, based on the specific course design.

Semester 4
ENERGY EFFICIENT ARCHITECTURE (ELECTIVE)

Course Code	15BAR4.13
Contact hours per week	3
Format	Workshop
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Create awareness of designing energy efficient building envelopes that respond to the climate of a place, efficient practices in India, advocating of the application of renewable energy system and the promotion of efficient lighting & HVAC system to reduce energy demand.

CO 2: Make aware of the future trends in creating sustainable built environment.

Learning Objective:
Creating awareness of designing energy efficient building envelopes that respond to the climate of a place bldg. lighting, resource–efficient practices in India, advocating of the application of renewable energy system and the promotion of efficient lighting & HVAC system to reduce energy demand. To make the students aware of the future trends in creating sustainable built environment.

Learning Outcome:
- **Knowledge:** Energy efficient design principles and concepts.
- **Skill:** Ability to design energy efficient buildings using principles of passive, active as well as hybrid systems.
- **Attitude:** Understand the importance of energy efficiency in architecture and develop an energy efficient and sustainable approach to design.

Topical outline and References to be decided on by the faculty in charge, based on the specific course design.

Semester 4
BUILDING AUTOMATION SYSTEMS (ELECTIVE)

Course Code	15BAR4.14
Contact hours per week	3
Format	Lecture / Workshop
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Describe automation systems in buildings concerning climate control, and the interconnection of different automated systems into an integrated building management system

Learning Objective:
Gain knowledge on automation systems in buildings concerning climate control, and the interconnection of different automated systems into an integrated building management system.

Learning Outcome:
- **Knowledge:** Understand the concept of building management systems.
- **Skill:** Develop the ability to approach climate control within buildings as an integrated system which is adaptive and responsive to actual needs.
- **Attitude:** Holistic approach to climate control and building systems.

Topical outline and References to be decided on by the faculty in charge, based on the specific course design.

Semester 4
SUSTAINABLE ARCHITECTURE (ELECTIVE)

Course Code	15BAR4.15
Contact hours per week	3
Format	Workshop
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Introduce the theoretical and practical aspects of sustainable design and the various technologies involved in executing them.

Learning Objective:
To introduce the students to the theoretical and practical aspects of sustainable design and the various technologies involved in executing them.

Learning Outcome:
- **Knowledge:** Sustainability in its broader sense and its relation to architecture
- **Skill:** Understanding of basic concepts and underlying philosophies of sustainability to aid in design decisions.
- **Attitude:** Develop sustainable approach in various aspects of architectural design.

Topical outline and References to be decided on by the faculty in charge, based on the specific course design.

SUMMER 2
OPTIONAL 2nd YEAR SUMMER PROGRAM
Course Code: 15BAR4.16

COURSES OF STUDY & TRAINING						
Sl.No.	**Name of Courses**	**Course Format**	**Credits : Contact hours**	**Credits**	**No of Teaching Hours / Week**	
					Studio / Practical	**Lecture**
1	**Special Study**	Internship / Workshop / Independent Study / Research	1:2	4	8	-
Total				4	8	0

The Summer Programs focus on experiential learning beyond classroom, to balances full time work experience with academics. It can be conducted in form of Internship, Workshop, Field Trips, Independent Study or Research. Relevance to the design studio in the subsequent semesters to be explored.

SEMESTER 5

COURSES OF STUDY & TRAINING						
Sl. No.	**Name of Courses**	**Course Format**	**Credits: Contact hours**	**Credits**	**No of Teaching Hours / Week**	
					Studio / Practical	**Lecture**
1	**Architectural Design Studio- 3**	Studio	1:1.5	4	6	
2	**Working Drawing Studio**	Studio	1:1.5	4	6	
3	**Theory of Design - 4**	Lecture	1:1	2		2
4	**Structures 5**	Lecture	1:1	4		4
5	**Quantities & Estimation**	Lecture	1:1	3		3
6	**Specification**	Lecture	1:1	2		2
7	**Electrical & Lighting Systems**	Lecture	1:1	3		3
8	**Building code**	Lecture	1:1	2		2
9	**Human Rights, Gender Equity & Environmental Studies**	Lecture		Audit		2
10	**Elective***	Workshop		Audit	3	
11	**Elective***	Lecture		Audit		2
	Co-operative Learning Preparation	Workshop				
	Total			**24**	**15**	**20**

***Electives semester 5**
Tropical Architecture-1
Steel in Architectural Design
Contemporary Architecture and Theory- 1
Environmental Planning and Design
Expert Systems Advanced Computing
Facilities Planning

Semester 5
ARCHITECTURAL DESIGN STUDIO-3

Course Code	15BAR5.1
Contact hours per week	6
Format	Studio
Method of assessment	Portfolio + Jury

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Identify Urban Concepts and Institutions

CO2: Describe DESIGN AND EVOLUTION of an Architectural LANGUAGE from a given program while catering to certain defined URBAN concerns

CO3: Manifest Architectural Language while catering to its core function is explored along with concept of Place-Making, Public as well as Private domains, Formal Interpretation of the Programme.

CO4: Synthesize the working culture of vertical studio - conducted with semester 3 students

Learning Objective:

Introduction of Urban Concepts and Institutions. DESIGN AND EVOLUTION of an Architectural LANGUAGE from a given program while catering to certain defined URBAN concerns. MANIFESTATION of an Architectural Language while catering to its core function is explored along with concept of Place-Making, Public as well as Private domains, Formal Interpretation of the Programme. This design studio is conducted as a VERTICAL studio with the SEM3 students. The same project is presented to both and they are expected to work together as one large group with common discussions and presentations.

Learning Outcome:

- **Knowledge:** A socio-cultural understanding of the place and structuring an appropriate program and an architectural response towards a certain goal.
- **Skills:** Exposure to exercises undertaken by the SEM 3 lend an impetus to the students to explore beyond the basic exercises of pure Form-Making.

- **Attitude:** A comparison between the LANGUAGE as prescribed for the SEM-3 vs. their own system allows them to gain an insight and engage in a critical debate about the advantages and validity of each system.

Topical Outline:

- **UNIT 1: PROGRAMME AND LANGUAGE FORMATION:** In the first part, the students will engage in a series of CRITICAL OBSERVATIONS about the SITE and the existing TYPE. Various programmatic explorations would be proposed along with corresponding concerns about the existing situation at the SITE. The aim is to allow the students to engage in personal
  READING of the site, understanding various DETERMINANTS and proposing an appropriate conceptual direction that their individual designs would take. Evolving an Architectural Language would be undertaken individually with the Studio-in-charge and proposed before the beginning of the next portion.

- **UNIT 2: DESIGN PROJECT:** This is undertaken together with the students of SEM 3. Possible Programs could be - School, Community Places, Panchayat Complex, Market, etc. Smaller supporting urban infrastructure upto a maximum of 1,000 Sq.m - like community space, bus shelter, exhibition space, toilet facilities, informal commercial activities, may be programmed additionally by the student and integrated within the project.
  While the students are urged to discuss together with SEM3 students, focus of the Studio for this semester students will be on -
  - Informed modification to the program.
  - Derivation of a Language
  - Customizing the Program
  - Urban Response
  - Mapping of Determinants
  - Resolution of Structure
  - Internal Layout
  - Services
  - Architectural Details and Material Specifications.

References:

1. Collage City: Colin Rowe, Prof Fred Koetter, 1978
2. Ideas and Forms: Le Corbusier: William J R Curtis, 1986

Semester 5
WORKING DRAWING STUDIO

Course Code	15BAR5.2
Contact hours per week	6
Format	Studio
Method of assessment	Portfolio

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Create and utilize construction documents

CO 2: Decipher and communicate information through drawings and specifications

Learning Objective:
The aim is for students to understand the creation and proper use of construction documents, communicate information through drawings and specifications.

Learning Outcome:

- **Knowledge:** This course is an introduction to architectural working drawings and detailing.
- **Skill:** The students will attain skills required to produce drawings in accordance with standard industry practice and to a level suitable for building permit approval applications.
- **Attitude:** The ability to read and interpret plans and specifications and to produce working drawings for buildings.

Topical Outline:

The course is organized around a series of modules related to complete a set of working drawings in accordance to the standards and byelaws.

- **UNIT 1: Introduction:**
  1. Drafting Tools
  2. Introduction to Specifications

3. Geometry and Scales
4. Useful Reference Information

- **UNIT 2: Line Work and Drafting Expression:**
  1. Lettering
  2. Symbols and Conventions
  3. Dimensions
  4. Notes and Titles

- **UNIT 3: Building Codes and Standards:**
  Working Drawings and Related Construction Specification

- **UNIT 4: Working Drawing Process:**
  1. Site plan
  2. Site utility plan
  3. Landscaping plan
  4. Floor plan
  5. Foundation plan
  6. Structural Plan
  7. Framing plan
  8. Roof plan
  9. Exterior elevations
  10. Building sections
  11. Cross referencing
  12. Wall sections
  13. Interior Elevations
  14. Schedules: Doors, window, finishes
  15. Detailing: Door, Window, others
  16. Stairs
  17. Environmental index

References:

1. The Professional Practice of Architectural Working Drawings: Osamu Wakita, 1984

Semester 5
THEORY OF DESIGN-4

Course Code	15BAR5.3
Contact hours per week	2
Format	Lecture
Method of assessment	Portfolio

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Describe architectural and urban theory with emphasis on significant developments in the modern and post-modern periods

CO2: Describe theories to understand phenomenon of architecture, of architectural design practice and of the problems that architecture and urbanism must solve in the early twenty-first century

CO3: Describe historical and philosophical origins of the concepts used and their applicability to current work scenario

Learning Objective:

An introduction to architectural and urban theory with emphasis on significant developments in the modern and post-modern periods. Introduction to the contribution of architectural theory to an understanding of the phenomenon of architecture, of architectural design practice and of the problems that architecture and urbanism must solve in the early twenty-first century. Gain competence in the application of a body of knowledge in the areas of ARCHITECTURE and URBANISM, including the ability to intelligently and critically use key concepts from these fields. To understand and appreciate how these key concepts apply to the current practice of architecture, the historical and philosophical origins of the concepts used, the research methodologies and the need to make original contributions to the field. Be able to apply the ideas and concepts learned in the course, to architectural projects currently undertaken by students in the studio.

Learning Outcome:

- **Knowledge:** A basic introduction to key concepts of contemporary architectural and urban theory.
- **Skill:** To grasp intelligently and critically apply these concepts to new situations arising from current socio-political context.
- **Attitude:** To structure written arguments and critiques about architecture and urbanism that draw on the concepts and critical arguments discussed and studied in the course.

Topical Outline:

- **UNIT 1: HISTORY OF ARCHITECTURAL THEORY:**
  1. EASTERN - VASTU, FENGSHUI, ROLE OF THE ARCHITECT
  2. CONCEPTS OF VAASTU.
  3. WESTERN - LEON ALBERTI BATTISTA. ROLE OF ARCHITECT.

- **UNIT 2: CONTEMPORARY THEORY:** A series of presentations each handling a set of concepts with their corresponding examples in the natural or built environments.
  1. MODERNISM
  2. STRUCTURALISM
  3. CAPITALISM + MARX
  4. PHENOMENOLOGY
  5. POST- MODERNISM - COMPLEXITY AND CONTRADICTION
  6. CRITICAL REGIONALISM
  7. DECONSTRUCTION - DERRIDA + EISENMAN
  8. UTOPIA
  9. DIAGRAM
  10. CURRENT - PARAMETRIC, ENVIRONMENTAL

- **UNIT 3: APPLICATION:** This part would deal with critical analysis of the individual CONTEMPORARY PROJECTS. This could be conducted as series of presentations made individually by each student explicating the EXPRESSION through the lens of CRITICAL THEORY addressed in the UNIT II of this course.

- **UNIT 4: CRITICAL VIEWPOINT:** This part would deal with critical analysis of the designs explored in the DESIGN STUDIO. This could be conducted as a series of presentations made individually by each student looking at the designs developed in the Architectural Studio. Objective criticism by peers and general discussions amongst the students are encouraged.

References:

1. Kruft, Hanno-Walter. A History of Architectural Theory From Vitruvius to the Present, trans. Ronald Taylor (London: Philip Wilson Publishers, 1994).
2. Nesbitt, Kate (ed.). Theorizing a New Agenda for Architecture: An Anthology of Architectural Theory 1965-1995 (New York: Princeton Architectural Press, 1996).
3. Neil Leach ed., Rethinking Architecture, a reader in cultural theory
4. Michael Hays ed., Architecture Theory since 1968

Semester 5
STRUCTURES-5

Course Code	15BAR5.4
Contact hours per week	4
Format	Lecture
Method of assessment	Portfolio / Written

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Describe method of pre-stressing system and stress losses involved in the design methods of PSC elements

CO 2: Design structural steel members including connections, the design concept of masonry walls and understanding the concepts of special structural forms

Learning Objective:

The students should be able to learn and understand the concept of method of pre stressing system, losses involved in the design methods of PSC elements, the design of structural steel members including connections, the design concept of masonry walls and understanding the concepts of special structural forms.

Learning Outcome:

- **Knowledge:** The students are able to apply appropriate system to pre-stressed a particular structure and estimate the internal forces due to pre-stressing the PSC structure. Understand the concept of masonry wall, classification of walls, shells, domes, flat slab, pneumatic structures, grid structures, tensile structure.
- **Skill:** Students will be able to get an idea of designing the pre-stressed, steel and masonry structures.
- **Attitude:** Exposure to the Pre-stressed concrete, Steel and Masonry.

Topical Outline:

- **UNIT 1: Principle of Prestressing:** Introduction- Materials for Prestressed concrete, System and method of prestressing, analysis of sections, stress and strength concept, load balancing concept, effect of loading on tensile stresses in the tendons.

- **UNIT 2: Design of Steel Structures including connections:** Bolted connection, Introduction- code of practice- bearing and friction type of bolts joints subjected to moment and direct load and Welded connections, Introduction- code of practice – butt and fillet welds- weld symbols-joints subjected to shear and bending - joints subjected to shear and torsion.
  Introduction- types of tension member- design consideration – design of tension members.

- **Unit 3: Design of Masonry structures:** Introduction to Masonry structure, design concepts, concept of Shell, folded plate, domes, grid structure, flat slab, tensile and pneumatic structure and tall building concept.

References:

1. Duggal S K “Limit state design of steel structures”, Tata Mc Grawhill, New Delhi, 2010
2. Rajagopalan N, “Prestressed Concrete”, Narosa publishing house, New Delhi 2005.
3. N. Krishna Raju “Prestressed Concrete” Fourth Edition, Tata Mc Grawhill, New Delhi,2010.
4. Subramanian N “Design of Steel Structures” as per IS 800:2007 First edition, Oxford University Press, 2010.

Semester 5
QUANTITIES AND ESTIMATION

Course Code	15BAR5.5
Contact hours per week	3
Format	Lecture
Method of assessment	Portfolio / Written

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Decipher concept of abstract and detailed estimates based on measurement of materials and works

CO 2: Describe cost control, valuation and depreciation in conjunction to the construction practices

Learning Objective:
To inform to students the need for estimation, the concept of abstract and detailed estimates based on measurement of materials and works; about cost control, valuation and depreciation in conjunction to the construction practices.

Learning Outcome:
- **Knowledge:** The art of building construction through specification writing. Students learn to work out the approximate estimate, detailed estimate for small scale building projects and low cost housing
- **Skill:** Optimizing the costing of a project through exposure to the Pre-stressed concrete, Steel and Masonry.
- **Attitude:** Types of areas, types of estimates, methods of taking out quantities, modes of measurement, preliminary and detailed estimates, plinth area rates and cost indices, rates of labour and material, rate analysis, CPWD schedule of rates.

Topical Outline:

- **UNIT 1: ESTIMATION**
  Types & purpose, Approximate estimate of buildings – Bill of quality, factors to be considered, principles of measurement and billing, contingencies, measurement of basic materials like brick, wood, concrete and unit of measurement for various items of work – abstract of an estimate.

- **UNIT 2: DETAILED ESTIMATE**
  Deriving detailed quantity estimates for various items of work of a building. Like earthwork excavation, brick work, plain cement concrete, Reinforced cement concrete works, wood work, iron works, plastering, painting, flooring, weathering course for a single storied building.

- **UNIT 3: CURRENT TRENDS**
  Methods of contracting and its link to specification drafting - the Business Environment and the structure in practice. Valuation, depreciation and its implications – case studies.

References:

1. S.C. Rangwala, “Estimating, Costing and Valuation (Professional practice)”, 1984
2. B.W. Dutta, “Estimating & Costing” (Revised by S. Dutta), UBS Publishers Distribution P.Ltd. India, 1983
3. M. Chakraborti, “Estimating Costing and Specification”, 1984
4. Gurcharan Singh & Jagdish Singh, “Estimating Costing and Valuation”, Standard Publishers Distributors, 2012

Semester 5
SPECIFICATION

Course Code	15BAR5.6
Contact hours per week	2
Format	Lecture
Method of assessment	Written

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Describe the need and importance of specification

CO 2: Write specifications – important aspects of the design of a specification

Learning Objective:
To inform to students the need and importance of specification, how to write specifications – important aspects of the design of a specification.

Learning Outcome:
- **Knowledge:** To understand the importance of specification writing in building construction.
- **Skill:** To gain insight on the value of writing specifications and the art of writing them for specific programmes.
- **Attitude:** Methods of specification writing, typical space for building works, implications of variations and incomplete specifications, impact on building costs. Types of contracts, tenders, relative merits, general conditions and commercial terms. Studio exercises related to specifications for a small building project. Standard CPWD specifications, Scheduled and Non-scheduled items.

Topical Outline:
- **UNIT 1: SPECIFICATION**
  Necessity of specification, importance of specification, - How to write specification, - Types of Specification, -Principles of Specification writing,

- Important aspects of the design of specification – sources of information – Classification of Specification.

- **UNIT 2: SPECIFICATION WRITING**
  Brief Specification for 1st class, 2nd class, 3rd class building. Detailed specification for earthwork excavation, plain cement concrete, Reinforced concrete, first class and second class brickwork, Damp proof course, ceramic tiles/marble flooring and dado, woodwork for doors, windows frames and shutters, cement plastering, painting & weathering course in terrace.

References:

1. M. Chakraborti, “Estimating Costing and Specification”, 1984

Semester 5
ELECTRICAL AND LIGHTING SYSTEMS

Course Code	15BAR5.7
Contact hours per week	3
Format	Lecture
Method of assessment	Portfolio / Written

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Describe basics of electricity and wiring systems within domestic and commercial buildings

CO 2: Describe fundamentals of lighting and lighting designs

CO 3: Abide by the NBC Code for building services

Learning Objective:

To inform the students of the laws and basics of electricity and wiring systems within domestic and commercial buildings; expose them to the fundamentals of lighting and lighting designs and to abide by the NBC Code for all of the above building services.

Learning Outcome:

- **Knowledge:** To understand the basics of Electricity and wiring system
- **Skill:** Application of fundamentals of lighting and knowledge of wiring systems in designing electrical layouts for various building programs.
- **Attitude:** Exposure to the NBC Code and lighting systems applicable in building design.

Topical Outline:

- **UNIT 1: Electrical and electronic systems, electrical wiring systems:**
  Laws of electrical circuits: Ohms and Kichoffs Laws Basics of electricity– Single/Three phase supply. Earthing for safety – types of earthing –ISI specifications Electrical wiring systems in domestic and commercial buildings.

Conduits, Types of wiring Diagram for connection. Bus way, Bus Bars, lighting track and conduits (Aluminium metallic, non-metallic) arrangements. Power handling, equipment, switch board, panel boards.

Lighting conductors: Purpose, materials, fixing, earthing arrangements

Electronic and Communication Systems Communication and data systems-communication spaces, pathways, cabling systems, voice and data, communication, Electronic security systems, computer labs/server, Rooms etc. Electrical Installations in Buildings. Main and distribution boards – transformers – switch gears– substations – space requirement and Layout of the same in building types.

- **UNIT 2: Fundamentals of lighting:**
  1. Principles of light: Electromagnetic radiation, waves, nature of vision, measurement of lighting
  2. Principles of illumination: Definitions, Visual tasks, Factors affecting visual tasks Units of light, definitions of flux, solid angle, luminous intensity – utilization factor – depreciation factor- MSCP – MHCP, brightness, glare.

- **UNIT 3: Illumination and lighting:**
  Electric light sources: brief description, characteristics and application of different types of lamps, methods of mounting and lighting control Luminaries classification/ - Lumen method for design – Room reflectance/ Glare – manufacturer's data on luminaries / luminaries cost.

- **UNIT 4: Lighting design: installation and application in buildings:**
  Artificial light sources, spectral energy distribution, Luminous efficiency-color temperature – color rendering, Additive, subtractive color and their application areas and outdoor lighting, Lighting for Office, Schools, Libraries, Residential, Hospital, Parking, Outdoor. Elementary ideas of special features required and minimum level of illumination for the physically handicapped and elderly in building types. Solar energy systems for lighting – Photovoltaic systems for Residential/Commercial buildings. Reducing electric loads, installation and maintenance – LEED certification & energy efficient lighting, lighting controls, Solar systems – Case studies and exercises involving in the above.

References:

1. E.P. Ambrose, “Electric Heating”, John Wiley & Sons Inc., New York, 1968.
2. Philips, “Lighting in Architectural Design”, McGraw Hill. New York, 1964.
3. R. G. Hopkenson & J. D. Kay, “The lighting of Buildings”, Faber & Faber, London, 1969.
4. National Building Code of India, 2005 (NBC 2005)
5. Handbook of building Engineers in metric systems, NBO(India), 1968

Semester 5
BUILDING CODE

Course Code	15BAR5.8
Contact hours per week	2
Format	Lecture/Workshop
Method of assessment	Portfolio

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Apply National building code, regional building codes and Indian Standard Codes on building design

Learning Objective:
To inform the students of the laws and basics of electricity and wiring systems within to familiarize students with building codes and Indian standard codes.

Learning Outcome:
- **Knowledge:** Students will be able to learn and understand the National building code, regional building codes and Indian Standard Codes. They will be exposed to standard tools and techniques in building construction.
- **Skill:** Students will be able to integrate building codes and standards into the design process.
- **Attitude:** To ensure that the quality of construction is maintained.

Topical Outline:
- **UNIT 1: National Building code:** Study of National building code in relation to architectural controls, services, fire protection etc.

- **UNIT 2: Regional Building Codes:** Study of regional building codes with respect to building types, location, architectural controls, services, etc. It will cover both national and international examples, to gain understanding of both national as well as international standards.

- **UNIT 3: Standard Codes:** Study of standard codes related to architecture and design. It will include introduction of various codes like IS code, BS code, ASHRAE, ISHRAE, etc.

References:

1. National Building Code of India, 2005 (NBC 2005)
2. MUDA Zonal Regulations

Semester 5
HUMAN RIGHTS, GENDER EQUITY & ENVIRONMENTAL STUDIES

Course Code	15BAR5.9
Contact hours per week	2
Format	Lecture
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Describe Human Rights, the status quo and initiatives on Gender issues in India and an overview of Environmental Studies

Learning Objective:
To impart the basic understanding and implications of Human Rights, the status quo and initiatives on Gender issues in India and an overview of Environmental Studies.

Topical Outline:

- **UNIT 1: HUMAN RIGHTS**
  1. **Human Rights–**Meaning; Universal Declaration of Human Rights
  2. **Human Rights Advocacy:** Global Advocacy of Human Rights; Amnesty International and other organization; People's Union for Civil Liberty (PUCL); Human Rights Commission in India; Minority Commission in India; Remedies against violation of Human Rights in India.
  3. **United Nations and Human Rights:** Civil and Political Rights: Economic, Social and Cultural Rights

- **UNIT 2: GENDER EQUITY**
  1. **Sex and Gender –** Masculinity and Feminity – Patriarchy, Matriarchy, Gender Roles and Attributes, Gender Division of Labour – Gender bias, Gender Stereotypes – Need for Gender Sensitization.
  2. **Status of Women in India:** Important indicators – sex ratio, education, health, nutrition, maternal and infant mortality, work participation rates,

political participation.

3. **Contemporary Women's issues:** Discrimination against girl child; Violence against women; Problems of Health and Nutrition; Women's Education and gender bias in education; Trafficking of Women; Globalization and impact on women.
4. **State Initiative on Gender Issues:** Constitution rights of women; Laws pertaining to women; National and State Commission for women.

- **UNIT 3: ENVIRONMENTAL STUDIES**
  1. **Environment:** Components of Environment Concepts of Ecology; Ecological factors: Soil, air, water; Eco System – Pond and Forest as Ecosystem; Human Population Growth.
  2. **Environmental Pollutions:** Types of Pollution – a) soil, air, water b) noise and radioactive pollution; Sources of Pollution and their effects; Control measures: Legal and administrative.
  3. **Conservation and Preservation of Environment:** Natural resources and their conservation – water, soil and forest; Agencies involved in environmental protection in India; Environmental Movements in India; Legal and administrative measures for environmental protection.

References:

Human Rights

1. S. Davidson: Human Rights, Buckingham, Open University,
2. Nirmal Chiranjivi: Human Rights in India, New Delhi, Oxford University Press Gender Equity
3. Usha Sharma (ed): Gender Mainstreaming and Women's Rights, Authorspress, New Delhi, 2004
4. Mohini Chatterjee: Feminism and Gender Equity, Aavishkar Publishers Jaipur
5. Neera Desai and Maithreyi Krishnaraaj, Women's Studies in India: Some perspectives. Popular Prakashan, Mumbai, 1986
6. Desai Neera and Thakkar Usha: Women in Indian Society, National Book Trust, India, 2001
7. Tharabai S.B: Women's Studies in India, APH Publication Corporation, New Delhi, 2000

8. Sushma Yadav and Anil Datta: Gender Issues in India, Radha Publications, New Delhi, 2003

Environmental Studies

1. N.K. Chakravarthy: Environmental Protection and Law, Ashis Publishing House, New Delhi
2. Eugene P. Odum: Basic Ecology, Savndus College, London
3. Kumar N: Air Pollution and Environmental Protection, Mittal Publication, New Delhi
4. Trivedi R K and Singh, UK: Environmental Laws on Wild Life, Mittal Publication, New Delhi
5. K.A. Agarwal: Wild Life in Indian Conservation and Management, Nishi Publications
6. Erach Baruch: Text Book for Environmental Studies, UGC, New Delhi and Bharati Vidyapeeth Institute Environment Education and Research, Pune
7. Erach Baruch: The Biodiversity of India, Mapin Publishing Pvt Ltd., Ahmedabad

Semester 5
TROPICAL ARCHITECTURE-1 (ELECTIVE)

Course Code	15BAR5.10
Contact hours per week	2 /3
Format	Lecture / Workshop
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Describe elements, features and characteristics of tropical architecture

CO 2: Analyse evolution of tropical architecture due to social, cultural, technological and climatological factors

Learning Objective:
To have an understanding on the elements, features and characteristics of tropical architecture and its evolution due to social, cultural, technological and climatological factors.

Learning Outcome:
- **Knowledge:** Understanding of the elements and features of architecture of tropical regions
- **Skill:** Designing vernacular elements of the architecture of tropical regions with respect to forms and materials in its true essence and spirit.
- **Attitude:** Insight into the wisdom of ages which led to the evolution of tropical architecture and its relevance in terms of social, cultural, economic and environmental sustainability.

Topical outline and References to be decided on by the faculty in charge, based on the specific course design.

Semester 5
CONTEMPORARY ARCHITECTURE & THEORY-1
(ELECTIVE)

Course Code	15BAR5.11
Contact hours per week	2 / 3
Format	Lecture / Workshop
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Describe significant contemporary directions emerging within architectural works around the world

CO2: Perceive critical theoretical approaches taken by contemporary architectural practices within the late-modern society

CO3: Analyse contemporary practices within the Indian Sub-Continent

Learning Objective:

This course is an Advanced Theory course with emphasis on significant contemporary directions emerging within architectural works around the world. It aims to shed light on critical theoretical approaches taken by contemporary architectural practices within the late-modern society. The course will also undertake an overview of the contemporary practices within the Indian Sub-Continent. It is aimed at developing the ability of the students to apply the ideas and concepts learned in the course, critically, to architectural design exercises undertaken in the studio.

Learning Outcome:

- **Knowledge:** To be informed about the relationship between architectural works and theoretical writings and understand how ideas get translated into architectural forms.
- **Skill:** To be able to appreciate and look at contemporary works critically in the backdrop of architectural theories/writings and apply it to their own projects.

- **Attitude:** To position one's own work critically within the contemporary context.

Topical Outline:

The individual topics would be selected and structured by the concerned Instructor of the course. The topics listed below are an indication of the possible directions that the elective may take.

- **UNIT 1: THEORETICAL APPROACHES**
  - Architectural 'Uncanny', Anthony Vidler
  - Disjunction, Bernard Tschumi
  - Deconstruction, Peter Eisenman
  - Blobs, Greg Lynn
  - Bigness, Rem Koolhaas
  - Diagram, Ben van Berkel, Toyo Ito, SANAA, EIsenman
  - Constructions, John Rajchman
  - Tectonic, Kenneth Frampton
  - Evolutionary Architecture, John Frazer

- **UNIT 2: CONTEMPORARY PRACTICES**

  SANAA, DILLER+SCOFIDIO, DANIEL LIBESKIND, PETER ZUMTHOR, ALVARO SIZA, RENZO PIANO, NORMAN FOSTER, MARIO BOTTA, REM KOOLHAAS, PETER EISENMAN, BERNARD TSCHUMI, HERZOG & DE MEURON, ZAHA HADID, SHIGERU BAN, EDUARDO SOUTO DE MOURA, LEGORETTA, TADAO ANDO, EMILIO AMBASZ, BIG, FRANK GEHRY

- **UNIT 3: CONTEMPORARY PRACTICES IN THE INDIAN SUBCONTINENT**

  ACHYUT KANVINDE, CHARLES CORREA, ANANT RAJE, B.V.DOSHI, RAJ REWAL, GEOFFREY BAWA, LAURIE BAKER, RAHUL MEHROTRA, STUDIO MUMBAI, GURJIT SINGH MATHAROO

- **UNIT 4: INDIVIDUAL RESEARCH**

  The student is expected to select any critically relevant architectural practice and present an analysis of their works with respect to the basic theoretical approach adopted by the practice.

Semester 5
ENVIRONMENTAL PLANNING AND DESIGN (ELECTIVE)

Course Code	15BAR5.12
Contact hours per week	2 /3
Format	Lecture / Workshop
Method of assessment	Portfolio / Written

COURSE OUTCOMES

At the end of the course students will be able to...

CO1: Address the various facets of environmental planning impact assessment studies, eco-cities development, environmental improvement

CO2: Address environmental issues at various scales – regional, urban and site level

CO3: Assess the scope of intervention at a particular scale and tools available, while having an understanding at all scales

Learning Objective:

To address the various facets of environmental planning impact assessment studies, eco-cities development, environmental improvement etc. The exercises lead to an appreciation of an understanding of environmental issues at various scales – regional, urban and site level. Also the need to understand the scope of intervention at a particular scale and tools available, while having an understanding at all scales.

Learning Outcome:

- **Knowledge:** Planning and Environment Planning, planning contexts, types of planning, planning process and tools, definition of environment, types of environment, population, resources, environmental degradation and pollution, pollutants and their effects and control, environmental planning types.
- **Skill:** To develop methods of scientific analysis and evaluation of the various factors of development and its effect on the environment.
  Recognize environmental considerations at the planning stage which will prevent much environmental degradation later on. Land use planning, to be

meaningful, has to take cognizance of advanced techniques and tools that are now available for predicting environmental impacts.

- **Attitude:** To acquaint the student with the evolution of the subject, relevance and application as per latest development in the world and also in India. Assignments are in the form of case studies and seminars.

Topical outline and References to be decided on by the faculty in charge, based on the specific course design.

Semester 5
STEEL IN ARCHITECTURAL DESIGN (ELECTIVE)

Course Code	15BAR5.13
Contact hours per week	2 / 3
Format	Lecture / Workshop
Method of assessment	Portfolio / Written

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Describe qualities and possibilities of steel structures as a construction material in architecture

Learning Objective:
Understanding of the qualities and possibilities of steel structures as a construction material in architecture.

Learning Outcome:
- **Knowledge:** Understanding of structural properties, dimensioning and formal expression.
- **Skill:** Ability to design steel structures and constructions based on their specific features and design options.
- **Attitude:** To use steel as a material to express design intentions and develop sustainable design solutions.

Topical outline and References to be decided on by the faculty in charge, based on the specific course design.

Semester 5
EXPERT SYSTEMS ADVANCED COMPUTING (ELECTIVE)

Course Code	15BAR5.14
Contact hours per week	2 / 3
Format	Lecture / Workshop
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Document a settlement in detail with including its planning, zoning, typical house, lifestyle, culture, and construction techniques

Learning Objective:
Gain deeper understanding on parametric design and artificial intelligence and it's possibilities and benefits towards the design process.

Learning Outcome:
- **Knowledge:** Being able to use parametric design, understanding parameters and criteria as inputs for the design process.
- **Skill:** Use Rhino and Grasshopper as powerful tools for design and architecture
- **Attitude:** Students should know basics of Grasshopper to be able to gain deeper knowledge on its application in the design process.

Topical outline and References to be decided on by the faculty in charge, based on the specific course design.

Semester 5
FACILITIES PLANNING (ELECTIVE)

Course Code	15BAR5.15
Contact hours per week	2/ 3
Format	Lecture / Workshop
Method of assessment	Portfolio / Written

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Perceive dimensions of Architectural Design for planning and management

Learning Objective:
To understand dimensions of Architectural Design for planning and management.

Learning Outcome:
- **Knowledge:** Students will learn the entire process of building construction from site planning till facilities management.
- **Skill:** The facilities planning will give an insight into different approaches to be taken for each type of project and to plan for optimum solutions.
- **Attitude:** They will be exposed to the practical problems faced in planning and will learn to coordinate and manage resources and time.

Topical outline and References to be decided on by the faculty in charge, based on the specific course design.

Semester 5
CO-OPERATIVE LEARNING PREPARATION

Course Code	15BAR5.16
Contact hours per week	
Format	Workshop
Method of assessment	-

Learning Objective:

This course aims to prepare the students for the Co-operative Learning assignment in semester 6, by preparing them for practical work in a professional environment, as well as guiding them in choosing an appropriate office or organisation for their Semester 6 Co-operative Learning assignment.

SEMESTER 6

COURSES OF STUDY & TRAINING						
Sl.No.	**Name of Courses**	**Course Format**	**Credits: Contact hours**	**Credits**	**No of Teaching Hours / Week**	
					Studio / Practical	**Lecture**
1	**Computer Applications in Architecture**	Studio	1:1.5	2	3	
2	**Co-operative learning**	Studio	1:2	14	28	
3	**Structures Workshop - I**	Lecture	1:1	2		2
4	**Elective-Tropical Architecture-2 (Documentation)**	Field Trip		Audit	4	
Total				**18**	**35**	**2**

Semester 6
COMPUTER APPLICATIONS IN ARCHITECTURE

Course Code	15BAR6.1
Contact hours per week	3
Format	Studio
Method of assessment	Portfolio

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Practice Computer aided architecture like parametric design and digital architecture

Learning Objective:
To understand and be familiar with concepts of Computer aided architecture like parametric design, digital architecture etc. In design-oriented disciplines, uses of computers & computational logics have been prominent as progressions in technology are made as a fast pace.

Learning Outcome:
- **Knowledge:** Equips the students to explore the use of computers in design development and break the barriers of conventional design aids by the use of parametric design software to develop innovative and creative designs
- **Skill:** Ability to work effortlessly with parametric design software.
- **Attitude:** The students will be well-versed with software and technologies and the aptitude to create innovative designs with the aid of computers.

Topical Outline:
The studio is structured with both theoretical & practical understanding of computation & computer-related applications for creative disciplines, prominently architecture & design.
The topics of discussion would include, but not limited to, Coding, Generative Art, Generative Design, Digital Architecture, parametric design and Algorithmic Design.

Semester 6
CO-OPERATIVE LEARNING

Course Code	15BAR6.2
Contact hours per week	28
Format	Practical
Method of assessment	Portfolio

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Gain practical experience in a field of one's interest

Learning Objective:
To further offer students the opportunity for selected practical experience in a field of one's interest. It is purposefully intermingled with a gradually expanding academic background.

Learning Outcome:
- **Knowledge:** Understand the undertakings in an area of specialization further with academic backing.
- **Skill:** To be equipped with the domain-specific expertise
- **Attitude:** To gain maximum exposure in an area of one's particular interest and be able Topical Outline:

GROUP SUBJECTS OF SPECIALISATION
The names and topics for elective are suggestive. Institute may add many more electives and alter the list as per local requirements and resources. For Non-specialisation, the subjects could be a mix of from groups below as offered by institute to suit its philosophy.

A. INTERIOR ARCHITECTURE
1. Theory of Interior Design
2. Visual Arts
3. Advance basic design.

4. Vernacular Interiors
5. Traditional crafts.
6. Contemporary Crafts
7. Furniture design

B. ECO ARCHITECTURE

1. Horticulture
2. Soil studies
3. Theory of Landscape design
4. Landscape construction
5. Street furniture design
6. Ecology
7. Plant Morphology

C. CONSTRUCTION TECHNOLOGY

1. Advance workshop
2. Basics of Management
3. Site management
4. Advance Surveying & Leveling
5. PERT/ CPM Techniques
6. Low cost materials
7. Design of services
8. Basic accounting

Semester 6
STRUCTURES WORKSHOP-1

Course Code	15BAR6.3
Contact hours per week	2
Format	Lecture / Workshop
Method of assessment	Portfolio

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Apply construction techniques and behaviour of the structural elements in building design

Learning Objective:
To provide the students with hands-on experience of the construction techniques and behaviour of the structural elements. This workshop will focus on different materials and their structural qualities and possibilities.

Learning Outcome:
- **Knowledge:** To gain an insight of the behavioural patterns of structural systems in mud, bamboo, and masonry structures.
- **Skill:** To understand the construction techniques and details in these systems.
- **Attitude:** At the end of workshop, students will gain confidence on practicality of construction.

CO 2: Decipher different materials and their structural qualities and possibilities

Topical Outline:
- **UNIT 1:** Mud based structure
- **UNIT 2:** Bamboo structures
- **UNIT 3:** Masonry domes, vaults and arches

Semester 6
TROPICAL ARCHITECTURE - 2 (DOCUMENTATION)
(ELECTIVE)

Course Code	15BAR6.4
Contact hours per week	4
Format	Practical
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Document in details of the elements, features and characteristics of a typical example of tropical architecture of a specific region

Learning Objective:
To have a detailed understanding on the elements, features and characteristics of tropical architecture of a specific region through documentation of a typical example.

Learning Outcome:
- **Knowledge:** Detailed understanding of the elements and features of architecture of a specific region in the tropical zone.
- **Skill:** Designing vernacular elements of the architecture of a tropical region with in depth understanding of detailing, measurements, materials and proportions. Ability to document projects in an academic way.
- **Attitude:** Respect for traditional craftsmanship and building systems used in a tropical region.

Topical outline and References to be decided on by the faculty in charge, based on the specific course design.

SUMMER 3
OPTIONAL 3rd YEAR SUMMER PROGRAM
Course Code: 15BAR6.5

COURSES OF STUDY & TRAINING						
Sl.No.	**Name of Courses**	**Course Format**	**Credits : Contact hours**	**Credits**	**No of Teaching Hours / Week**	
					Studio / Practical	**Lecture**
1	**Special Study**	Internship / Workshop / Independent Study / Research	1:2	4	8	-
Total				**4**	**8**	**0**

The Summer Programs focus on experiential learning beyond classroom, to balances full time work experience with academics. This 3rd year Summer Program is meant for extension of the Co-operative Learning work which has started in Semester 6, thereby aiming for a six months contribution to professional practise and a meaning full learning experience.

SEMESTER 7

COURSES OF STUDY & TRAINING						
Sl. No.	**Name of Courses**	**Course Format**	**Credits : Contact hours**	**Credits**	**No of Teaching Hours / Week**	
					Studio / Practical	**Lecture**
1	**Urban Studio**	Studio	1:1.5	9	12	
2	**Building Construction and Materials - 5**	Studio	1:1.5	2	4	
3	**Urban Design**	Lecture	1:1	2		2
4	**Structures Workshop - 2**	Lecture	1:1	3		3
5	**Elective***	Lecture	1:1	2		2
6	**Elective***	Lecture	1:1	2		2
7	**Field Trip**	Field Trip		Audit		
Total				**20**	**16**	**9**

***Electives semester 7**
LEED Lab - 1
Emerging Technologies
Housing
Theatre/Film Set Design
Bio Mimicry
Construction Management
Interior Design
Advanced Building Materials
Charettes and Participatory Planning

Semester 7
URBAN STUDIO

Course Code	15BAR7.1
Contact hours per week	12
Format	Studio
Method of assessment	Portfolio

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Create architecture that 'fits' into an urban context and to be able to generate design resolutions on an urban scale, based on analysis and ideation.

Learning Objective:
To document an urban context to understand what 'urban' and 'public realm' really means. To understand the differences between urban design and urban development, role of architecture in defining 'urban' character and to envisage 'urban' space as extensions of public/private domains. To expose the students to the challenges of bigger scale site planning involving a group of buildings.

Learning Outcome:
- **Knowledge:** Understand the differences between urban design and urban development.
- **Skill:** To create architecture that 'fits' into an urban context. To be able to generate design resolutions on an urban scale, based on analysis and ideation.
- **Attitude:** To gain exposure to the multifaceted character of an urban context and to design layers of public and private realms in cognizance of city level urban requirements.

Topical Outline:

- **UNIT 1: Study and analysis of urban setting:** Introduction to urban design to develop an ability to appreciate how the architectural spaces within the urban ensemble provide a setting for life and a unique local character.

The intent of the studio is to question or raise Issues by:

1. **Reading/writing and urban scenography –** through reading, writing, panoramas, stills, videos.
2. **Analysis, fact finding vs. tactical/investigative research**
   Understanding issues of context, program and place making. In order to set up design parameters, students are encouraged to seek out key issues in the place of study, such as: historicity, land use, sustainability, ecology, feasibility, diversity, versatility, spectacle, security, boundaries, recreation, celebration, sensorial spaces, complementary/ supplementary program and so on.

- **UNIT 2: Ideation and design of urban interventions:** speculation and setting up a framework for design through various diagramming techniques.
  Students are to work in a team. Group's ideation of requirements generated as a response to the urban issues identified. Translation of the ideation into a design that fits within the urban context.

References:

1. New Theory of Urban Design: Christopher Alexander
2. A Pattern Language: Christopher Alexander
3. The City Shaped: Spiro Kostof
4. Cities for people: Jan Gehl
5. Cities by Design: Fran Tonkiss

Semester 7
BUILDING CONSTRUCTION AND MATERIALS 5

Course Code	15BAR7.2
Contact hours per week	4
Format	Studio
Method of assessment	Portfolio

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Expand and deepen the knowledge and skills of the students on constructional aspects of concrete and steel and its application in various building components of a building.

Learning Objective:
This subject is aimed to expand and deepen the knowledge and skills of the students on constructional aspects of concrete and steel and its application in various building components of a building.

Learning Outcome:
- **Knowledge:** Acquaintance with material qualities and methods of construction using Concrete and Steel and Introduction to Finishing materials.
- **Skill:** Understanding of aspects such as structural systems, finishes and detailing.
- **Attitude:** The students would be able to comprehend and make correct analyses of and detailed specifications for buildings.

Topical Outline:
- **UNIT 1: Steel:**
  1. Detailed drawings and construction details of Steel Staircases such as Straight flight and Spiral.
  2. Introduction to the concept of Mezzanine floors.
  3. Introduction to Structural Steel Trusses- Detailed drawings and construction details of various types in conjunction with Roof coverings, Openings,

Valleys and Gutters. Innovations in the application of steel in the urban context.

4. Introduction to and Construction details of Space Frames and their Applications.
5. Introduction to False ceiling. Detailed drawings and construction details of the same.
6. Introduction to various materials, products and hardware for false ceiling, panelling and partitions.
7. Introduction to Pre-fabrication; Its advantages and disadvantages of on-site and off-site; Relevance of prefabrication in Indian construction industry.

- **UNIT 2: Finishes:**
  1. Introduction to various types of Floor Finishes such as P.V.C. sheets, Tiles, Carpets and Veneers with detailed drawings.
  2. Cladding of interior and exterior walls in various materials such as brick tiles, stones, vitreous tiles, panelling, plywood, board etc.
  3. Design detailing and construction of kitchens including flooring, wall finishes, counters, sinks, cabinets, services, etc. Types of kitchen - residential & commercial.
  4. Concept of modular kitchens & construction methods.
  5. Construction detailing of Toilets including fixing and fixtures, tiles (flooring), counter basins, concrete-top basins etc.
  6. Design detailing and construction of wardrobes.

- **UNIT 3: Building Materials:**
  1. Industrial timber products - Block board, plywood, particle board, fiber board, laminates, veneers, properties / application as building materials
  2. Glass & Ceramics- as a building material – classification, manufacture, properties and applications.

Note: *The theory in this course can be linked to the Structures Workshop - 2 in this semester, which focuses on reuse and conservation of heritage buildings and other valuable existing structures. Thereby the students will be able to use their theoretical knowledge in hands on experience on materials and structures.*

Semester 7
URBAN DESIGN

Course Code	15BAR7.3
Contact hours per week	2
Format	Lecture
Method of assessment	Portfolio + Jury

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Initiate an understanding of the basic principles of urban design and develop a sensitization towards the urban issues and suggest effective design ideas for situations involving public realm.

CO 2: Understand Character, Continuity & Enclosure, Quality of the public realm, ease of movement, legibility, adaptability, diversity, and aspects of development form of Urban Design

Learning Objective:
To initiate an understanding of the basic principles of urban design and develop a sensitization towards the urban issues and suggest effective design ideas for situations involving public realm.

Learning Outcome:
- **Knowledge:** To understand the role of Urban design as a discipline, and its role in understanding and interpreting a city.
- **Skill:** Various reading methods are to be explored, to understand the historical as well as present urban form.
- **Attitude:** To address urban design issues to create and develop awareness.

Topical Outline:
- **UNIT 1: What is Urban Design:** Introduction to the concepts and implementation of Urban Design; Concept of public space and public domain; Relationship between Architecture, Urban Design and Town Planning; Perception of city form and pattern – Townscape elements

- **UNIT 2: Objectives of Urban Design:** Character, Continuity & Enclosure, Quality of the public realm, ease of movement, legibility, adaptability, diversity, and aspects of development form; Types of Urban Design
  Interventions – at different scales

- **UNIT 3:** The Heritage of Urban Design: Roots of Urban Design from pre history to modern times.

- **UNIT 4: Role of Space in Historical Towns:** Comparative analysis of public spaces, their organisation and articulation in pre-history, early, medieval and renaissance periods in west and east. Aspects of heritage and historical continuity.

- **UNIT 5: Comparisons of cities:** of ancient India and with medieval development, the colonial city and the modern city. Study and compare their social, cultural and geographical aspects.

- **UNIT 6: Renewal and redevelopment:** Objectives, programs of urban renewal, public involvement and participation.

- **UNIT 7: Comparative Practice:** Townscape policies, Techniques, regulations and methods adopted for urban design.

- **UNIT 8: Urban Design and Urban Sustainability:** the inter-relationships

References:

1. Emerging concepts in urban space design: Broadbent, Geoffrey
2. New theory of urban design: Christopher, Alexander
3. Townscape: Cullen, Gordon
4. Urban Pattern - City Planning and Design: Gallion, Arthur B and Eisner, Simon
5. Urban Space: Krier, Rob
6. Image of the city: Lynch, Kevin
7. Urban Design - The Architecture of Towns and Cities: Spreiregen, Paul D.
8. Urban Design - Methods and Techniques: Moughtin, C, Cuesta, R, Sarris, C & Signoretta,
9. Urban Design - A Typology of Procedures and Products: Lang, JT

Semester 7
STRUCTURES WORKSHOP-2

Course Code	15BAR7.4
Contact hours per week	3
Format	Lecture / Workshop
Method of assessment	Portfolio

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Provide with hands-on experience of the construction techniques and behaviour of the structural elements focussing on heritage conservation and adaptation.

Learning Objective:

To provide the students with hands-on experience of the construction techniques and behaviour of the structural elements. The focus of the workshop will be on heritage conservation and adaptation.

Learning Outcome:

- **Knowledge:** The students gain an understanding of conservation practice, principles and philosophy and get acquainted with existing structures and possible problems that they face through site visits.
- **Skill:** Hands on experience on working on adaptation and conservation of existing structures.
- **Attitude:** Understanding of the importance of conservation and adaptation of heritage and other valuable existing buildings.

Topical Outline:

This workshop is given on location. Suitable existing buildings with architectural qualities will be identified during the summer program. The students will work with local professionals on a detailed design for conservation and adaptation of the buildings, focussing on authentic materials, structural principles and details.

Note: *This workshop can be combined with the Building Construction and Materials- 5 course of this semester 2, which focuses on in depth theoretical knowledge on materials and finishes.*

Thereby the students will be able to use their theoretical knowledge in hands on experience on materials and structures.

Semester 7
LEED-LAB-1 (ELECTIVE)

Course Code	15BAR7.5
Contact hours per week	2
Format	Lecture/Workshop
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Focus on the theoretical backgrounds and setting up case studies of LEED accredited buildings

Learning Objective:
Through innovative teaching, LEED Lab serves to enhance the academic experience by utilizing the built environment to educate and prepare students to become green building leaders and sustainability – focused citizens.

The course is split in LEED-Lab-1, offered semesters 7 and 8 and LEED-Lab-2, offered in semester 8 and 10. LEED-Lab 1 focuses on the theoretical backgrounds and setting up case studies, LEED-Lab-2 focuses on hands on experience by data monitoring, analysis, leading to results. It is highly recommended for students to take both courses for full understanding and to be able to access the LEED Green Associate and LEED Accredited Professional Examinations.

LEED Lab is an experiential learning offering developed by the USGBC (U.S. Green Building Council) which integrates environmental sustainable initiatives on campus into an academic course. Through the course spanning three semesters, students will facilitate the LEED for Building Operations and Maintenance (LEED O+M) process with a goal of certifying area building. Students will pursue the LEED AP credential in an area of their choice after completing the course. LEED Lab will equip students with skills, knowledge and expertise needed to be effective communicators, project managers, critical thinkers, problem solvers, engaged leaders, and team players in the field of environmental and social sustainability.

The course content at NIA has been adapted to the local context by taking into consideration the climate, culture and community in South-Western India. Students will be exposed to policies and codes in India such as ECBC (Energy Conservation Building Code) and NBC (National Building Codes), and local culture through community interaction and outreach.

Learning Outcome (LEED-Lab 1 and 2):

- **Knowledge:**
- Understand the LEED for Building Operations and Maintenance rating system
- Comprehend the ECBC (Energy Conservation Building Code) and NBC (National Building Codes) in India.
- **Skill:**
- Implement the LEED building certification process
- Assess the performance of existing campus buildings. Understand the limitations and possible improvement in the existing campus infrastructure.
- Examine campus sustainability efforts
- Apply knowledge of green building assessments
- Interpret national and international sustainability standards for building design (codes, local laws, environmental laws etc.)
- **Attitude:**
- Exhibit professional written communication skills
- Comprehend the value of industry, client interaction and expertise
- Acquire the knowledge to prepare for the LEED Green Associate and LEED Accredited Professional Examinations.

Topical outline (LEED-Lab-1 and 2:

- **Topics to be covered:**
  Energy and Water Efficiency, Site Management, Passive Cooling, Resource Conservation, Cost Efficiency, Material Efficiency, Project Management, Operations and Maintenance, Indoor Air Quality, Campus Sustainability, Communication and Marketing, Report Writing and processes related to the LEED rating system.

- **Teaching Medium:**
  Visiting Building Sites, Theoretical Studies, Lectures, Guest Speakers, Interactive presentations, Group Discussions, Analysis related to building operations such as Cost Benefits, Energy Auditing etc.

Semester 7
EMERGING TECHNOLOGIES (ELECTIVE)

Course Code	15BAR7.6
Contact hours per week	2
Format	Lecture / Workshop
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Explore emerging technologies and their possible relations to design and architecture

CO 2: Understand how emerging technologies can relate to the architectural design and building process.

Learning Objective:
Explore emerging technologies and their possible relations to design and architecture

Learning Outcome:
- **Knowledge:** Understanding of how emerging technologies can relate to the architectural design and building process.
- **Skill:** Ability to explore emerging technologies for communicating design and optimising building process.
- **Attitude:** Research on emerging technologies as well as experimenting to gain better understanding of their possibilities and benefits.

Topical outline and References to be decided on by the faculty in charge, based on the specific course design.

Semester 7
HOUSING (ELECTIVE)

Course Code	15BAR7.7
Contact hours per week	2
Format	Lecture / Workshop
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Gain understanding of housing requirements for people from different socioeconomic backgrounds in the Indian context

Learning Objective:
To gain understanding of housing requirements for people from different socio-economic backgrounds in the Indian context and to identify a site for a mixed housing development for the Urban Housing Studio in semester 8.

Learning Outcome:
- **Knowledge:** To understand the patterns of settlement and housing in India.
- **Skill:** To analyse housing requirements by survey of residents from different socio-economic backgrounds.
- **Attitude:** To be exposed to the schematics, space requirements and issues in housing in India.

Topical outline and References to be decided on by the faculty in charge, based on the specific course design.

Semester 7
THEATER AND FILM SET DESIGN (ELECTIVE)

Course Code	15BAR7.8
Contact hours per week	2
Format	Lecture / Workshop
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Design the look of the play or film - set design, costumes, make-up, and lighting to designing the colour, texture and overall look of the play or film.

Learning Objective:
To expose students to the various aspects involved in designing the look of the play or film. It will cover everything from set design, costumes, make-up, and lighting to designing the colour, texture and overall look of the play or film. To that end, students will not only need to learn about art, history, culture, literature but even things like implications of the socio-political atmosphere on society.

Learning Outcome:
- **Knowledge:** In the classroom students are encouraged to explore, in depth, the text, character, music, history, and psychological elements of their work and are challenged to apply their creativity in new and imaginative ways.
- **Skill:** The learners concentrate on designing spaces – interior and exterior - according to their functional hierarchies and interrelationships.
- **Attitude:** Creativity and ingenuity are two of the most important attributes that a set designer can have. Students must be able to create or build seemingly impossible sets or props with limited resources.

Topical outline and References to be decided on by the faculty in charge, based on the specific course design.

Semester 7
BIO MIMICRY (ELECTIVE)

Course Code	15BAR7.9
Contact hours per week	2
Format	Lecture / Workshop
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Perceive biomimicry solutions so as to come up with own design applications to achieve sustainable and ecological ideas found in nature. These Biomimicry solutions will be applied to architectural design process.

Learning Objective:
Students will research biomimicry solutions to come up with their own design applications to achieve sustainable and ecological ideas found in nature. Biomimicry solutions will be applied to architectural design process.

Learning Outcome:

Knowledge:

- Gain insight to examine the relationship between our natural and built environments.
- Biological systems teach us about how we design, construct, transport, market, maintain, use and discard our built inhabitations.

Skill:

- Will be able to drive abstractions from nature's solutions into design generation concepts.
- Will be able to evaluate the contributions of natural environments to design process and other alternatives
- Will be able to develop advanced skills on the use of creative design methods by examining the nature

Attitude:

- Provide tools, methods and skills for practicing biomimetic design

- Provide knowledge inside and outside students' own design discipline, in order to get the 'big picture' and allow for true innovation
- Instil constant thinking about nature, health and sustainability

Topical outline to be decided on by the faculty in charge, based on the specific course design.

References:

1. Biomimicry: Innovation Inspired by Nature, Janine Benyus, Perennial, 2002.
2. Pulse: The Coming Age of Systems and Machines Inspired by Living Things, Robert Frenay, 2006.
3. Cats' Paws and Catapults: Mechanical Worlds of Nature and People, Steven Vogel, W. W. Norton & Company, 2000.
4. The New Way Things Work, David Macaulay, Houghton Mifflin/Walter Lorraine Books, 1998.
5. Out of Control: The New Biology of Machines, Social Systems, and the Economic World, Kevin Kelly, Addison-Wesley, 1994.

Semester 7
CONSTRUCTION MANAGEMENT (ELECTIVE)

Course Code	15BAR7.10
Contact hours per week	2
Format	Lecture / Workshop
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Describe general management principles and theories in the construction industry.

Learning Objective:
This course aims to provide students with the knowledge on the general management principles and theories in the construction industry.

Learning Outcome:
- **Knowledge:** Topics including planning and scheduling techniques, principle management, management of resources in a construction project, IT applications in the construction process.
- **Skill:** Evolution of Management thought, different schools / approaches to Management Behavioural, Quantitative, Systems, Contingency approach.
- **Attitude:** Explore the roles of architects and construction managers to apply scheduling, planning, resource allocation, resource levelling, and cost control in managing construction projects

References:
1. Principles of Management. - P.C. Tripathi and P.N. Reddy. McGraw Hill
2. Management in Construction Industry - P.P. Dharwadkar, Oxford & IBH.
3. The Principles of Business Management.- S.A. Sherlekar, Himalaya Publications.

Semester 7
INTERIOR DESIGN (ELECTIVE)

Course Code	15BAR7.11
Contact hours per week	2
Format	Lecture / Workshop
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Perceive processes of interior design and the various aspects and considerations involved in practice of both residential and commercial design.

Learning Objective:
This course provides an introduction to the processes of interior design and the various aspects and considerations involved in practice of both residential and commercial design. It exposes the students to interior design as a profession and provides a framework for future courses.

Learning Outcome:
- **Knowledge:** The course acquaints the student with the profession of interior design including: design basics, planning, materials and elements, furniture, textiles, lighting, colour, art and accessories, kitchens and bathrooms, public spaces, human factors, design history, working methods, systems and business practices.
- **Skill: Students in this course gain knowledge of:**
- The design process
- Elements of interior design
- Technical aspects of interior design projects
- **Attitude:** Classroom activities support the student's ability to work in a team and enhance written, graphic and oral communication skills (written, graphic, and oral).

Topical outline to be decided on by the faculty in charge, based on the specific course design.

References:

1. Pile, John F. Interior Design, Third Edition. Upper Saddle River, New Jersey: Prentice Hall Press, 2003.
2. Christine M. Piotrowski, Becoming an Interior Designer, John Wiley and Sons, 2003
3. Arnold Friedman, Forrest Wilson, John F. Pile, Interior Design, Elsevier Publishing company, 3rd edition, 1982.
4. Henry Wilson, India: Decoration, Interiors, Design
5. Watson Guptill, First American edition, 2001 Michael Freeman, India Modern, Periplus editions, 2005
6. Sunil Sethi, Angelika Taschen, Indian Interiors, TASCHEN America Ltd; 25th ed. edition, 2009

Semester 7
ADVANCED BUILDING MATERIALS (ELECTIVE)

Course Code	15BAR7.12
Contact hours per week	2
Format	Lecture / Workshop
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Learn about advanced building materials, construction and technology in building construction.

Learning Objective:
To learn about advanced building materials, construction and technology in building construction. Learn how to apply new materials, structural systems and technology in the architectural and design work.

Learning Outcome:

Knowledge:

- Advanced building materials, construction and technologies supporting the architectural concept of the construction works with an emphasis on visual perception of the environment structure and texture of surfaces (e.g. transparent concrete, structural elements and materials with the ability to change dynamically visual characteristics, etc...).
- Advanced construction materials, engineering and technology supporting the architectural concept of the construction works with an emphasis on the function of the construction works (e.g., design and technology to help people with health disabilities, etc.).
- Advanced building materials, structures and technologies supporting the design concept of construction work in waterproofing technology, apertures coat jacket, and light massive enclosing walls, roof frames and the like.

- Advanced building materials, structures and technologies promoting energy and ecological building concept.

Skill:

- Comprehensively explain and critique engineering principles used in advanced building materials.
- Appraise the use of advanced materials as they affect the design process and adapt techniques in the use of advanced materials to create novel solutions to a wide range of problems. Constructively evaluate and aim to improve the issues related to the use of materials.
- Explain and debate with technical and policy based evidence, complex sustainability and environmental issues related to the use of materials.
- Identify and assess advantages and limitations related to the use of advanced materials

Attitude:

- Read scientific articles related to a topic relevant to a chosen subject
- Make a presentation of the outcome in their findings and to present it to their peers

Semester 7
CHARRETTES AND PARTICIPATORY PLANNING (ELECTIVE)

Course Code	15BAR7.13
Contact hours per week	2
Format	Lecture / Workshop
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Study the method of charrettes and participatory planning in the design process.

CO 2: Evolve decision making process and the importance of participation of all stakeholder, including the end users, in making feasible and sustainable plans.

Learning Objective:

To study the method of charrettes and participatory planning in the design process. Study of decision making process and the importance of participation of all stakeholder, including the end users, in making feasible and sustainable plans.

Learning Outcome:

- **Knowledge:** The students will learn to use charrettes and participatory planning as an effective planning tool. Understanding the value of charrettes and participatory planning in sustainable design.
- **Skill:** The basics of charrettes and participatory design will be introduced. Students will be exposed to the process of organising charrettes, group discussions, stakeholder participation, intensive brainstorming sessions and documentation of the solutions. They will develop a quick decision making capacity, based on inputs from all relevant stakeholders, with a strong focus on the end user.
- **Attitude:** Students will improve team work and learn strategic planning. The intensive sessions will enable them to deliver optimised design and planning solutions.

Topical outline and References to be decided on by the faculty in charge, based on the specific course design.

Semester 7
FIELD TRIP

Course Code	15BAR7.14
Contact hours per week	-
Format	Study tour
Method of assessment	Portfolio/ Assignment

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Comprehend role of Urban Design within a Society

CO 2: Interpret design connections with its surroundings within an Urban fabric with respect to a particular settlement/region/city

Learning Objective:
Understanding the role of Urban Design within a Society. Exploring its connections with its surroundings within an Urban fabric with respect to a particular settlement/ region/city.

Learning Outcome:
- **Knowledge:** Supervised study tours gain insight into how different contexts engage with and apply various forms of architecture, through interaction with communities, documentation and mapping exercises.
- **Skill:** Skills will be developed for interventions which reflect context-responsive concepts and understanding of critical analysis of the built environment.
- **Attitude:** Outside of the classroom, the course challenges and extends student perceptions of how societies engage with architecture and its applied forms.

Topical Outline:
- **UNIT I: Study –**Identifying a region and studying various physical and socio-cultural aspects.

- **UNIT II: Documentation –** Mapping of existing fabric, settlements, focussing on urban design and public space. Interaction with local people and stakeholders to be explored as a means of understanding current issues in the built environment and generating inputs for design solutions.

- **UNIT III: Analysis – Representation Modules:**

a) Introduction of Place
b) Detailed Analysis: - Location, Climate, Socio - Cultural Factors, Infrastructure, urban fabric, public space, amenities.

SEMESTER 8

COURSES OF STUDY & TRAINING						
Sl. No.	**Name of Courses**	**Course Format**	**Credits : Contact hours**	**Credits**	**No of Teaching Hours / Week**	
					Studio / Practical	**Lecture**
1	**Urban Housing Studio**	Studio	1:1.5	6	9	
2	**Environmental Design Studio**	Studio	1:1.5	4	6	
3	**Building Construction & Materials- 6**	Studio	1:1.5	2	3	
4	**Dissertation & Research Techniques**	Workshop	1:2	2	4	
5	**Landscape Design**	Lecture	1:1	2	-	2
6	**Mechanical systems**	Lecture	1:1	3		3
7	**Project Management & Building Economics**	Lecture	1:1	3		3
8	**Elective***	Lecture	1:1	2		2
9	**Field Trip**	Field Trip		Audit		
Total				**24**	**22**	**10**

***Electives semester 8**
LEED Lab - 1
LEED Lab - 2
Building Commissioning
Advanced Structures
Integrated Design Process
Intelligent Buildings
Contemporary Architecture and Theory-2

Semester 8
URBAN HOUSING STUDIO

Course Code	15BAR8.1
Contact hours per week	9
Format	Studio
Method of assessment	Portfolio + Jury

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Deduce influences and demands for housing in India and ability to propose suitable design resolutions in the area of strategic housing development.

CO 2: Interpret complexities of proving shelter for people from different socio-economic backgrounds in close proximity to each other, in a tightly kneed urban setting.

Learning Objective:
Introduction to influences and demands for housing in India and ability to propose suitable design resolutions in the area of strategic housing development.

Learning Outcome:
- **Knowledge:** Understanding of the complexities of proving shelter for people from different socio-economic backgrounds in close proximity to each other, in a tightly kneed urban setting.
- **Skill:** Ability to analyse these complexities and to let this emerge into a design for housing.
- **Attitude:** To approach housing as an inclusive community, which provide opportunity for people from different socio-economic backgrounds to interact with each other and also with the larger urban neighbourhood within which the housing community is situated.

Topical Outline:
- **UNIT 1:** Theoretical background on the nature and magnitude of the housing problem in India: The students to work in groups to study the themes listed below

and present their findings.

1. **Study of Urban and Rural housing:** urbanization and poverty issues in the Indian context.
2. **Role of Housing in the National level and the major housing programmes** carried out in the various five year plans.
3. **Important earlier Housing Schemes in India** for various categories like HIG, MIG, LIG, EWS.
4. **Study of Slums and its impact on the urban housing scenario.** Examples of the major slum clearance and slum Improvement scheme.
5. **Concept of Aided Self Help:** housing the poor through the NGO's.
6. **National Housing Policy:** need, objectives and role in housing.
7. **Housing Finance:** sources and characteristics. Major housing finance agencies at the national and state level like the NHB, HDFC, LICHFL, GIC, UTI, Commercial Banks etc.

- **UNIT 2: Individual study on mass housing design typologies:** isolated blocks, row housing, plotted housing, shared services, low rise and high rise housing development Research on different socio-economic categories / age groups / social communities - their needs and requirements - space utilization practices

- **UNIT 3: Design Project:** To design a community housing scheme on an urban level. The site and mix of residents that form the social community is based on the outcome of the Housing Elective in semester 7. Focus for the design is to create housing for different socio-economic categories within one layout, set in an urban context. To provide communal spaces and amenities which stimulate interaction between the residents and thereby strengthen the community as a whole. The housing layout should however not be treated as a gated community. Means for interaction with 'outsiders' and giving public value to space are to be explored and incorporated.

References:

1. India, The Urban Transition: Henrik Valeur
2. Housing and Urbanisation: Charles Correa
3. The social life of small urban spaces: Whyte
4. Urban design and people: Dobbins
5. How to Study Public Life: Gehl, J and Svarre, B.

Semester 8
ENVIRONMENTAL DESIGN STUDIO

Course Code	15BAR8.2
Contact hours per week	6
Format	Studio
Method of assessment	Portfolio

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Perceive the fundamentals of the issue of sustainability and then to explore various fields and ideas in history where the concern was elaborated and practiced.

CO 2: Understand issues affecting the environment, chronologically discuss the political, social and economic movements with reference to it, and explore topics with reference to philosophical outlooks in the context of sustainability.

Learning Objective:
To introduce the students to the fundamentals of the issue of sustainability and then to explore various fields and ideas in history where the concern was elaborated and practiced. Students are encouraged to reflect on issues affecting the environment, chronologically discuss the political, social and economic movements with reference to it, and explore topics with reference to philosophical outlooks in the context of sustainability.

Learning Outcome:
- **Knowledge:** To understand the true meaning of sustainable design and its correct practice
- **Skill:** To design, construct & operate structures to minimize or eliminate adverse results and enhance positive impacts
- **Attitude:** To develop awareness and familiarity with ‘green’ design

Topical Outline:

- **UNIT 1: Introduction to Green Buildings:** Why make Buildings Green

- **UNIT 2: Green Building Rating System:** The seven categories in the rating system: Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources, Indoor Environmental Quality, Innovation in Design and Regional Priority

- **UNIT 3: Introduction to a design exercises (Project application):** Design of a small building with an objective to integrate categories of green building rating.

- **UNIT 4: Sustainable Sites:** Site Specific Design; Development Density and Community Connectivity, Alternative Transportation, Site Development, Storm water Design and Heat Island Effect.

- **UNIT 5: Water Efficiency:** Innovative Wastewater Treatment and Reuse and Water Use Reduction

- **UNIT 6: Energy and Atmosphere:** Optimize Energy Performance, On- site Renewable Energy, Enhanced Commissioning and Green Power. To apply the principles of Solar Passive Architecture to design of buildings.

- **UNIT 7: Materials and Resources:** Building Reuse: Maintain Existing Walls, Floors, and Roof, Construction Waste Management, Materials Reuse, Recycled Content, Regional Materials and Certified Wood.

- **UNIT 8: Indoor Environmental Quality:** Construction Indoor Air Quality Management Plan and Daylight and Views.

- **UNIT 9: Regional Priority:** To provide incentive for project teams to address geographically significant environmental local issues. Introduction to passive techniques of cooling such as evaporative cooling, earth tubing, wind scoops, roof ponds, shaded courtyards etc.

- **UNIT 10: Review of project**

References:

1. Indian Green Building Council
2. ‘Housing, Climate and Comfort’ by Martin Evans
3. ‘Climate Responsive Architecture’ by Arvind Kishan, Baker and Szokolay

Semester 8
BUILDING CONSTRUCTION AND MATERIALS-6

Course Code	15BAR8.3
Contact hours per week	3
Format	Studio
Method of assessment	Portfolio

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Understand fundamental designing and detailing of interior spaces including materials for construction, working details, preparation of schematic and detail drawings, construction drawings, and costing.

CO 2: Understand aspects such as Structural Systems, Finishes and Detailing and to make correct analyses of and Detail specifications for Buildings

Learning Objective:
To expose students to fundamental designing and detailing of interior spaces including materials for construction, working details, preparation of schematic and detail drawings, construction drawings, and costing.

Learning Outcome:
- **Knowledge:** Acquaintance with Interior Material Qualities and Methods of Construction Employed in Interior Construction and Introduction to Finishing Materials.
- **Skill:** Understanding of Aspects such as Structural Systems, Finishes and Detailing
- **Attitude:** The students would be able to comprehend and make correct analyses of and Detail Specifications for Buildings.

Topical Outline:
- **UNIT 1:** Introduction to interior design. Visualization of interior spaces with respect to light, colour and functional aspects; use of materials in specific site

conditions depending on their type such as residences, restaurants, cinemas, auditoriums, planetariums. Introduction to the basic idea of materiality.

- **UNIT 2:** Working light and acoustic level working details, collection of materials and market study and case study quality materials and workmanship.

- **UNIT 3: Building materials:**
  1. **Fire-proofing, thermal insulation and sound insulation**
     Introduction, Properties and Applications.
  2. **Pre-fabricated building systems**
     Introduction to Pre-Fabricated Materials and their Applications.

References:

1. Jain, Shashi. (1994). Creative Interiors. Management Publishing Company, New Delhi
2. Ching, FrancisD.K. (1987). Interior Design Illustrated. Van Nostrand Reinhold, New York
3. Korn, Ahmed A. (1992). Interior Design. Iquara Publication Limited, Bombay
4. De Chiara, Joseph. (1992). Time Savers Standard for Interior Design and Space Planning. Mcgraw Hill Publishing Company.

Semester 8
DISSERTATION AND RESEARCH TECHNIQUES

Course Code	15BAR8.4
Contact hours per week	4
Format	Workshop
Method of assessment	Portfolio

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Perceive research and design methods utilised in different kinds of Architectural Design projects.

Learning Objective:

To provide students with an overview of the variety of research and design methods utilised in different kinds of Architectural Design projects. The intention is to assist them in contextualizing their research in terms of existing knowledge and varieties of research strategies by providing a forum for the devising, development and refinement of a rigorous research methodology. The genres of inquiry discussed include a gamut of disciplines current practices and issues in architecture.

Learning Outcome:

- **Knowledge:** To display an advanced level of design ability to convert the brief set forth earlier into a speculative proposition of design.
- **Skill:** Structured methods of project study and delineate the propositions of design into an architectural solution addressing all the dimensions.
- **Attitude:** To demonstrate the ability to comprehend the nature of architectural problem and create a brief which sets the framework for design.

Topical Outline:

The course work involves students to discuss with the faculty to identify an area of interest or specific types of buildings or issues anticipated to be tackled by the student in Architectural Design project (thesis). The ARCHITECTURAL DESIGN PROJECT (THESIS) Preparation may end with a project proposal giving routine

information on site, location, need, broad requirements and scale. It should clearly indicate the "thesis project question" or an area(s) of interest.

The Research should adhere to:

- Understanding basic principles of any research task with specific reference to architectural research and its application to the undergraduate level.
- The nature and function of research, scientific research, meaning of research in the field of architecture, pure and applied research, traditional and potential areas/types,
- The three stages of research, research methodology.
- Various techniques of data collection in general, specific techniques in architectural research, methods of analysis stage.
- Communication of research reporting, the structure of a report.
- The necessity for the development of writing skills, technical data about formal writing.
- The use of visuals, the qualities of research, the use of primary and secondary references, bibliography, notation, cross reference etc.
- Issues of selective reference.
- Methods of writing draft reports before finalisation.
- Behavioural studies and user evaluation.

References:

1. Dwivedi, R.S. (2001). Research Methods in Behavioural Science. Mcmillan, New Delhi.
2. Graziano, Anthon. (1989). Research Methods Process of Inquiry. Harper Collins Publishing New York.
3. Groat, Linda and Wang, David. (2002). Architectural Research Methods. John Wiley publication, New York.
4. Harrigan, J E. (1987). Human Factors Research Methods. Elsevier, Amsterdam.
5. Kothari, C R. (1990). Research Methodology: Methods & Techniques, 2nd edn. Wishwa Prakashan, New Delhi.
6. Sanhoff, Henry. (1991). Visual Research Methods in Design. Van Nostrand Reinhold, New York.
7. Zeisel, John. (1995). Inquiry by Design: Tools for Environment-Behaviour Research. Cambridge University press, Cambridge.

Semester 8
LANDSCAPE DESIGN

Course Code	15BAR8.5
Contact hours per week	2
Format	Lecture
Method of assessment	Written

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Introduce discipline of landscape architecture and its elements and to develop basic skills required in handling simple landscape design projects in a holistic manner.

Learning Objective:
To introduce students to the discipline of landscape architecture and its elements and to develop basic skills required in handling simple landscape design projects in a holistic manner.

Learning Outcome:
- **Knowledge:** Exposure to concepts of landscape architecture and its elements with its role in achieving a sustainable design.
- **Skill:** To assess the impacts of human activities on the environment and to strengthen and artistically maintain the ecological balance.
- **Attitude:** To comprehend and analyse the elements of landscape design and integrate into the design of the built environment.

Topical Outline:

- **UNIT 1: INTRODUCTION:** Basic definitions and drawing conventions of landscape architecture. Importance of landscape in developing sustainability in architecture.

- **UNIT 2: ELEMENTS OF LANDSCAPE (soft and hard):** Understanding the Elements of landscape architecture like vegetation, land and water bodies and their application in landscape design. Artificial elements such as stones, flooring, enclosing surfaces, canopies etc.

- **UNIT 3:INTRODUCTION TO TAXONOMY AND PLANT MATERIALS:** Study of trees, shrubs, grasses, ground covers, bamboos and their application and function in landscape design.

- **UNIT 4: HARD LANDSCAPE AND SOFT LANDSCAPE:** Components of hard landscape and soft landscape and their application and understanding through landscape projects.

- **UNIT 5: HISTORY:** Study of history and evolution of landscape architecture both in India and rest of the world. Renaissance Gardens, Mughal Gardens, Italian Gardens, Japanese Gardens, Rock gardens, water gardens.

- **UNIT 6: LANDSCAPE ARCHITECTS:** Study of works and philosophies of noted Indian and International landscape architects such as Ravindra Bhan, Shaheer, Geoffrey Jellicoe, Thomas church, Luis Barragan and their concepts and definitions.

- **UNIT 7: INTRODUCTION TO ECOLOGICAL LANDSCAPE (Site planning and site analysis):** Importance of site analysis; interrelationship between nature and human interventions. Exploration of site planning options with examples of Water front development and Urban parks.

- **UNIT 8: CASE STUDY:** Study and analysis of contemporary landscape design and landscaped areas like courtyards, gardens (residential), urban spaces such as traffic islands, urban parks, Street and site furniture.

- **UNIT 9: APPLICATION OF LANDSCAPE DESIGN:** Application to site plans, small gardens, residential areas, urban spaces, interior courtyards and other interior spaces by incorporating its understanding into the ongoing design project.

References:

1. Jellicoe, Geoffrey and Susan, The Landscape of Man, Thames & Hudson, 3rd Edition, 2012 RP
2. Design with Nature, Ian L. McHarg
3. Strake & Simmonds, Landscape Architecture, McGraw Hill, 2013
4. Fassbender. F. Landscapes & Gardens, Prism, 2013
5. Treib,Mere (Editor), Modern Landscape Architecture, MIT Press, Cambridge, 1992
6. Chung, Landscape World, Archi World, 2007

Semester 8
MECHANICAL SYSTEMS

Course Code	15BAR8.6
Contact hours per week	3
Format	Lecture
Method of assessment	Written / Portfolio

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Deduce the understanding of air conditioning, ventilation, and mechanical vertical circulation systems in buildings.

Learning Objective:
This course aims at exposing the architecture students to the areas of air conditioning, ventilation, and mechanical vertical circulation systems in buildings.

Learning Outcome:
- **Knowledge:** In depth understanding of indoor air quality and air conditioning systems and mechanical circulation systems
- **Skill:** Ability to calculate and design appropriate air conditioning systems, elevators, escalators etc.
- **Attitude:** Understand aspects affecting air quality and systems to modify it. Providing adequate mechanised circulation systems based on building function and requirements.

Topical Outline:
- **UNIT 1: Introduction:** Thermodynamics. History of Air Conditioning

- **UNIT 2: Psychrometrics:** Psychrometric properties, psychrometric chart, simple and computerized psychrometrics, psychrometric processes; Appreciation of indoor and outdoor conditions for a space in summer and winter. Evaporative cooling systems for dry and arid climates in India

- **UNIT 3: Air Conditioning Processes:** Summer and winter air-conditioning processes; Sources of thermal load in summer and winter using Load Estimation Chart; Sensible Heat Factor (SHF)

- **UNIT 4: Building Cooling Load Calculations:** Internal heat gain; system heat gain; ventilation load; cooling and heating load estimate; psychrometric calculations for heating and cooling load.

- **UNIT 5: Transmission and Distribution of Air:** AHU; Room air distribution; friction loss in ducts; dynamic loss in ducts; air duct design; space air diffusion

- **UNIT 6: Lifts and Elevators:** Traffic calculation, space and technical requirements. Design of speed, size, number, locational and arrangement issues- Escalators and Travellators its components, arrangements and functioning, space requirements.

References:

1. Prasad, M., “Refrigeration and Air Conditioning”, 2nd Ed., New Age International
2. Arora, C.P., “Refrigeration and Air Conditioning”, Tata McGraw-Hill
3. Howell, R.H., Saucer, H.J., and Coad, W.J., “Principles of Heating, Ventilation and Air Conditioning”, ASHRAE
4. ASHRAE Hand Book (Fundamentals), ASHRAE

Semester 8
PROJECT MANAGEMENT AND BUILDING ECONOMICS

Course Code	15BAR8.7
Contact hours per week	3
Format	Lecture
Method of assessment	Portfolio

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Impart knowledge about the methodology of executing a construction Project

Learning Objective:
To impart knowledge about the methodology of executing a construction Project, and to enhance the professional ability of the student to manage a construction project by exposing the students to the currently prevalent techniques in the planning, programming and management of a construction project.

Learning Outcome:
- **Knowledge:** Recognize the role of economics and its influences in design and construction. Analysing the course of a project before its commencement.
- **Skill:** Expertise to apply project management techniques in solving the constructional problems efficiently.
- **Attitude:** Ability to cautiously apply different PMT into any project plan and deliver the project.

Topical Outline:
- **UNIT 1: INTRODUCTION:** Role of Architect, Consultants and Contractor in decision making in project management.

- **UNIT 2: PROJECT PLANNING:** Introduction to sequence of construction activity and method of planning and programming, human aspects of project management, Project planning and project scheduling and project controlling.

- **UNIT 3: Elements of network & CPM and PERT analysis:** Event, activity, dummy, network rules, graphical guidelines for network, numbering of events and its application in problem solving.

- **UNIT 4: Project time reduction and optimization:** optimum duration, contracting the network for cost optimization, steps in cost-time optimization

- **UNIT 5: Project cost reduction and value engineering:** Project cost, Indirect project cost, direct project cost, slope of the direct cost curve, total project cost

- **UNIT 6: Project updating:** Timeline for updating information; Data required for updating, steps involved in the process of updating

- **UNIT 7: Resource allocation:** Resource usage profile: Histogram, Resource smoothing and Resource levelling.

- **UNIT 8: Computer applications in project management:** Safety Measures and management: Integrating workers' safety and material security into management.

- **UNIT 9: Billing requirement:** Role of the project manager in monitoring the specifications follow-up for quality control, the measurement book (MB), RA bills, interim and final checking and certification of works on site based on the BoQ and terms of contracts.

- **UNIT 10: Economics in relation to architecture, engineering and other sciences:** Meaning and scope of building economics, construction cost estimation and costing, Issues and challenges associated with building projects. Building Efficiency, Building Life-cycle. Costs and Benefits of Building – Monetary and Non-Monetary.

- **UNIT 11: Types of Insurances and Fire Insurance**

References:

1. Dr. B.C. Punmia et al. Project planning and control with PERT and CPM, Laxmi Publications, New Delhi
2. S.P. Mukhopadyay, Project management for Architect's and Civil Engineers, IIT, Kharagpur, 1974
3. Jerome D. Wiest and Ferdinand K. Levy, A Management Guide to PERT, CPM, Prentice Hall of India Pub, Ltd., New Delhi, 1982
4. R.A. Burgess and G. White, Building Production and Project Management, The construction press, London,1979.

Semester 8
LEED-LAB-1 (ELECTIVE)

Course Code	15BAR8.8
Contact hours per week	2
Format	Lecture/Workshop
Method of assessment	Audit

For course description see LEED-Lab-1, Semester 7.

Semester 8
LEED-LAB-2 (ELECTIVE)

Course Code	15BAR8.9
Contact hours per week	2
Format	Lecture/Workshop
Method of assessment	Audit + Examination

For course description see LEED-Lab-1, Semester 7.

Semester 8
BUILDING COMMISSIONING (ELECTIVE)

Course Code	15BAR8.10
Contact hours per week	3
Format	Lecture/Seminar
Method of assessment	Portfolio/ Assignment

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Understand contemporary practices of testing and commissioning and relevant standards and guidelines; and reliability concepts and their application to maintenance planning and management.

Learning Objective:
The subject aims to provide students with a clear understanding of contemporary practices of testing and commissioning and relevant standards and guidelines; and reliability concepts and their application to maintenance planning and management.

Learning Outcome:

Knowledge:

- Purpose of testing and commission (T&C); T&C standards and guidelines; parties responsible for T&C and their roles; T&C records; recommissioning;
- Instrumentations and methods for performance measurement and verification (M&V) for major building services equipment and systems;
- T&C methods for major building services systems;
- Methods for quantification of uncertainties in measurements and their implications to planning of T&C and M&V processes.

Skill:

Upon completion of the subject, students will be able to:

- Understand the purpose of testing and commissioning and basic measurement methods for plant performance verification;
- Identify relevant standards and guidelines for testing and commissioning of major services systems in buildings, the responsibilities of the involved parties

and the provisions needed for the works;

- Analyse the impacts of measuring instruments and measurement methods on uncertainties of measurement;
- Evaluate component and system reliability and availability from failure and repair statistics;
- Investigate the mode, effect and criticality of component and system failures and means for enhancing system reliability; and
- Appreciate the application of reliability concepts to maintenance management.

Attitude:

The subject will be covered by a range of teaching and learning (T&L) activities, which include interactive lectures, tutorials, a workshop and student-led seminar, and an in-class test. All topics in the syllabus will be covered in the lectures, which will emphasize on fundamental principles and their applications.

Semester 8
ADVANCED STRUCTURES (ELECTIVE)

Course Code	15BAR8.11
Contact hours per week	2
Format	Lecture/Workshop
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Deduce advanced structural systems and methods, like pre-stressed concrete, pneumatic structures, geodesic domes, post-tensioned timber, cross- laminated timber.

Learning Objective:
To expose students to advanced structural systems and methods, like pre-stressed concrete, pneumatic structures, geodesic domes, post-tensioned timber, cross-laminated timber.

Learning Outcome:
- **Knowledge:** Gain in depth understanding of structure systems, its material properties and its detailing.
- **Skill:** Develop the ability to use manual and CAD drawing techniques to conceptualise design.
- **Attitude:** To use advanced structural systems as a way to express design intentions and develop sustainable design solutions.

Topical outline and References to be decided on by the faculty in charge, based on the specific course design.

Semester 8
INTEGRATED DESIGN PROCESS (ELECTIVE)

Course Code	15BAR8.12
Contact hours per week	2
Format	Lecture/Workshops
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Perceive to work in multidisciplinary team setting, having an open mindset to inputs and concerns of other disciplines while at the same time keeping focussed on the overall design quality and thereby reaching optimized consensus.

Learning Objective:
To create awareness about the fact that the design process is driven by a multidisciplinary team with different interests and specialties. The students will learn to work in a multidisciplinary team setting, having an open mindset to inputs and concerns of other disciplines while at the same time keeping focussed on the overall design quality and thereby reaching optimized consensus.

Learning Outcome:
- **Knowledge:** Recognising the different concerns in a multidisciplinary design process and understanding of decision making based on different inputs.
- **Skill:** Ability to function as a team player in a multidisciplinary team, being open to arguments from other disciplines and working towards optimized design solutions within the team setting.
- **Attitude:** Awareness of the role of the architect in a design team, creating a professional and holistic approach to the design process.

Topical outline and References to be decided on by the faculty in charge, based on the specific course design.

Semester 8
INTELLIGENT BUILDINGS (ELECTIVE)

Course Code	15BAR8.13
Contact hours per week	3
Format	Lecture/Seminar
Method of assessment	Portfolio/ Assignment

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Understand types of Building Control Systems and to provide knowledge on the underlying concepts of intelligent buildings.

Learning Objective:
Understanding types of Building Control Systems and to provide knowledge on the underlying concepts of intelligent buildings.

Learning Outcome:

Knowledge:

- Intelligent building characteristics: Features and benefits of intelligent buildings. The anatomy of intelligent buildings. Environmental aspect. The marketplace and other driving forces behind the emergence of intelligent buildings.
- Building automation systems & controls: Philosophy, system configuration, system modules, distributed systems, communication protocol and on-line measurements. Fire protection, security and energy management. Control objectives. Sensors, controllers and actuators. Control system schematics system design. Microprocessor based controllers & digital controls. Examples of sub-systems such as: Digital Addressable Lighting Interface (DALI)
- Modern intelligent vertical transportation systems: Sky lobby, double-deck lifts, twin lifts, advanced call registration systems, large scale monitoring systems, applications of artificial intelligence in supervisory control, energy saving measures related to lift systems/ escalator systems, other modern vertical transportation systems, such as: gondola systems, materials handling systems, etc.

- Communication and security systems: Voice communication systems, local area network, wireless LAN, Digital TV, CCTV, digital CCTV, teleconferencing, cellular phone system, and CABD. SMATV. Data networking. Short- and long-haul networks. Wideband network.
  Office automations. Public address / sound reinforcement systems. Digital public address system. Modern security systems
- Structured cabling systems: Characteristics and benefits. Standards, configurations and physical media. EMI/EMC issues, grounding problems. System design. Different Categories of cables.
- Integrating the technologies and systems: The impact of information technology on buildings and people. Shared tenant services. Interaction and integration between building structure, systems, services, management, control and information technology. Application & design software packages.

Skill:

Upon completion of the subject, students will be able to:

- Identify benefits, impacts and driving forces of intelligent buildings, and its subsystems.
- Describe design philosophy at system level, system configurations, system submodules of vertical modern vertical transportation systems and building automation systems, including the out-stations, etc.
- Describe general design concept and principles of communication systems in intelligent building, such as voice communication system, video communication systems, LAN, wireless LAN, mobile phone system, data networks, office automation systems, etc.
- Describe the general principle, concepts and system configurations of structure cabling, including the features, characteristics and applications of different categories of cables.
- Given a technical topic, carry out literature search and present the findings in a technical report.

Attitude:

The subject will be covered by a range of teaching and learning (T&L) activities, which include interactive lectures, tutorials, a workshop and student-led seminar, and an in-class test. All topics in the syllabus will be covered in the lectures, which will emphasize on fundamental principles and their applications.

Semester 8
CONTEMPORARY ARCHITECTURE AND THEORY-2 (ELECTIVE)

Course Code	15BAR8.14
Contact hours per week	2
Format	Lecture / Workshop
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Highlight various facets of contemporary society and equip the students to critically look at the role of architecture and its engagement with society.

Learning Objective:
This course is an Advanced Theory course with emphasis on significant Cultural discourses prevalent within contemporary society. It aims to highlight various facets of contemporary society and equip the students to critically look at the role of architecture and its engagement with society. The course will also illustrate certain architectural practices which have tried to directly or indirectly relate their works with some of these ideas. By arriving at a better understanding of how architecture is situated within this discourse, it encourages the students to critically address these concerns through their designs.

Learning Outcome:
- **Knowledge:** To be informed about the various cultural theories and critiques about contemporary society and how it has affected architectural practice.
- **Skill:** To be able to evaluate architectural works with respect to a larger cultural role that it plays in contemporary society.
- **Attitude:** To position one's own work within the contemporary culture and advance possible theories towards a more critically relevant engagement with society.

Topical Outline:

The individual topics would be selected and structured by the concerned Instructor of the course. The topics listed below are an indication of the possible directions that the elective may take.

- **UNIT 1: CONTEMPORARY CULTURAL THEORIES**
  - Cultural Logic of Late Capitalism, Frederic Jameson
  - System of Objects, Jean Baudrillard
  - Simulacra and Simulacrum, Jean Baudrillard
  - Cyborg / Post-human, Donna Haraway
  - Work of Art in the Age of Technical Reproducibility, Walter Benjamin
  - Medium is the Message, Marshall McLuhan
  - Society of the Spectacle, Guy Debord
  - Looking Awry. Slavoj Zizek

- **UNIT 2: ARCHITECTURE + CULTURE**
  - Architecture where Desire may Live, Jacques Derrida
  - Constructions, John Rajchman
  - Overexposed City, Paul Virilio
  - Space and Power, Michel Foucalt
  - Against Architecture, writings of George Bataille
  - Junkspace, Rem Koolhaas
  - End of the Classical ....., Peter Eisenman
  - Architecture and the Crisis of Modern Science, Alberto Perez Gomez

- **UNIT 3: ARCHITECURAL EXAMPLES**
  - CHORA-L WORKS, Peter Eisenman
  - Park de La Villette, Bernard Tschumi
  - S,M,L,XL Rem Koolhaas
  - Houses, Peter Eisenman

- **UNIT 4: INDIVIDUAL RESEARCH**

  The student is expected to select any Architectural Work and look at it critically through the topics discussed above. The final research document may be in the form of a paper or a presentation.

Semester 8
FIELD TRIP

Course Code	15BAR8.15
Contact hours per week	-
Format	Study tour
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Interpret role of Urban Housing within a Society by exploring its connections with its surroundings within an Urban fabric with respect to a particular settlement/region/city.

Learning Objective:
Understanding the role of Urban Housing within a Society. Exploring its connections with its surroundings within an Urban fabric with respect to a particular settlement/ region/city.

Learning Outcome:
- **Knowledge:** Supervised study tours gain insight into how different contexts engage with and apply various forms of architecture, through interaction with communities, documentation and mapping exercises.
- **Skill:** Skills will be developed for interventions which reflect context-responsive concepts and understanding of critical analysis of the built environment.
- **Attitude:** Outside of the classroom, the course challenges and extends student perceptions of how societies engage with architecture and its applied forms.

Topical Outline:
- **UNIT 1: Study:** Identifying a region and studying various physical and socio-cultural aspects.

- **UNIT 2: Documentation:** Mapping of existing fabric, settlements, focussing on urban housing, amenities and public space. Interaction with local people and

stakeholders to be explored as a means of understanding current issues in the built environment and generating inputs for design solutions.

- **UNIT 3:** Analysis: Representation Modules:
  a) Introduction of Place
  b) Detailed Analysis: - Location, Climate, Socio - Cultural Factors, Infrastructure, urban fabric, public space, group- and mass housing, amenities, landscaped areas, topography and terrain conditions.

SUMMER 4
OPTIONAL 4TH YEAR SUMMER PROGRAM
COURSE CODE: 15BAR8.16

COURSES OF STUDY & TRAINING						
Sl.No.	**Name of Courses**	**Course Format**	**Credits : Contact hours**	**Credits**	**No of Teaching Hours / Week**	
					Studio / Practical	**Lecture**
1	**Special Study**	Internship / Workshop / Independent Study / Research	1:2	4	8	-
Total				**4**	**8**	**0**

The Summer Programs focus on experiential learning beyond classroom, to balances full time work experience with academics. This 4rd year Summer Program is meant as the starting point for the Internship work which will continue in Semester 9, thereby aiming for a six months contribution to professional practise and a meaning full learning experience.

SEMESTER 9

COURSES OF STUDY & TRAINING						
Sl.No.	**Name of Courses**	**Course Format**	**Credits : Contact hours**	**Credits**	**No of Teaching Hours / Week**	
					Studio / Practical	**Lecture**
1	**Internship**	Internship	1:2	18	36	
Total				**18**	**36**	**0**

Semester 9
INTERNSHIP

Course Code	15BAR9.1
Contact hours per week	36
Format	Practical
Method of assessment	Portfolio

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Participate in and be exposed to the various facets of architectural practice through internship at an established architectural studio.

CO 2: Understand the role and importance of the experience in practice and on site decision-making process.

Learning Objective:
To participate in and be exposed to the various facets of architectural practice through internship at an established architectural studio.

Learning Outcome:

- **Knowledge:** To understand the role and importance of the experience in practice and on site decision-making process.
- **Skill:** Ability to put the knowledge gained into carrying out and delivering a successful project
- **Attitude:** To be proactive and ensure maximum benefit out of the training experience.

Topical Outline:

- Professional training is for a period of 16-18 weeks.
- Compilation of a portfolio of studio subjects and other works (Sem 1 to 9). This, along with the student's CV and NIA's reference letter, is to be sent to various offices, wherein the student is desirous to gain placement.
- Students are required to gain placements under an Architect / Architectural firm,

who is registered with the Council of Architecture. The training coordinator will help streamline this process.

- The college will guide the students towards placement and interact with the architectural firms while introducing the student.
- Students will maintain a log-book for recording their studio works, participation in the office on a daily basis. The log book will be vetted by the Architect / Firm at the end of the tenure.
- Upon end of tenure, students should follow up to receive certificate of internship from the office.
- A jury will evaluate the students' works at the end of the semester. Students should present details of work and projects that they have been involved in the office. Clear representation of involvement is to be made known.

SEMESTER 10

COURSES OF STUDY & TRAINING						
Sl. No.	**Name of Courses**	**Course Format**	**Credits : Contact hours**	**Credits**	**No of Teaching Hours / Week**	
					Studio / Practical	**Lecture**
1	**Capstone Project**	Studio	1:1.5	12	18	
2	**Professional Practice**	Lecture	1:1	3		3
3	**Elective***	Lecture	1:1	4		4
4	**Elective***	Seminar	1:1	3		3
Total				**22**	**18**	**10**

***Electives semester 10**
LEED – Lab - 2
Life Cycle Costing and Analysis
Tall Buildings
Integrated Systems Management
Building Performance Simulation
Disaster Management
Finance and Engineering Integration
Design and Build Projects
Remote Sensing and GIS

Semester 10
CAPSTONE PROJECT

Course Code	15BAR10.1
Contact hours per week	18
Format	Studio
Method of assessment	Portfolio + Jury

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Prepare self-ideated architectural project

CO 2: Undertake projects of following capacity:
1. Architectural Design,
2. Urban Planning and Urban Design,
3. Research

Content:
The Capstone Project is a collaborative effort between the student and the advisor and is very much dependent on the student's initiative and creativity to develop final form and limits of each personal investigation. Overlapping issues and coordinated reviews and interaction within each studio section provide a strong perspective for individual design efforts.

The final comprehensive architectural project under the guidance of a specific faculty advisor. There are three main directions out of which the student has to choose one to focus on in his Capstone Project:

1. Architectural Design
2. Urban Planning and Urban Design
3. Research

Learning Objective:
To demonstrate architectural knowledge, skills, and professional interests and goals. To simultaneously understand and include within the design process various external determinants - understanding of economic, social and environmental

context, materiality of construction including primary building systems/components, i.e., structure, skin, life safety, environmental systems, and process of implementation. To strengthen understanding of how design process mediates the formation of the design project through consideration of contemporary factors of culture, theory, social/political/economic status, market forces, and ethics in interaction with tectonics of building systems/components of construction, materials, structure, environmental design to shape the design of building/landscape in particular and architectural practice in general. To develop critical reasoning, thinking and communication skills.

Learning Outcome:

- Ability to raise clear and precise questions, use abstract ideas to interpret information, consider diverse points of view, reach well-reasoned conclusions, and test alternative outcomes against relevant criteria and standards.
- Ability to use appropriate representational media, such as traditional graphic and digital technology skills, to convey essential formal elements at each stage of the programming and design process.
- Understanding of the diverse needs, values, behavioral norms, physical abilities, and social and spatial patterns that characterize different cultures and individuals and the implication of this diversity on the societal roles and responsibilities of architects.
- Understanding the role of applied research in determining function, form, and systems and their impact on human conditions and behavior.
- Ability to design sites, facilities, and systems to provide independent and integrated use by individuals with physical (including mobility), sensory, and cognitive disabilities.

  Ability to comprehend and simultaneously cater to issues of Site Design, Sustainability, Environmental Systems, Structural Systems, Building Service Systems, Building Materials and Assemblies, Human Behavior, Ethics and Professional Judgment, Community and Social Responsibility.

Semester 10
PROFESSIONAL PRACTICE

Course Code	15BAR10.2
Contact hours per week	3
Format	Lecture
Method of assessment	Portfolio / Written

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Deduce the role professional and statutory bodies, the code of conduct and most importantly the role of an architect in project execution.

Learning Objective:

- **Knowledge:** Understand the role professional and statutory bodies, the code of conduct and most importantly the role of an architect in project execution.
- **Skill:** Structured methods of project execution and the right of way of exercising the rights as a professional.
- **Attitude:** Ability to make informed decisions on site within the guidelines and norms.

Topical Outline:

- **UNIT 1: Profession:** Idea of profession and essential difference among profession, trade and business. It's essential tenets, duties and liabilities.

- **UNIT 2: Profession of Architecture:** Types and extent of services offered by architects, scale of fees, stages of payment, and contract between client and architect.

- **UNIT 3: Code of Professional Conduct:** Architects Act of 1972. Role of Council of Architecture and the Indian Institute of Architects in the functioning of the Profession.

- **UNIT 4: Architectural Practice-1:** Types of Architectural firms, proprietorship, partnership, associate ship. Advantages and disadvantages of

each type of firm. Basic accounting procedures. Taxes and implications of service tax.

- **UNIT 5: Architectural Practice-2:** Various means of building client base and gaining projects. Architectural competitions, guidelines of COA, procedure of conduct of such competitions.

- **UNIT 6: Building Industry:** General overview of the industry. Various participants and dimensions of building industry. Finance, statutory controls, construction procedures, enforcement issues related to building industry and the role of architect, employer, and contractor.

- **UNIT 7: Contract Management:** Overview of procedures in contract management with a focus on Architect's role.

- **UNIT 8: Tender-1:** Procedure of calling for tender, documents necessary for tendering process. Tender document and its content. Types of tenders, suitability of different types to various categories of projects. Advantages and disadvantages of each type of tender. Tender notices, opening, scrutiny, process of selection and award.

- **UNIT 9: Tender-2:** Architect's role in tender process. Essential characteristics of Tender Notice, Earnest Money Deposit, Security Deposit, Retention Amount, Mobilization Amount and Bonus & Penalty Clauses.

- **UNIT 10: Tender issues:** Various issues arising out of tendering process and the role of an architect in maintaining objectivity in the process.

- **UNIT 11: Contract:** General Principles, types of contract, definitions of various terms used in the contract document. Contract document, contents and sections dealing with various aspects of contract management. Conditions and Scope of Contract and the role of an architect in ensuring a positive completion of a contract. Architect's role in the contract and vested authority.

References:

1. Professional Practice for Architects & Engineers by Roshan Namavathi
2. Legal and Contractual Procedures for Architects by Bob Greenstreet
3. AJ Legal Handbook
4. Professional Practice by KG Krishnamurthy and SV Ravindra

Semester 10
LEED-LAB-2 (ELECTIVE)

Course Code	15BAR10.3
Contact hours per week	2
Format	Lecture/Workshop
Method of assessment	Audit + Examination

For course description see LEED-Lab-1, Semester 7.

Semester 10
LIFE CYCLE COSTING AND ANALYSIS (ELECTIVE)

Course Code	15BAR10.4
Contact hours per week	3 / 4
Format	Seminar
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Demonstrate the value of LCCA, how it can be successfully incorporated into the decision-making process, and what actions public agencies have taken to put LCCA programs in place.

Learning Objective:
Demonstrate the value of LCCA, how it can be successfully incorporated into the decision-making process, and what actions public agencies have taken to put LCCA programs in place.

Learning Outcome:
- **Knowledge:** To describe the environmental impact throughout a product's lifecycle; be able to perform basic life cycle cost analysis and to analyse the most cost effective maintenance alternative
- **Skill:** Method to assess the total cost of facility ownership. It takes into account all costs of acquiring, owning, and disposing of a building or building system; Concept, purpose, benefits, stages, relevance in decision-making and its application in Budgeting
- **Attitude:** Provide better information to decision-makers and help target limited funds to the most beneficial and cost effective projects

Topical outline to be decided on by the faculty in charge, based on the specific course design.

References:

1. Building Economics: Theory and Practice by Rosalie T. Ruegg and Harold E. Marshall. New York: Van Nostrand Reinhold, 1990.
2. Facility Maintenance and Repair Cost Reference by Whitestone Research. 2010-2011 (15th Edition)
3. Engineering Economy by G. J. Thuesen and W. J. Fabrycky. Prentice Hall, 1993. ISBN 0-13-277491-7.
4. Life-Cycle Costing Manual for the Federal Energy Management Program by Sieglinde Fuller and S.R. Petersen. NIST Handbook 135. National Institute of Standards and Technology, 1995.
5. Simplified Energy Design Economics by Harold E. Marshall and Rosalie T. Ruegg. NBS SP 544. Washington, DC: National Bureau of Standards, January 1980.
6. Dhillon, B.S. (2009). Life Cycle Costing for Engineers. CRC Press Inc.

Semester 10
TALL BUILDINGS (ELECTIVE)

Course Code	15BAR10.5
Contact hours per week	3 / 4
Format	Lecture/Workshop
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Describe construction methods for high rise buildings, focusing on the structural aspects and systems and their design philosophy dealing with the effects of wind and earthquake loading and fire.

Learning Objective:
Understanding of construction methods for high rise buildings, focussing on the structural aspects and systems and their design philosophy. Dealing with the effects of wind and earthquake loading and fire.

Learning Outcome:
- **Knowledge:** Understanding of design principles of high-rise concrete, steel, engineered timber and hybrid structures.
- **Skill:** Ability to translate design principles and material features into sustainable and energy efficient designs for high rise buildings.
- **Attitude:** Getting acquainted with performance-based design objectives.

Topical outline and References to be decided on by the faculty in charge, based on the specific course design.

References:
1. Taranath, B. (1998). Steel, Concrete, & Composite Design of Tall Buildings. New York: McGraw-Hill.

Semester 10
INTEGRATED SYSTEMS MANAGEMENT (ELECTIVE)

Course Code	15BAR10.6
Contact hours per week	3
Format	Lecture/Seminar
Method of assessment	Portfolio/ Assignment

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Deduce how the various systems that constitute a building design (site, structure, skin, building services and environmental controls, space and finishes, etc.) are interwoven and integrated with a view to achieving a high-performance building

Learning Objective:

The learning objectives of this course are:

- To understand how the various systems that constitute a building design (site, structure, skin, building services and environmental controls, space and finishes, etc.) are interwoven and integrated with a view to achieving a high performance building;
- To attain an appreciation of building systems integration in architecture through case studies with an emphasis on sustainable design and construction

Learning Outcome:

- **Knowledge:**
  Core concepts will be developed through the themes of sustainability, efficiency and performative architecture. The course is intended to create a dialogue between all, identifying and discussing key terms and definitions as they relate to Sustainability, Efficiency and Performative Architecture (focused on integrated and optimized building systems).
  Skill:
- Sustainable Design Principles and Human Behaviour
- Climate and Site Analysis and Design
- Building Materials and Assemblies

- Building Envelope and Passive Systems
- Ordering Systems Skills
- Environmental Building Systems (Active and Generative)

Attitude:

It explores the integration of site, structure, skin, services, space and other sustainability considerations in architectural design. The core of the course is placed on appreciating how systems are related to each other in the context of aiming for a high performance building in various categories of major use. Case study approach will be adopted to illustrate the concept and practice.

Semester 10
BUILDING PERFORMANCE SIMULATION (ELECTIVE)

Course Code	15BAR10.7
Contact hours per week	3 / 4
Format	Seminar
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Perceive building performance analysis and the systems and technologies used.

Learning Objective:
To introduce the students to building performance analysis and the systems and technologies used.

Learning Outcome:
- **Knowledge:** Concepts in building performance and its relation to the architectural design process.
- **Skill:** Building performance analysis and simulation software and their use in architectural design.
- **Attitude:** Energy efficient, climate responsive and sustainable approach to design using building performance simulations to take decisions during the design process.

Topical outline and References to be decided on by the faculty in charge, based on the specific course design.

Semester 10
DISASTER MANAGEMENT (ELECTIVE)

Course Code	15BAR10.8
Contact hours per week	3 / 4
Format	Seminar
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Explain basic concepts in Disaster Management in Architectural context

Learning Objective:
- To Understand basic concepts in Disaster Management
- To Understand Definitions and Terminologies used in Disaster Management
- To Understand Types and Categories of Disasters
- To Understand the Challenges posed by Disasters
- To understand Impacts of Disasters

Learning Outcome:

Knowledge:

Concepts of Hazard, Vulnerability, Risks, Natural Disasters (earthquake, Cyclone, Floods, Volcanoes), and Man Made Disaster (Armed conflicts and civil strip, Technological disasters, Human Settlement, Slow Disasters (famine, draught, epidemics) and Rapid Onset Disasters(Air Crash, tidal waves, Tsunami) Risks, Difference between Accidents and Disasters, Simple and Complex Disasters, Refugee problems, Political, Social, Economic impacts of Disasters, Gender and Social issues during disasters, principles of psychosocial issues and recovery during emergency situations,

Equity issues in disasters, Relationship between Disasters and Development and vulnerabilities, different stake holders in Disaster Relief. Refugee operations during disasters, Human Resettlement and Rehabilitation issues during and after disasters, Inter-sectoral coordination during disasters, Models in Disasters.

Skill:

- Application of Disaster Concepts to Management
- Analyse Relationship between Development and Disasters.
- Ability to Categories Disasters

Attitude:

- To get acquainted to various disasters that India is vulnerable to, and the hazard maps that enable them to visualize their vulnerabilities
- Concept of preparedness leading to reduced vulnerability

Topical outline to be decided on by the faculty in charge, based on the specific course design.

References:

1. Bryant Edwards (2005): Natural Hazards, Cambridge University Press, U.K.
2. Carter, W. Nick, 1991: Disaster Management, Asian Development Bank, Manila.
3. Central Water Commission, 1987, Flood Atlas of India, CWC, New Delhi.
4. Central Water Commission, 1989, Manual of Flood Forecasting, New Delhi.
5. Government of India, 1997, Vulnerability Atlas of India, New Delhi. 6. Sahni, Pardeep et.al. (eds.) 2002, Disaster Mitigation Experiences and Reflections, Prentice Hall of India, New Delhi.

Semester 10
FINANCE AND ENGINEERING INTEGRATION (ELECTIVE)

Course Code	15BAR10.9
Contact hours per week	3 / 4
Format	Seminar
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Deduce building costs as a factor in the design process and on means of project funding.

CO 2: Understand the impact of design decisions on costs.

Learning Objective:

This elective focuses on building costs as a factor in the design process and on means of project funding.

To understand the impact of design decisions on costs. Understanding of the importance of building costs in the design process and introducing the students to ways to use costs as a design parameter and therefore a design tool. To introduce students to different ways of organising project funding.

Learning Outcome:

- **Knowledge:** Recognising finances as one of the important design parameters. To gain understanding of funding systems: which systems are available and how to address them. Understanding of crowd funding and participatory design process.
- **Skill:** Ability to use finances and building costs as a tool in the design process. Understanding of the impact of design decisions on building costs. Ability to address relevant means of project funding, based on the characteristics of the design project.
- **Attitude:** Awareness of finances being an important part in the decision making during the design and engineering process in a multi disciplinary setting.

Topical outline and References to be decided on by the faculty in charge, based on the specific course design.

Semester 10
DESIGN AND BUILD PROJECTS (ELECTIVE)

Course Code	15BAR10.10
Contact hours per week	3 / 4
Format	Seminar
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Establish an ethos of recycling, reusing and remaking with and within the built environment.

Learning Objective:
The elective intends to establish an ethos of recycling, reusing and remaking with and within the built environment. Students are encouraged to have a hands on involvement both in understanding design and 'building', which fosters collaboration among the students and professionals.

Learning Outcome:
- **Knowledge:** A broad understanding of the complexity of the design and building process, understanding of the connection and dependence between the two.
- **Skill:** Hands on experience on the realisation of design, based on context, concept and practicalities. Being able to have a holistic approach towards projects from scratch till finalizing, understanding design and realization are strongly interconnected and impacting each other.
- **Attitude:** A professional and realistic attitude towards all participants in both the design and the building process.

Semester 10
REMOTE SENSING AND GIS (ELECTIVE)

Course Code	15BAR10.11
Contact hours per week	3 / 4
Format	Seminar
Method of assessment	Audit

COURSE OUTCOMES

At the end of the course students will be able to...

CO 1: Understand the concepts and technologies involved in Remote Sensing (RS) and Geographical Information System (GIS).

Learning Objective:
The learning objectives of this course is to understand the concepts and technologies involved in Remote Sensing (RS) and Geographical Information System (GIS).

Learning Outcome:

- **Knowledge:**
  Basic remote sensing, platform, sensors, and introduction to sensors, basic principal & methods of photo interpretation and techniques of data collection through satellite data; Classification techniques using satellite data; Digital image processing, enhancement techniques in urban information extraction; Aerial photography as a tool for collection of data and preparation of maps, its application in planning and preparation for a project, orientation concept and methodology transformation and adjustment techniques.

- **Skill:**
  Experiments in lab, Instruction for making overlays; Computation of photo scale Orientation of a stereo pair under a mirror stereoscope; Recognition on aerial photograph of objects indicated on ground photographs; Detection of defined objects, Description and identification of objects. Use of auxiliary features for object identification; Systematic scanning of a photograph, and object identification; Identification of land use with a given classification; Monitoring

urban changes, mosaic preparation. Base map preparation elementary data analysis using satellite data; Experiments in lab, Instruction for making overlays. Classification preparation; Interpretation delineation of various land use on satellite data products. GIS techniques and their application in planning field

- **Attitude:**
  Assignment will be in the form of a manual/handwritten journal covering all the topics mentioned above with suitable examples, sketches and supportive material. Students will work on analytical and design projects of simple function area of smaller scale and produce the work in the form of sheets and a report.