



Structure & Rules of Examination
For
Bachelor of Architecture (B. Arch) Programme (CBCS 2020)

Bharati Vidyapeeth (Deemed to be University)
College of Architecture, Pune



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Bharati Vidyapeeth
(Deemed to be University)
Pune, India,

Founder Chancellor : Dr. Patangrao Kadam

★ Accredited with 'A+' Grade (2017) by NAAC ★
★ Category I University Status by UGC ★
★ NIRF Ranking 'E6' ★

"Social Transformation Through Dynamic Education"



Dr. Vishwajeet Kadam
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Registrar

NOTIFICATION NO. 1055

It is hereby notified for the information of all concerned that the proposal to revise the course structure, syllabus and rules of examinations of B.Arch. programme proposed by the concerned Board of Studies and recommended by the Faculty of Engineering and Technology is considered by the authorities of the University.

The authorities of the University have approved the course structure, rules of examinations and 1st year syllabus of B.Arch. programme offered under the Faculty of Engineering and Technology to be implemented from the academic year 2020-21 :

Ref. No. BVDU/ 2020-21/1486
Date : November 5, 2020

G. Jayakumar
Registrar

1. The Principal, College of Architecture, Pune 43
2. The Dean, Faculty of Engineering and Technology, Pune 43
3. The Controller of Examinations, BVDU
4. The IT Cell for uploading in the Website.

Adm/Syllabus/academic/COA File

Bharati Vidyapeeth (Deemed to be University) College of Architecture, Pune-43.	
Inward No.:	187
Date:	21/11/2020
Sign:	

Table of Contents

VISION OF BV (DU) UNIVERSITY	i
MISSION OF BV (DU) UNIVERSITY	i
VISION OF BV (DU) COLLEGE OF ARCHITECTURE PUNE.....	i
MISSION OF BV (DU) COLLEGE OF ARCHITECTURE PUNE.....	i
PROGRAMME: BACHELOR OF ARCHITECTURE (B.ARCH)	ii
Programme Objectives:	ii
Programme Outcomes:	ii
SALIENT FEATURES OF SYLLABUS	ii
RULES FOR FIRST TO FIFTH YEAR B. ARCH	iii
Rule No.1: Eligibility for Admission	iii
Rule No.2: Duration of the course (as per Council of Architecture)	iii
Rule No.3: Scheme of Assessment	iii
Rule No. 4: Granting of Academic Term	iv
Rule No. 5: Progression Requisite	iv
Rule No 6: Examinations.....	v
Rule No. 7: Credits.....	vii
Rule No.8: Criteria for Passing.....	ix
Rule No.9: Grading system.....	ix
Rule No.10: Award of Degree (B.Arch.)	xi
Rule No.11: Introduction of this Curriculum	xii
Rule No.12: Course Code.....	xii
Rule No.13: Maximum period for duration of course.....	xiii
STRUCTURE OF B.ARCH DEGREE PROGRAMME	xiv
Structure & Examination Pattern of First Year B.Arch.	xvi
Structure & Examination Pattern of First Year B. Arch	xvii
Structure & Examination Pattern of Second Year B.Arch.	xviii
Structure & Examination Pattern of Second Year B.Arch.	xix
Structure & Examination Pattern of Third Year B. Arch.....	xx
Structure & Examination Pattern of Third Year B. Arch.....	xxi
Structure & Examination Pattern of Fourth Year B. Arch	xxii
Structure & Examination Pattern of Fifth Year B. Arch	xxiv
Structure & Examination Pattern of Fifth Year B. Arch	xxv
GUIDELINES FOR PAPER-SETTING SYLLABUS CBCS-2020	xxvi
LIST OF ELECTIVES	xxvii

VISION OF BV (DU) UNIVERSITY

“To be a world class University for Social Transformation through Dynamic Education”

MISSION OF BV (DU) UNIVERSITY

- To provide quality technical education with advanced equipment, qualified faculty members, and infrastructure to meet the needs of the profession and society.
- To provide an environment conducive to innovation, research and entrepreneurial leadership.
- To practice and promote professional ethics, transparency, and accountability for social community, economic and environmental conditions.

VISION OF BV (DU) COLLEGE OF ARCHITECTURE PUNE

“Inculcate Sensitivity towards Sustainable Built Environment through Architectural Education”

MISSION OF BV (DU) COLLEGE OF ARCHITECTURE PUNE

The institution shall strive

- To inculcate knowledge, skills, values and ethics to create ‘**socially responsible**’, ‘**environmentally sensitive**’, ‘**economically conscious**’, architectural professionals.
- To promote innovations and research for a sustainable built environment.

PROGRAMME: BACHELOR OF ARCHITECTURE (B.ARCH)

Programme Objectives:

- To develop creative, capable, future ready architectural professionals.
- To create responsible and dedicated individuals who are intellectually mature, emotionally sensitive and self-motivated towards a sustainable built environment.
- To orient courses and course content in order to develop holistic learners, for taking up challenging responsibilities in the respective field.
- To offer courses which help the graduates to emerge as competent professionals fully aware of their commitment to the society and nation.

Programme Outcomes:

The graduates will be able to:

- Imbibe the fundamental knowledge of the built environment.
- Identify and analyse current architectural issues.
- Create and envision a built environment responding to physical, social, cultural, economical and environmental context.
- Communicate effectively in verbal, written and graphical form.
- Use modern architectural tools, technology and software for analysis, design and construction.
- Imbibe ethics and values as learners and professionals.
- Develop research ability and promote experiential learning.
- Function effectively as an individual; work cooperatively and responsibly as a team.
- Encourage interdisciplinary learning.
- Prepare for professional, societal and environmental challenges.
- Promote managerial, entrepreneur and leadership qualities in profession.

SALIENT FEATURES OF SYLLABUS

- Imparting '**Outcome Based Education**'.
- Included programme outcome, programme specific outcome, course outcome and intended learning outcome.
- Categorisation of courses focusing on development of 'Cognitive', 'Affective' and 'Psychomotor' domains of learning and learners.
- Offers a wide range of electives in every semester, which facilitates choice to learners in selecting courses of their own interests. Introduced open electives at First year B.Arch.
- Skill enhancement facilitated through professional skill courses as well as open electives.
- Practical training incorporated in VIII semester which helps students in achieving research ability by providing consecutive courses such as Research projects and Architectural design Project in IX and X semesters respectively.
- Social and environmental awareness through 'Audit Courses'.
- Vertical progression and horizontal integration of courses considering the stage of development of learning.

RULES FOR FIRST TO FIFTH YEAR B. ARCH

Rule No.1: Eligibility for Admission

Eligibility Criteria: Students seeking admission to First year of Bachelor's Degree Course in Architecture must fulfil the eligibility criteria laid down by Council of Architecture, New Delhi, India and the University as applicable from time to time.

Rule No.2: Duration of the course (as per Council of Architecture)

The Architecture course shall be of minimum duration of 5 academic years/ 10 semesters of approximately 15 to 18 working weeks (90 work days)each, inclusive of one semester of approximately 16 working weeks of Practical Training during Semester-VIII in a Professional's office.

Rule No.3: Scheme of Assessment

A candidate to be eligible for the degree of Bachelor of Architecture will be required to appear for and pass all examinations as under:

- Semester I Examination in Architecture (First Year Semester-I)
- Semester II Examination in Architecture (First Year Semester-II)
- Semester III Examination in Architecture (Second Year Semester-III)
- Semester IV Examination in Architecture (Second Year Semester-IV)
- Semester V Examination in Architecture (Third Year Semester-V)
- Semester VI Examination in Architecture (Third Year Semester-VI)
- Semester VII Examination in Architecture (Fourth Year Semester-VII)
- Semester VIII Examination in Architecture (Fourth Year Semester-VIII)
- Semester IX Examination in Architecture (Final Year Semester-IX)
- Semester X Examination in Architecture (Final Year Semester-X)

Rule No. 4: Granting of Academic Term

Each semester shall comprise of Eighteen weeks (Minimum 90 working days).

The candidate will be permitted to appear for semester examination only if he/she has,

- **75 % attendance in each course that constitutes a head of passing as prescribed by the university.**
- **Satisfactory completion of the sessional work as prescribed in the syllabus.**
- **Good conduct:** The Principal/ Director of the institution shall have the right to withhold the student from appearing for examination of a specific course if the above requirements are not fulfilled.

Rule No. 5: Progression Requisite

As a general rule, a student shall be allowed to keep the next year of study of the course, if he/she has a backlog of not more than “**Six heads of passing**” in the preceding year.

Furthermore,

- A student shall be allowed to get admitted to Second Year B. Arch. course, if he/she has a backlog of not more than “**Six heads of passing**” at First year B. Arch (semester I and II considered together).
- A student shall be allowed to get admitted to Third Year B. Arch course, if he/she has cleared all the heads of passing at First year B.Arch and if he/she has a backlog of not more than “**Six heads of passing**” at Second Year B.Arch (semester III and IV considered together).
- A student shall be allowed to get admitted to Fourth Year B.Arch course, if he/she has cleared all the heads of passing at Second Year B.Arch (Semester III and IV considered together) and if he/she has a backlog of not more than “**Six heads of passing**” at Third Year B.Arch (semester V and VI considered together).
- A student shall be allowed to get admitted to Final Year B.Arch course, if he/she has cleared all the heads of passing at Third Year B. Arch (Semester V and VI considered together), and if he/she has a backlog of not more than “**Six heads of passing**” at fourth Year B.Arch (semester VII and VIII considered together).

Rule No 6: Examinations

6.1. Conduct of Examinations

The university examinations for all the 10 semesters shall be conducted at the end of each semester by the University.

6.2. Pattern of Examination: The evaluation scheme for B.Arch comprises of --

University Examination (UE) -60 marks (for courses having IA and UE both)

Internal Assessment (IA)- 40 marks (for courses having IA and UE both)

Internal Assessment (IA) - 100 marks (for courses having only IA)

UE and IA will constitute two separate heads of passing.

6.2.1 University Examination (UE)

- UE will be conducted by the University and will be based on the entire syllabus.
- UE shall be assessed jointly by the internal and external examiners from amongst the panel approved by the University in equal weight-age. An examiner for any of the courses of examinations shall have a minimum of 5 years teaching or 5 years of professional experience in his/her field of study. However, an external examiner for Semester-X Architectural Design Project shall have a minimum of 10 years teaching/professional experience after Council of Architecture registration.
- The nature of assessment will vary depending upon the course and its delivery and whether it is studio-based or theory based. **Refer to detailed syllabus for individual courses.**
- Work done by the student which is assessed for UE i.e Sessional (SS) or Sessional + Oral (SO) will be based on entire syllabus.
- Number of assignments for UE will be minimum **three** and a maximum **five**.
- UE may be undertaken through following suggestive form of assignments (but not restricted to):
 1. Portfolio
 2. Models
 3. Reports

University Examination (UE) head will constitute ANY ONE of the following:

a. Sessional(SS) : Assessment by internal & external examiner in equal weight-age of the session , that is ,work done by the student during the semester and certified by the course teacher.

b. Sessional + Oral(SO): Assessment by internal & external examiner in equal weight-age of the sessional ,that is, work done by the student during the semester and certified by the course teacher along with oral of the student is to be conducted (i.e. provided that the student appears for UE).

c. Terminal paper (TP): Assessment by internal & external examiner in equal weight-age of total maximum marks. (Duration of paper: 2-1/2 hrs. for theory paper & 3 hrs. for drawing paper.)

6.2.2: Internal Assessment (IA)

IA will be conducted by the Institution imparting B.Arch. course. IA will be done by the teacher teaching the course through a continuous assessment system that is spread through the duration of course and weight-age will be for the session, that is, work done by the student during the semester & assessed by the course teacher covering the entire syllabus. The marks assigned for attendance in IA weight-age will be 5(five) only. Number of assignments for IA will be minimum **three** and a maximum **five**.

There will be 15(fifteen) teaching and 3(three) assessment weeks in a semester.

Individual faculty members shall have the flexibility to design the continuous assessment assignments in a manner so as to evaluate student's capabilities across knowledge, skills and attitudes. IA may be undertaken through any or combination of the methods stated below:

The following components can be used-

- Seminar presentation
- Written Test /Open Book
- Reviews
- Essays
- Short answer questions
- Study of best practices /precedent study/field study
- Multiple choice questions/Quiz
- Projects/group projects/Dissertation
- Reflective Practical assignments
- Drawing Portfolios
- Report writings
- Learning logs/diaries
- Hands on workshops and participation

For IA, in case of courses having Terminal paper (TP), it is mandatory to conduct minimum one class- test as a form of assignment.

The faculty shall announce in advance the units based on which continuous assessment shall be conducted. Detailed records of continuous assessment shall be maintained by the teaching faculty and these will be submitted to the institute at the end of the semester.

Rule No. 7: Credits

The total credits for the B.Arch. degree programme are 296 credits.

Semester-wise distribution of credits is as follows:

Semester	I	II	III	IV	V	VI	VII	VIII	IX	X
Credits	30	30	30	30	30	30	30	30	28	28

7.1. Evaluation criteria for additional credits:

Credit may also be given for participation in extra-curricular/co-curricular activities. There will be a maximum of **10 credits at UG level. 25-30 hours** of extra-curricular/ co-curricular work may be considered as one credit.

Participation in these activities at national/ international/state level can be claimed to earn a maximum of 10 extra credits which are over and above the minimum number of credits the student has to complete for award of the degree. These credits would be awarded for the type of activity undertaken from the joining of course till the end of course. Students have to submit the necessary documents at the end of Semester-X.

7.2. Award of extra credits per participation

Sr.No	Type of Activity	Credits Awarded
1	Publication in International/ National Journal(for 1st or 2nd author only)	01
	Publication in Scopus/ Referred Journal	02
2	Participation with presentation in seminar, workshop, conference, etc. (national/ international/state/ local)	01
3	Participation in seminar, workshop, conference, etc. (national/ international /state/ local)	0.5
4	Sending entry to design competition held at state / national / international level	01
5	Winning award at the contest mentioned above	02
6	Publication of Final year Architectural Design Project in International/ National Journal under guidance & co-authorship of guide.	1
7	MOOC Courses with certificate:	
	1) 4 hr. /week course	1
	2) 12 hr. /week course	3
	3) 4 hr./week course	1
	4) 12 hr./week course	3

The student has to accumulate and submit the respective documents to the principal, to become eligible for getting the credits as mentioned above.

7.3. Non-credit courses -Audit Courses:

Audit Courses will be conducted in Semester-IV and Semester-VI as per the syllabus. Universities will conduct examinations and it is mandatory for students to pass in these courses. Passing in these courses is by clearance. **Audit courses are Non-credit courses**

7.4. Credit Transfer:

Credit transfer option may be made available to students on exchange with other universities under MoUs if any after verifying the equivalency for particular courses on a case to case basis.

Rule No.8: Criteria for Passing

To pass in every semester examination and earn a minimum grade point, a candidate must obtain minimum 50% marks in each head of passing and 50% marks in aggregate.

8.1. For all courses, both UE and IA constitute separate heads of passing.

- In order to pass in such courses and earn minimum grade point.
- The student must obtain minimum grade point of 6.0(50% marks) at UE and also minimum grade point of 6.0 (50%) marks at IA.
- A student who fails at UE in a course has to reappear only at UE as a backlog candidate and clear the head of passing. Similarly, a student who fails in a course at IA has to reappear only at IA as a backlog candidate and clear the head of passing.

8.2. Students with a backlog in IA will have to present themselves and their work for continuous assessment throughout the semester for which they intend to appear.

8.3. In case of backlog courses, a student can work on the same topic of assignment for two more chances. Even after two chances in case he/she fails, the course teacher may change or modify the topic of assignment.

Rule No.9: Grading system

The grading system will be a 10-point absolute grading system.

9.1 Award of Grades (Ten point Grading systems):

The assignment of score obtained by the candidate (out of maximum 100) to a grade may be done as follows:

Range of % of marks	Grade Point	Grade Letter
80<= Marks <100	10	O
70<= Marks <80	9	A+
60<= Marks <70	8	A
55<= Marks <60	7	B+
50<= Marks <55	6	B
Marks <50	0	D

9.2 Performance

The performance of a student will be evaluated in terms of two indices, viz

- a) Semester Grade Point average (SGPA) is calculated separately after every end-semester examination.
- b) Cumulative Grade point average (CGPA) is calculated across all the semesters at the end of the programme.

9.3 Semester Grade point average (SGPA)

SGPA measures the cumulative performance of a learner in all courses in a particular semester. SGPA is calculated by the formula

Where the credit-value is assigned to a course and is a GPA obtained by the learner in the course.

The SGPA shall be calculated up to two decimal places accuracy.

9.4 Cumulative Grade point average (CGPA)

CGPA measures the cumulative performance of a learner in all courses since his/her enrolment. CGPA is calculated by the formula

Where the credit-value is assigned to a course and is a GPA obtained by the learner in the course.

The CGPA shall be calculated up to two decimal places accuracy.

Rule No.10: Award of Degree (B.Arch.)

A student who has completed the minimum grade point specified for the programme and obtains required CGPA as prescribed (in the table below) shall be declared to have passed in the programme. The final result will be in terms of letter grade only and is based on the CGPA of all courses studied and passed within the time permissible by the University & as per COA Rules prescribed.

The criteria for the award of **Degree (B.Arch.)** are as given in table below:

Range of CGPA	Final Grade	Letter Grade
9.50 CGPA 10.00	O	Outstanding
9.00 CGPA 9.49	A+	Excellent
8.00 CGPA 8.99	A	Very Good
7.00 CGPA 7.99	B+	Good
6.00 CGPA 6.99	B	Satisfactory
CGPA Below 6.00	F	Fail

Degree Requirements:

A candidate who has successfully completed all the Core and Elective courses and obtains required CGPA as prescribed (in the table above), shall be eligible to receive the Degree.

Registration (as an Architect) will only be given by the Council of Architecture, New Delhi, India as per the prevailing rules.

University & Council of Architecture, New Delhi may frame additional rules and regulations or modify these rules if needed and once approved they would be binding on the students.

Rule No.11: Introduction of this Curriculum

The new curriculum for the degree course in architecture B.Arch will be introduced from Academic Session 2020 -2021

- First year B.Arch. Course from June 2020
- Second year B.Arch. Course from June 2021
- Third year B.Arch. Course from June 2022
- Fourth year B.Arch. Course from June 2023
- Final year B.Arch. Course from June 2024

Rule No.12: Course Code

Code used for serial numbers of the courses in the structure for B.Arch. course shall be as follows:

12.1. First Character: will be Faculty and for Engineering Faculty BVDU has assigned K character.

12.2. Second Character: will be for BoS to which that course belongs (H for Architecture)

12.3. Third character: relates to Department for which course is to be conducted (M for Architecture)

12.4. Fourth character: will be for UG or PG course (U for UG in Architecture)

12.5. Fifth Character: will stand for Semester No.

Semester Code:

1. First Semester
2. Second Semester
3. Third Semester
4. Fourth Semester
5. Fifth Semester
6. Sixth Semester
7. Seventh Semester

8. Eighth Semester

9. Ninth Semester

10. Tenth semester

12.6. Sixth character: will be serial no. of course in that semester structure from 1 to 9.

Rule No.13: Maximum period for duration of course

Students have to qualify for a degree within the period prescribed by the University Grants Commission. If the student could not, he/she will be allowed two more years beyond the prescribed period. In exceptional cases, further extension of one more year, may be considered by the University. University & Council of Architecture, New Delhi may frame additional rules and regulations or modify these rules if needed and once approved they would be binding on the students.

In case a candidate is not able to complete the course in the prescribed duration, the university or institution may provide an exit option for the candidate if has completed and earned all credits for the first three years of study.

STRUCTURE OF B.ARCH DEGREE PROGRAMME

Structure of B.Arch. degree programme is proposed to be implemented from academic year 2020-21, to provide students centric educational philosophy.

A. Course Categories:

Under CBCS, the degree programme will consist of the following categories of courses, in the framework of council of Architecture:

1. Professional Core Courses (PC)
2. Building Science and Applied Engineering (BS& AE)
3. Enhancement Course
4. Skill Enhancement Courses (SEC)
5. Professional Ability Enhancement Courses (PAEC)
6. Elective Courses
 - a. Open Electives (OE)
 - b. Professional elective (PE)

In addition, a student should satisfactorily complete Audit courses (AC) minimum 2 No's prescribed in the curriculum. Audit courses are non-credit courses.

A.1. Compulsory courses consisting of

- a. **Professional Core (PC)**) courses introducing the students the foundation of architectural topics
- b. **Building Science and Applied Engineering (BS& AE)** courses informs the Professional Core courses
- c. **Skill Enhancement (SEC)** Courses nurtures skill of the
- d. **Professional Ability Enhancement (PAEC)** Courses

A.2. Elective Course enables students to take up a course of their own interest and facilitates students a freedom in selecting courses.

- a. **Open Elective** Courses enables an exposure to some other discipline
- b. **Professional Elective** Courses supportive to the core discipline of the study or provides an extended scope; may be very specific; specialised; advanced.

A.3. Audit Course courses consisting of

- a. Disaster Management
- b. Environmental Studies

B. Credits:

Credits are the weightages are assigned to the courses based on the following general pattern:

1. lecture period
1 credit
2. Periods Lab/Workshop/ Tutorial
credit 1
3. Period of Design/ Construction/ Practical Training/ Thesis
credit 1

B.1. The curriculum for B. Arch. Programme is designed to have a minimum of 296 credits + 2 Non CGPA credits distributed across ten semesters of study for the award of degree.

B.2.A student must earn a minimum number of credits under each category as shown in Table 1 and also a minimum total of credits (296 credits + 2 Non CGPA courses) for the award of B. Arch degree.

Table1: Distribution of credits

No	Category	Code	Credits	Percentage
1	Professional Core	PC	149	50.34%
2	Building Science and Applied Engineering	BSAE	60	20.27%
3	Skill Enhancement Course	SEC	17	05.74%
4	Professional Ability Enhancement Courses	PAEC	34	11.49%
5	Open Elective	OE	10	03.38%
6	Professional Electives	PE	26	8.78%
	Total Credits		296	100.00%
		NON CGPA		
	Audit courses		----	---

Structure & Examination Pattern of First Year B.Arch.

Semester I							Total Duration-30 hrs./Week					
							Total Credits -30					
Course Code	Course Category	Course	Teaching Scheme				Examination Scheme (Marks)				Credits	
			(in hours/week)				IA	UE				Total
			L	SP	W	Total			TP	SO	SS	
KHMU11	PC	Architectural Design-I	2	2	2	6	40	-	60	-	100	6
KHMU12	BSAE	Building Construction and Materials-I	2	-	4	6	40	-	60	-	100	6
KHMU13	BSAE	Theory of Structures-I	1	-	1	2	40	-		60	100	2
KHMU14	PC	History of Architecture –I	2	-	1	3	40	60	-	-	100	3
KHMU15	PC	Architectural Drawings and Graphics-I	1	-	4	5	40	60	-	-	100	5
KHMU16	PC	Workshop	1	-	2	3	40	-	-	60	100	3
KHMU17	PC	Basic Design-I	1	-	2	3	40	-	60	-	100	3
KHMU18	OE	Elective I	1	-	1	2	100	-	-	-	100	2
		Total				30	380	120	180	120	800	30
Notations: L-Lectures, SP-Studio project, W-Workshop/Studio Exercises												
IA: Internal Assessment; UE: University Examination TP- Terminal Paper ,SS-Sessional ,SO -Sessional Oral												
PC: Professional Core Course; BSAE: Building Science and Applied Engineering Course ,OE: Open Elective												

Structure & Examination Pattern of First Year B. Arch

Semester-II							Total Duration-30 hrs./Week					
							Total Credits -30					
Course Code	Course Category	Courses	Teaching Scheme (in hours/week)				Examination Scheme (Marks)				Credits	
			L	SP	W	Total	IA	UE			Total	Total
								TP	SO	SS		
KHMU21	PC	Architectural Design-II	2	2	2	6	40	-	60	-	100	6
KHMU22	BSAE	Building Construction and Materials-II	2	-	4	6	40	-	60	-	100	6
KHMU23	BSAE	Theory of Structures-II	1	-	1	2	40	-	-	60	100	2
KHMU24	PC	History of Architecture -II	2	-	1	3	40	60	-	-	100	3
KHMU25	PC	Architectural Drawings and Graphics-II	1	-	4	5	40	60	-	-	100	5
KHMU26	PC	Climatology	2	-	1	3	40	-	-	60	100	3
KHMU27	PC	Basic Design -II	1	-	2	3	40	-	60	-	100	3
KHMU28	OE	Elective II	1	-	1	2	100	-	-	-	100	2
		Total				30	380	120	180	120	800	30
Notations: L-Lectures, SP-Studio project, W-Workshop/Studio Exercises												
IA: Internal Assessment, UE: University Examination, TP- Terminal Paper, SS-Sessional, SO -Sessional Oral												
PC: Professional Core Course, BSAE: Building Science and Applied Engineering Course,OE: Open Elective												

Structure & Examination Pattern of Second Year B.Arch.

Semester-III							Total Duration-30 hrs./Week					
							Total Credits -30					
Course Code	Course Category	Courses	Teaching Scheme (hours/week)				Examination Scheme (Marks)				Credits	
			L	SP	W	Total	IA	UE				Total
								TP	SO	SS		
KHMU31	PC	Architectural Design -III	1	4	1	6	40	-	60	-	100	6
KHMU32	BSAE	Building Construction and Materials-III	2	-	4	6	40	-	60	-	100	6
KHMU33	BSAE	Theory of structures-III	2	-	-	2	40	60	-	-	100	2
KHMU34	PC	History of Architecture-III	2	-	1	3	40	-	60	-	100	3
KHMU35	PC	Architectural Drawings and Graphics-III	1	-	4	5	40	-	-	60	100	5
KHMU36	PC	Building services-I	2	-	1	3	40	60	-	-	100	3
KHMU37	SEC	Computer Applications in Architecture-I	1	-	2	3	100	-	-	-	100	3
KHMU38	PE	Elective-III	1	-	1	2	100	-	-	-	100	2
		Total				30	440	120	180	60	800	30
Notations: L-Lectures, SP-Studio Project, W-Workshop/Studio Exercises												
IA: Internal Assessment, UE: University Examination, TP- Terminal Paper, SS-Sessional, SO -Sessional Oral												
PC: Professional Core Course, BSAE: Building Science and Applied Engineering Course, SEC: Skill Enhancement Course, PE: Professional elective												

Structure & Examination Pattern of Second Year B.Arch.

Semester-IV							Total Duration-30 hrs/Week					
							Total Credits -30					
Course Code	Course Category	Courses	Teaching Scheme (in hours/week)				Examination Scheme (Marks)				Credits	
			L	SP	W	Total	IA	UE				Total
								TP	SO	SS		
KHMU41	PC	Architectural Design-IV	1	4	1	6	40	-	60	-	100	6
KHMU42	BSAE	Building Construction and Materials-IV	2	-	4	6	40	-	60	-	100	6
KHMU42	BSAE	Theory of Structures-IV	2	-	-	2	40	60	-	-	100	2
KHMU44	PC	History of Architecture-IV	2	-	1	3	40	-	60		100	3
KHMU45	BSAE	Surveying and Levelling	1	-	4	5	40	-	-	60	100	5
KHMU46	BSAE	Building Services-II	2	-	1	3	40	60	-	-	100	3
KHMU47	SEC	Computer Applications in Architecture-II	1	-	2	3	100	-	-	-	100	3
KHMU48	PE	Elective-IV	1	-	1	2	100	-	-	-	100	2
	AC	Environmental Studies	-	-	-	-	-	-	-	-	-	-
		Total				30	440	120	180	60	800	30

Notations: L-Lectures, SP-Studio Project, W-Workshop/Studio Exercises

IA: Internal Assessment, UE: University Examination, TP- Terminal Paper, SS-Sessional, SO -Sessional Oral
 PC: Professional Core Course, BSAE: Building Science and Applied Engineering Course, SEC: Skill Enhancement Course, PE: Professional Elective, AC: Audit Course

Structure & Examination Pattern of Third Year B. Arch

Semester-V							Total Duration-30 hrs/Week					
							Total Credits -30					
Course Code	Course Category	Courses	Teaching Scheme (in hours/week)				Examination Scheme (Marks)				Credits	
			L	SP	W	Total	IA	UE				Total
								TP	SO	SS		
KHMU51	PC	Architectural Design-V	1	6	1	8	40	-	60	-	100	8
KHMU5	BSAE	Building Construction and Materials-V	2	-	3	5	40	60	-	-	100	5
KHMU53	BSAE	Theory of Structures-V	1	-	1	2	40	-	-	60	100	2
KHMU54	PC	Specification Writing	2	-	1	3	40	60	-	-	100	3
KHMU55	PC	Landscape Architecture -I	1	1	1	3	40	-	60	-	100	3
KHMU56	BSAE	Building Services-III	2	-	1	3	40	-	-	60	100	3
KHMU57	SEC	Working Drawing -I	1	-	3	4	40	-	60	-	100	4
KHMU58	PE	Elective-V	1	-	1	2	100	-	-	-	100	2
		Total				30	380	120	180	120	800	30
Notations: L-Lectures, SP-Studio project, W-Workshop/Studio Exercises												
IA: Internal Assessment; UE: University Examination, SS-Sessional, SO -Sessional Oral												
PC: Professional Core Course; BSAE: Building Science and Applied Engineering Course, SEC: Skill Enhancement Course, PE: Professional Elective												

Structure & Examination Pattern of Third Year B. Arch

Semester-VI							Total Duration-30 hrs/Week					
							Total Credits -30					
Course Code	Course Category	Courses	Teaching Scheme (in hours/week)				Examination Scheme (Marks)					Credits
			L	SP	W	Total	IA	UE			Total	Total
								TP	SO	SS	1	
KHMU61	PC	Architectural Design-VI	1	6	1	8	40	-	60	-	100	8
KHMU62	BSAE	Building Construction and Materials-VI	2	-	3	5	40	60	-	-	100	5
KHMU63	BSAE	Theory of Structures-VI	1	-	1	2	40	-	-	60	100	2
KHMU64	PC	Estimation and Costing	2	-	1	3	40	60	-	-	100	3
KHMU65	PC	Landscape Architecture -II	1	1	1	3	40	-	60	-	100	3
KHMU66	BSAE	Building Services-IV	2	-	1	3	40	-	-	60	100	3
KHMU67	SEC	Working Drawing- II	1	2	1	4	40	-	60	-	100	4
KHMU68	PE	Elective-VI	1	-	1	2	100	-	-	-	100	2
	AC	Disaster Management	-	-	-	-	-	-	-	-	-	-
		Total				30	380	120	180	120	800	30

Notations: L-Lectures, SP-Studio Project, W-Workshop/Studio Exercises

IA: Internal Assessment; UE: University Examination, SS-Sessional, SO -Sessional Oral

PC: Professional Core Course, BSAE: Building Science and Applied Engineering Course, SEC: Skill Enhancement Course, PE: Professional Elective, AC: Audit Course

Structure & Examination Pattern of Fourth Year B. Arch

Semester-VII							Total Duration-30 hrs/Week					
							Total Credits -30					
Course Code	Course Category	Courses	Teaching Scheme (in hours/week)				Examination Scheme (Marks)				Credits	
			L	SP	W	Total	IA	UE			Total	Total
								TP	SO	SS		
KHMU71	PC	Architectural Design-VII	1	8	1	10	40	-	60	-	100	10
KHMU72	PC	Interior Design	1	2	1	4	40	-	60	-	100	4
KHMU73	PC	Urban Planning	1	-	2	3	40	-	60	-	100	3
KHMU74	PAEC	Research in Architecture	2	-	2	4	40	-	-	60	100	4
KHMU75	SEC	Advance Computer Applications in Architecture	1	-	2	3	40	-	60	-	100	3
KHMU76	PE	Elective-VII	1	-	2	3	40	-	-	60	100	3
KHMU77	PE	Elective-VIII	1	-	2	3	40	-	-	60	100	3
		Total				30	280	Nil	240	180	700	30
Notations: L-Lectures, SP-Studio Project, W-Workshop/Studio Exercises												
IA: Internal Assessment; UE: University Examination, TP: Terminal Paper,SS-Sessional, SO -Sessional Oral												
PC: Professional Core Course;PAEC: Professional Ability Enhancement Course,SEC:Skill Enhancement Course,PE: Professional Elective												

Structure & Examination Pattern of Fourth Year B. Arch

Semester-VIII							Total Credits -30					
Course Code	Course Category	Courses	Teaching Scheme (in hours/week)				Examination Scheme (Marks)					Credits
			L	SP	W	Total	IA	UE			Total	
								TP	SO	SS		
KHMU81	PAEC	Practical Training	-	-	-	-	-	-	100		100	24
KHMU82	OE	Self-Study	-	-	-	-	-	-		100	100	6
							Nil	Nil	100	100	200	30
Notations: L-Lectures, SP-Studio Project, W-Workshop/Studio Exercises												
IA: Internal Assessment; UE: University Examination, TP: Terminal Paper, SS-Sessional, SO -Sessional Oral												
PAEC: Professional Ability Enhancement Course, OE: Open Elective												
Note 1: For practical training, a student has to undergo 16 weeks of training per semester.												
Note 2: The work from practical training will be assessed after the student completes the internship in this semester.												
Note 3: Validity of training shall be only for a year after completion of training.												

Structure & Examination Pattern of Fifth Year B. Arch

Semester-IX							Total Duration-28hrs/Week					
							Total Credits -28					
Course Code	Course Category	Courses	Teaching Scheme (in hours/week)				Examination Scheme (Marks)				Credits	
			L	SP	W	Total	IA	UE				Total
								TP	SO	SS		
KHMU91	PC	Advanced Architectural Design (Context Studio)	2	6	4	12	40	-	60	-	100	12
KHMU92	PC	Capstone Project	1	2	1	4	40	-	60	-	100	4
KHMU93	PAEC	Research Project	1	-	3	4	40	-	-	60	100	4
KHMU94	PAEC	Professional Practice	1	-	1	2	40	-		60	100	2
KHMU95	PE	Elective-IX	1	-	2	3	40	-	60	-	100	3
KHMU96	PE	Elective-X	1	-	2	3	40	-	60	-	100	3
		Total				28	240	Nil	240	120	600	28
Notations: L-Lectures, SP-Studio Project, W-Workshop/Studio Exercises												
IA: Internal Assessment; UE: University Examination, TP: Terminal Paper, SS-Sessional, SO -Sessional Oral												
PC: Professional Core Course, PAEC: Professional Ability Enhancement Course, PE: Professional Elective												

Structure & Examination Pattern of Fifth Year B. Arch

Semester-X							Total Duration-28hrs/Week					
							Total Credits -28					
Course Code	Course Category	Courses	Teaching Scheme (in hours/week)				Examination Scheme (Marks)				Credits	
			L	SP	W	Total	IA	UE			Total	
								TP	SO	SS		
KHMU101	PC	Architectural Design Project	1	12	5	18	40		60		100	18
KHMU102	PC	Seminar in Architecture	1	-	3	4	100				100	4
KHMU103	PE	Elective-XI	1	-	2	3	40		60		100	3
KHMU104	PE	Elective-XII	1	-	2	3	40		60		100	3
		Total				28	220	Nil	180	Nil	400	28
Notations: L-Lectures, SP-Studio Project, W-Workshop/Studio Exercises												
IA: Internal Assessment; UE: University Examination, TP: Terminal Paper, SS-Sessional, SO -Sessional Oral												
PC: Professional Core Course, PE: Professional Elective												

GUIDELINES FOR PAPER-SETTING SYLLABUS CBCS-2020

1. Question paper to cover questions from the entire syllabus.
2. All UE theory papers are for a maximum 60 marks.
3. Duration:
 - a. 2&1/2 hrs. for writing papers
 - b. 3hrs. for drawing papers.
4. There will be two sections of max. Marks 30 each.
 - a. Section-I from Units-I,II& III of syllabus
 - b. Section-II from Units-IV,V& VI of syllabus
5. There will be four questions in each section of 10 marks each.
6. Maximum marks for each question will be in whole numbers & not in fractions.
7. In each Section following pattern will be followed:

Section –I

 - a. Question no. 1 is compulsory
 - b. Attempt any Two questions out of Question no. 2, 3,4.

Section –II

 - a. Question no. 5 is compulsory
 - b. Attempt any Two questions out of Question no. 6, 7,8.
8. In each section 20% marks will be assigned for Analytical questions i.e in each section out of 30 marks 6 marks are assigned for Analytical component. This component will be in compulsory questions i.e Question no.1 and Question no.5.

LIST OF ELECTIVES

Following is the list of electives under various streams for each semester to facilitate choice to learners in selecting courses of their own interest. However, the list given is only suggestive and can expand or modify it for enrichment of the course. The college will offer electives based upon the availability of resources in the college, provided minimum 20 students choose the particular elective. However colleges have to ensure that the student does not repeat a particular elective. Wide range of 'Open Electives' are offered for Semester I, II & VIII as below. Students have to choose any one from the list.

Semesters	Open Electives
Sem-I	Physical Education and Yoga
	Performing Arts
	Culinary Art
	Stress Management
	Community Engagement
	Pottery
Sem-II	Architectural Photography
	Personality development and Communication Skills
	Foreign Languages
	Calligraphy Techniques
	Ayurveda as a lifestyle
	Cyber Security
Sem.VIII	Certificate Course
	Study in their interest area

For Sem. VIII students can take up certificate courses such as MOOC, SWAYAM etc. It could be an online course, or conduct study in their interest area.

From Sem-III to Sem X, students can choose electives as per structure of the syllabus from any of the three streams (Professional Electives) mentioned in the table below. A student may adhere to a particular stream of electives of his/her choice and nurture his/her area of interest and develop his/her expertise across semesters. In the semesters where two electives are offered per semester, students have to choose them from two different streams.

Semesters	Design	Technology and Management	Allied (Art, legalities, culture, environment, etc.)
Sem-III	Vernacular Architecture	Alternative Building Materials and Technology	Sketching
	Theory of Design	Presentation Techniques in Architecture	Horticulture
Sem-IV	Climate Responsive Building Design	Sustainable Water Management	Visual Communication
	Graphic Design	Glass in Architecture	Introduction to Indology
Sem-V	Universal Design	Building Automation	Rural development
	Light in Architecture	Sustainable Waste Management	Architectural Journalism
	Water in Architecture	Cost Effective Construction	Ekistics
Sem-VI	Furniture Design	Auditorium Acoustics and Services	Affordable Housing
	Gendered Spaces	Fenestrations in Buildings	Building Economics
	Architects and Their Philosophies	Facility Management	Introduction to Archaeology
Sem-VII	Product Design	Long Span Structures	Gender in Architecture
	Architectural Conservation	Disaster Resistant Structures	Behaviour Psychology
	Healthcare Design	Prefabricated and Prestressed Structures	Ergonomics
	Critical Thinking of Modern Architecture	Steel Structures	Housing Laws and Policies
			Traffic Awareness - Road Safety and Civic Sense
Sem-IX	Set Design	Office Management	Study of Cities
	Hospitality Design	Real Estate Management	Intellectual Property Rights
	Urban Design	Fire Fighting Systems in Buildings	Art in Architecture
	Landscape Urbanism	Pneumatic Structures	Urban Infrastructure Planning
Sem-X	Digital Architecture	Construction Management	Cultural Landscapes
	Industrial Design	Intelligent Building Systems	Geographic Information System
	Modular Furniture Design	Valuation	Legalities in Architectural Profession
	Specialised Architecture(Defence/ Airports/Stadiums)	Specialised Services in Buildings	Green Building Rating Systems
	*Ancient Building Science	* Modular Coordination	* Study of Iconography in Temples

Note :* As per BOS resolution 3a (dated 4th June 21) ,three elective courses have been shifted from fourth semester to tenth semester.



F.Y. B. Arch (CBCS 2020)
(Contents Semester I to II)
For
Bachelor of Architecture (B. Arch) Programme

Bharati Vidyapeeth (Deemed to be University)
College of Architecture, Pune



Prof. Dr. Shivajirao Kadam
Chancellor

Prof. Dr. M. M. Salunkhe
Vice Chancellor

Bharati Vidyapeeth
(Deemed to be University)
Pune, India.

Founder Chancellor : Dr. Patangrao Kadam

* Accredited with 'A' Grade (2017) by NAAC *
* Category I University Status by UGC *
* NIRF Ranking 66 *

"Social Transformation Through Dynamic Education"



and Beyond

Dr. Vishwajit Kadam
Pro Vice Chancellor

G. Jayakumar
Registrar

NOTIFICATION NO. 1055

It is hereby notified for the information of all concerned that the proposal to revise the course structure, syllabus and rules of examinations of B.Arch. programme proposed by the concerned Board of Studies and recommended by the Faculty of Engineering and Technology is considered by the authorities of the University.

The authorities of the University have approved the course structure, rules of examinations and 1st year syllabus of B.Arch. programme offered under the Faculty of Engineering and Technology to be implemented from the academic year 2020-21 :

Ref. No. BVDU/ 2020-21/1786
Date : November 5, 2020

G. Jayakumar
Registrar

1. The Principal, College of Architecture, Pune 43
2. The Dean, Faculty of Engineering and Technology, Pune 43
3. The Controller of Examinations, BVDU
4. The IT Cell for uploading in the Website.

Adm/Syllabus/accadsec/ COA File

Bharati Vidyapeeth (Deemed to be University) College of Architecture, Pune-43.	
Inward No.:	131
Date:	6/11/2020
Sign:	

SEMESTER I

First Year B Arch.

Architectural Design-I

CourseCode:KHMU11	Course Category: Professional Core		Semester: I
Credits :	6	Internal Assessment	40 Marks
Lectures per week	2	Terminal Paper	-
Studio Projects per week	2	Sessional Oral (SO	60marks
Workshops or studio exercises / week	2	Sessionals (SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	108Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	90 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	18 Hours

Course Objectives:

1. To apply knowledge gained in other subjects and present them in graphic form using manual medium.
2. To imbibe the importance of pre-study in design process
3. To provide knowledge and understanding of design with special attention to design fundamentals and orientation

Course Outcomes:

CO No.	Cognitive levels	On successful completion of course the learner will be able to:
1.	Remembering	Define anthropometry and recognize the importance of cardinal directions in design.
2.	Understanding	Comprehend design fundamentals in relation to space design.
3.	Applying	Develop visualization of liveable spaces by understanding relationship between the activities and spaces through case studies and site visits.
4.	Analysing	Analyse the aspects related to function, space, structure, and aesthetics.
5.	Evaluating	Relate knowledge in the domain of fundamentals of design
6.	Creating	Design a single activity space and create final project and model

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Study of Design Fundamentals <ul style="list-style-type: none">- Study of anthropometry, (study of basic human activities in Indian and Global context)- Study of function and circulation (Relationship between function and space)	12
Unit -II	Study of orientation of buildings <ul style="list-style-type: none">- Study of cardinal and ordinal directions- Study of building orientation with respect to basics of sun and wind- Understanding the preferred/ non preferred, favorable/non favorable orientation with respect to cardinal directions and climate	12
Unit -III	Pre-study: Learning from primary and secondary resources <ul style="list-style-type: none">- Case-studies and site visits- Books, reports, articles- Films and documentaries	24
Unit-IV	Architectural Design <ul style="list-style-type: none">- Single activity architectural design project (approximately 50 sqm.), with application of the learning's from study of design fundamentals, study of cardinal directions, climate, and the pre-study.	30
Unit-V	3-D models <ul style="list-style-type: none">- Study models- Physical model of the final design proposal with site development	12
Total Contact Hours		90

Learning Resources:

1.	Akiko Busch (1991) <i>The Art of Architectural Models</i> , Hong Kong, Design Press
2.	Ching Francis, D. K. (1999) <i>Visual Dictionary of Architecture</i> , New Jersey, John Willy and Sons
3.	Ching Francis, D. K. (2007) <i>Architecture: Form Space & Order</i> , New Jersey, John Willy and Sons
4.	Krishnan Arvind (2017), <i>Climate Responsive Architecture: A Design Handbook for Energy Efficient Buildings</i> , McGraw Hill Education
5.	Neufert Ernst (1970) <i>Neufert Architects data</i> , Bauwelt-Verlag (German 1 st Ed.), Lockwood (English 1 st Ed.)
6.	Nick Bunn (2010) <i>Architectural Model Making</i> , London, Laurence King Publishing
7.	Pandya Yatin (2014) <i>Elements of Space Making</i> , Ahmedabad, Mapin Publishing
8.	Pramar V. S. (1973) <i>Design Fundamentals in Architecture</i> , Somaiya Publication
9.	Rapoport Amos (1969), <i>House, form and culture</i> , Pearson
10.	Thakkar Jay, Morrison Skye, (2008) <i>Matra: Ways of Measuring Vernacular Built Forms of Himachal Pradesh</i> , SID research Cell, CEPT University

First Year B Arch.

Building Construction and Materials-I

CourseCode:KHMU13	Course Category: BSAE		Semester: I
Credits :	6	Internal Assessment	40 Marks
Lectures per week	2	Terminal Paper	-
Studio Projects per week	-	Sessional Oral (SO	60marks
Workshops or studio exercises / week	4	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	108Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	90 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	18 Hours

Course Objectives:

1. To enable students to understand materials, principles and methods of construction
2. To cover the breadth of students including components and systems of buildings

Course Outcomes:

CO No.	Cognitive levels	On successful completion of course the learner will be able to:
1.	Remembering	Define various components of building and know technical terms, the different materials available for masonry work
2.	Understanding	Understand the concept of load transmission and distinguish load bearing and framed structure
3.	Understanding	Describe purpose ,methods and types of finishes
4.	Applying	Apply knowledge gained in Theory of Structureand develop understanding about basic principles of construction method
5.	Analysing	Analyse Different materials in terms of properties, types, application in design ,market forms available ,advantages and disadvantages etc
6.	Evaluating	Compare different types of materials in masonry work
7.	Creating	Design masonry element and entrance gate applying alternative materials and methods of construction
8.	Creating	Create drawings,models and relate structural behaviourism and construction techniques

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Introduction Introduction to building construction as course and its relevance to Architectural design. <ul style="list-style-type: none"> - Introduction to various components of building from foundation to roof. - Structural elements of load bearing and framed structure and its differences 	7
Unit -II	Materials <ul style="list-style-type: none"> - Properties, sustainability aspects, various types, cost, application in buildings, defects and strengths, market survey of bricks , stones ,cement, sand, aggregates, mortar and lime. 	7
Unit -III	Finishes <ul style="list-style-type: none"> - Pointing: Purpose and types - Plastering: Method and types i.e. neeru faced, sand faced, rough cast, pebble finish and all proprietary types. Innovative materials used for pointing and plastering	7
Unit-IV	Foundation <ul style="list-style-type: none"> - Excavation: purpose and types, plinth formation - Introduction to shallow foundation - Strip foundation for a load bearing structure in stone and brick upto plinth level including plinth formation - Foundation for brick piers, entrance steps, compound walls. 	21
Unit-V	Masonry <ul style="list-style-type: none"> - Fundamentals, principles of load bearing construction for medium rise structures using brick, stone, concrete blocks, solid blocks, hollow blocks, cavity blocks etc. - Introduction to various types of brick masonry. - Bonds: English, Flemish, header, stretcher, garden wall, rat trap and other types. - Junctions: Tee, crossed and right angled - Introduction to stone masonry and its types: dry rubble, uncoursed rubble, random rubble, squared, polygonal, etc. - Composite masonry 	31
Unit-VI	Entrance gate and Fencing <ul style="list-style-type: none"> - Entrance gate - Constructional details of entrance gate in a compound wall of following types: Sliding Gate with floor channel, Side hung, side hung with wicket gate. - Fencing - Construction in different materials like Barbed wire, Chain link, Wire mesh, R.C.C. Grills, M.S. Grills etc. 	17
Total Contact Hours		90

Learning Resources:

1.	Rangwala S.C.(2007) Engineering Materials, Gujarat, Charator Publication House
2.	Duggal S.K.(2009) Building materials, New Delhi, New Age International
3.	Varghese P.C. (2005) Building Materials, New Delhi, Prentice Hall of India Pvt. Ltd.
4.	Duggal S.K. (1997) Building Materials, New Delhi, Oxford and IBH publishing Co.Pvt. Ltd.
5.	Spence R.F. and Cook D.J.(1983) Building Materials in Developing Countries, New York, John Wiley and Sons.
6.	W.B. McKay(1981)Building construction Vol. II, UK,Longmans Green and Co.
7.	Barry(1958)The construction of buildings, Vol.I , Blackwell science
8.	Roy Chudley, GogerGreeno (1988), Buildings Construction handbook, Routledge

First Year B Arch

Theory of Structures-I

CourseCode:KHMU13	Course Category: BSAE		Semester: I
Credits :	2	Internal Assessment	40 Marks
Lectures per week	1	Terminal Paper	-
Studio Projects per week	-	Sessional Oral (SO	-
Workshops or studio exercises/ week	1	Sessionals(SS)	60marks
No.s of Weeks in Semester	18	No.s of hours in Semester	36 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	30 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	6 Hours

Course Objectives:

1. To understand the structural concepts and behaviour of structural element

Course Outcomes:

CO No.	Cognitive levels	On successful completion of course the learner will be able to:
1.	Remembering	Recognize the significance of the main structural elements in structural analysis
2.	Understanding	Explain structural concepts, fundamentals of structure and describe of the various loading conditions acting on the structure
3.	Understanding	Illustrate the concept of free body diagram of structures and structural elements
4.	Applying	Calculate Self weight, resolution of forces, centre of gravity, moment of inertia, material constants for all types of structures, and stress calculations of structural members having different material properties
5.	Applying	Develop an ability to analyse internal response of structure
6.	Analysing	Compare response of structural system for various materials
7.	Evaluating	Evaluate the behaviour of structural elements of ancient and modern structures
8.	Creating	Design stepped foundation, wall of uniform thickness and variable thickness and relate principles of this subject to the other subjects such as Building Construction, Architectural design, Architectural drawing and graphics, History of Architecture

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Introduction to fundamental concepts of structure:- Introduction to fundamental concepts of Applied Mechanics relevant to structures and characteristics of material like unit weight, elasticity, plasticity, ductility, hardness. Understanding of rigid body, deformable body, force systems, characteristics of forces, transmissibility, types of structures. Concept of tension, compression in structures	04
Unit -II	Resolution of forces :- Types of loads and moment a) calculation of self-weight based on density for load bearing elements. b) Resultant concurrent force system with simple practical examples. c) Concept of moment and resultant of non-concurrent force system with simple practical examples	06
Unit -III	Equilibrium of forces acting on beam:- Introduction to i) Equilibrium conditions of force systems. ii) Types of loads -point loads, uniformly distributed load(udl), uniformly varying load(uvl), types of supports (hinge, simple, roller, fixed) , types of beams (simply supported, cantilever, overhanging, fixed, continuous) iii) Support reactions in beams.	06
Unit-IV	Centroid & Centre of Gravity: Importance and application of centroid and centre of gravity for plane sections like Rectangle, circle, semicircle, triangle. iii) Calculation of centroid for shapes-- C,T,L,I	04
Unit-V	Moment of Inertia: Moment of Inertia For standard sections, Parallel axis theorem, Perpendicular axis theorem, Radius of gyration. Moment of Inertia of sections considered for centre of gravity (Unit IV).Importance and Application	04
Unit-VI	Simple stress & Strain:- Concept of Simple stress and strain. Calculation of self-weight for load bearing elements and downward soil pressure due to the same. Simple numerical based composite (modular ratio) and compound elements. Behaviour of ductile and brittle material in terms of stress and strain curve. Introduction to elastic constants and its significance. Definition of fatigue, creep. Introduction to flinched beams	06
Total Contact Hours		30

Learning Resources:

1.	Beer and Johnston,(2008).Mechanics of Materials.NewDelhi,Tata McGraw-Hill
2.	Mario Salvadori.(1980).Why buildings stand up:The strength of architecture. McGraw-Hill
3.	S.B.Junnarkar&Dr.HJ Shah,(2012).Mechanics of Structures Vol. I & II.Anand,CharotarPublishing
4.	KhurmiR.S.(2014).Strength of Materials.NewDelhi,S.Chand& Company Ltd
5.	DongreA.P.(2011).Strength of Materials.Pune/Hyderabad,Scitech Publications

First Year B Arch.

History of Architecture-I

CourseCode:KHMU14	Course Category: Professional Core		Semester: I
Credits :	3	Internal Assessment	40 Marks
Lectures per week	1	Terminal Paper	60marks
Studio Projects per week	-	Sessional Oral (SO	-
Workshops or studio exercises / week	2	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	54 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	45 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	9 Hours

Course Objectives:

1. To learn from the wisdom of traditional knowledge systems.
2. To imbibe the fundamental knowledge of the built environment
3. To study the history of architecture as a response to climate, culture and socio political conditions.

Course Outcomes:

CO No.	Cognitive levels	On successful completion of course the learner will be able to:
1.	Remembering	Identify issues with reference to cultures, civilizations, and settlements across the world at different periods of time
2.	Remembering	Know technology and its impact on built environment and building form
3.	Understanding	Understand the development of architecture as a process through a holistic approach of contextual and cultural evolution
4.	Understanding	Differentiate between various styles and elements of development and describe prominent historic buildings
5.	Applying and Analysing	Develop ability to analyse the evolutionary aspects of stage of progress
6.	Evaluating	Compare architectural style across culture of that time with reference to location -geography, Social Systems, Religion ,climate, art etc.
7.	Creating	Derive materials, construction techniques in design from historic civilization

Course Contents:

Units	Contents of The Course	Hours
Unit -I	<p>Prehistoric Housing forms in the initial phase: Cave shelters- (suggestive examples at Lascaux, Terra Amata etc.) Community structures: (suggestive examples Menhir, dolmen, gallery and passage graves, Stonehenge, Ggantija Malta etc.)</p>	6
Unit -II	<p>River Valley Civilizations –Asia Introduction to development of the settlements - location, social and cultural aspects, climate, construction techniques, building materials, building typologies and architectural characteristics, settlement principles etc - Yellow River, Indus River</p>	9
Unit-III	<p>Vedic Architecture Vedic culture and settlement planning layouts, City Planning in later Vedic period and Buildings and construction techniques. Buddhist Architecture Introduction to the Evolution and development of Major typologies like Stambha, Chaitya, Vihara, Stupa. Development of Chaitya arch(suggestive examples Ashokan Stambhas, Lomas Rishi Cave, The Great Stupa at Sanchi, Chaitya Hall at Karli, Chaitya and Viharas at Verul and Ajanta etc)</p>	7
Unit-IV	<p>River Valley Civilizations -Western Introduction to development of the settlements - location, social and cultural aspects, climate, construction techniques, building materials, building typologies and architectural characteristics, settlement principles etc - Nile River, Tigris River</p>	7
Unit-V	<p>Greek Civilization Introduction to the Social and cultural Systems, political scenario, History and evolution of Architectural typologies, Characteristics of Buildings, construction technology and elements evolved like Classical Orders, Optical corrections etc. (Suggestive examples Acropolis, City of Athens Temples, Theatres, Agora, Stoa, Council Halls etc)</p>	8
Unit-VI	<p>Roman Civilization Introduction of the History, evolution and characteristics Elements of special attributes. Introduction to the, Social and cultural Systems, political scenario, History and evolution of Architectural typologies, Characteristics of Buildings, construction technology and elements evolved like Arches, arcuated construction, bridges, aqueducts, etc(suggestive examples City of Rome ,Temples- Pantheon, Basillica at Trajan, Amphitheatre, Hippodrome, Circus, Palaces-hydrian’s villa , Thermae at Carcallaetc</p>	8
Total Contact Hours		45

Learning Resources:

1.	Sir Banister Fletcher, (1999) A History of Architecture, Indian Edition. Delhi, CBS Publications.
2.	Percy Brown,(1983) Indian Architecture (Hindu And Buddhist). Bombay, Taraporevala and Sons
3.	Denis Montagnon, (2001) Rome . ISBN 3-8228-5870-6. Germany, TashchenGmnH Satish Grover, (2003) The Architecture of India (Buddhist and Hindu Period). New Delhi, Vikas Publishing Housing Pvt. Ltd.
4.	Leland M Roth ,(1994) Understanding Architecture: Its Elements, History and Meaning. Craftsman House;
5.	Pier Luigi Nervi, General Editor, (1972) History of World Architecture – Series. New York, Harry N. Abrams Inc. Pub
6.	Burns, Ralph, Lerner, Meacham, (1991) World Civilizations. First Indian Edition, Delhi, Goyl Saab Publishers and Distributors.
7.	Roger Smith, (1987) An Illustrated history of Architectural Styles. Omega Books Ltd. SebastianoSerlio,(1982) The five books on architecture. New York, Dover Publication Inc.
8	SebastianoSerlio,(1982) The five books on architecture. New York, Dover Publication Inc
9	Satish Grover, (2003) The Architecture of India (Buddhist and Hindu Period). New Delhi, Vikas Publishing Housing Pvt. Ltd.

First Year B Arch.

Architectural Drawing and Graphics-I

CourseCode:KHMU15	Course Category: Professional Core		Semester: I
Credits :	5	Internal Assessment	40 Marks
Lectures per week	1	Terminal Paper	60marks
Studio Projects per week	-	Sessional Oral (SO	-
Workshops or studio exercises / week	4	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	90 Hours
No.s of Weeks for Teaching + Sessional Work	15	No.s of Hours for Teaching + Sessional Work	75 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	15 Hours

Course Objectives:

1. To develop visualisation and presentation skills as tools for creative thinking and representation of ideas and concepts
2. To acquire effective communication in graphical form in Architecture
3. To impart basic knowledge and skill to draft a drawing manually.

Course Outcomes:

CO No.	Cognitive levels	On successful completion of course the learner will be able to:
1.	Remembering	Know architectural drawing techniques using drafting tools.
2.	Remembering	Acquire vocabulary and grammar such as scale, annotations, labelling, dimensioning etc.
3.	Understanding	Understand the concept of orthographic projection, surface development.
4.	Applying	Use freehand techniques for preparing drawings and develop perception and presentation of different forms
5.	Analysing and Evaluating	Analyse and relate Architectural Drawing Graphics with Architectural Design, Building Construction, Working Drawing etc
6.	Creating	Create conceptual and presentation drawings for various purposes

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Introduction to graphic language and its components <ul style="list-style-type: none"> - Introduction to instruments - Line types: meaning and application - Architectural lettering and dimensioning techniques and their role and application in composition of drawings with various examples - Architectural annotations and conventions 	12
Unit -II	Orthographic Projections <ul style="list-style-type: none"> - Geometrical construction, planar geometry - Method of Orthographic projections - Drawing 2-dimensional drawings from 3-dimensional objects 	18
Unit -III	Surface Development <ul style="list-style-type: none"> - Surface Development of various three-dimensional objects 	13
Unit-IV	Study of Graphical Scales <ul style="list-style-type: none"> - Introduction to graphic scale and their applications - Scaled enlargement and reduction of simple objects and site plans of complex shapes - Scaled drawings (plan/sections and elevations) of complex objects/ simple building of sufficient size to demonstrate use of various scales, conventions and standard annotations 	9
Unit-V	Sketching <ul style="list-style-type: none"> - Introduction to architectural sketching and principles of free hand sketching such as proportions, light and shade: with primary thrust on sketching of building elements and built/un-built environment. 	8
Unit-VI	Sections: from simple geometrical elements to complex architectural elements <ul style="list-style-type: none"> - Graphical and visual communication through sections of geometric forms along with the understanding of the line weights, material indications, etc. - Graphical and visual communication through sections of architectural elements / building along with the understanding of the line weights, material, indications, etc 	15
Total Contact Hours		75

Learning Resources:

1.	F. D K. Ching (2009) Architectural Graphics, New Jersey, John and Wiley and Sons.
2.	Manual of Section, David J. Lewis, Marc Tsurumaki, and Paul Lewis.
3.	Architectural Drawing Course: Tools and Techniques for 2D and 3D Representation, by <i>Mo Zell</i> .
4.	N.D.Bhatt (2012) Engineering Drawing, Gujrat, Charotar Publishing House.
5.	Hugh C. Browning (1996) The Principles of Architectural Drafting, New York, Watson-Guption Publications.
6.	Calvin F. Schmid, Stanton E. Schmid, (1954) Handbook on Graphic Presentation, New York, The Ronald Press Company
7.	David Littlefield (2012) Matric Handbook, London and New York, Routledge Taylor and Francis Group.
8.	Sleeper R.(2000)Architectural Graphic Standards, New York, John Wiley and Sons.

First Year B Arch.

Workshop

CourseCode:KHMU16	Course Category: Professional Core		Semester: I
Credits :	3	Internal Assessment	40 Marks
Lectures per week	1	Terminal Paper	-
Studio Projects per week	-	Sessional Oral (SO	-
Workshops or studio exercises / week	2	Sessionals(SS)	60
No.s of Weeks in Semester	18	No.s of hours in Semester	54 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	45 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	09 Hours

Course Objectives:

1. To introduce various types of models at appropriate scales such as site model, study model, block model, finished presentation models
2. To introduce students to various materials, tools and techniques used in making architectural models.
3. To introduce students to various skills such as joinery, cutting, finishing in carpentry, smithy.

Course Outcomes:

CO No.	Psychomotor levels	On successful completion of course the learner will be able to:
1.	Imitation	Observe the nature and texture of different materials
2.	Manipulation	Replicate forms in drawing by making models
3.	Precision	Choose tools and joinery techniques required for model making
4.	Precision	Integrate two dimensional drawing and three dimensional form
5.	Articulation	Constructor Compose three dimensional forms using different model making materials and equipment in different scale
6.	Naturalisation	Make Everyday objects, some building elements ,building forms with a wide variety of available materials and handle simple tools in carpentry

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Materials for model making: Introduction to various materials like various types of papers, mount boards, softwood (balsa), cork, clay etc for architectural model making.	6
Unit -II	Tools and techniques in model making Introduction to various tools and techniques cutting, scoring, folding and gluing techniques, using templates, measuring aids, to build surfaces and simple/ solids such as cubes, prism, cylinders, pyramids, cones, spheres etc or interpenetrated forms.	9
Unit-III	Adv. Materials, methods and tools: Using materials such as plastics, films, plaster of paris, clay, acrylic, wax, metals, glass, fabric etc and their moulding, scooping, cutting, joining methods etc	6
Unit -IV	Wood and metal work: Exercises in cutting and joinery with planers, saw, lathe, and jigs; Joinery details in wood, metal, blocks, pipes, plates, etc, composition of basic and complex geometrical forms.	9
Unit-V	Finishing: Exercises in finishing with planers, sander; Finishing surfaces with various protective coats, paints, varnishes, oils etc	9
Unit-VI	Prototyping and advanced modelling: Introduction to model making using machines - explore laser cutting, acid etching, stereo lithography, 3D printing, etc. Introduction to various types of model making for Architectural studies like block model, working models, contour models, site models, openable models, service models etc.	6
Total Contact Hours		45

Learning Resources:

1	Engel, P. (1989). Folding the Universe: Origami from Angelfish to Zen. Vintage.
2	Janke, R. (1978). Architectural models/Architekturmodelle (No. 72.027). Academy Editions,.
3	Mills, C. B. (2011). Designing with models: a studio guide to architectural process models. John Wiley & Sons.
4	Taylor, J. R., & Taylor, J. R. (1971). Model building for architects and engineers. McGraw-Hill Companies.

First Year B Arch.

Basic Design -I

CourseCode:KHMU17	Course Category: Professional Core		Semester: I
Credits :	3	Internal Assessment	40 Marks
Lectures per week	1	Terminal Paper	-
Studio Projects per week	-	Sessional Oral (SO	60marks
Workshops or studio exercises / week	2	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	54 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	45 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	09 Hours

Course Objectives:

1. To develop the basic understanding of the fundamentals of design
2. To provide knowledge and understanding of elements and principals of design; its importance

Course Outcomes:

CO No.	Cognitive levels	On successful completion of course the learner will be able to:
1.	Remembering	Know elements of Design
2.	Understanding	Understand Effects of scale, the concept of form, space and structure through creative thinking
3.	Applying	Develop Lateral thinking and apply the principles of design
4.	Analysing	Analyse aspects of form, space and aesthetics
5.	Evaluating	Appraise design forms in terms of visual character and critique basic design composition
6.	Creating	Create two dimensional and three dimensional composition with various media

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Elements of Design: Introduction to: <ul style="list-style-type: none"> - Different Elements of design - Fundamentals of Design 	08
Unit -II	Scale, Proportion: <ul style="list-style-type: none"> - Proportion & scale: Material proportions, structural proportions - Golden Section - Anthropometry Visual Scale and Human Scale	08
Unit -III	Principles of Design <ul style="list-style-type: none"> - Introduction to Principles of Design - Theory on Lateral Thinking and exercise on generation of alternatives - Explorations of Principles of Design through 2D and 3D compositions 	09
Unit-IV	Volume , Form & Space <ul style="list-style-type: none"> - Properties of Form - Subtractive & additive forms - Degree of enclosure – Planes - Volumetric Study of Spaces – positive and negative spaces 	08
Unit-V	Organisation: <ul style="list-style-type: none"> - Organisation of Form & Space - Spatial Relationships - Spatial Organisations - Explorations of Organisation through 3D compositions 	08
Unit-VI	Indian Aesthetics: Introduction to all art forms including architecture as a holistic sacred domain with reference from Vishudharmottarpurana. ·Introduction to Art in India as a way of life, as a ritual, as a socio-cultural expression, and more, e.g. Rangoli, Mehendi, Serving of food, ornamentation, arrangement of puja, and so on.	04
Total Contact Hours		45

Learning Resources:

1.	Akiko Busch (1991) <i>The Art of Architectural Models</i> , Hong Kong, Design Press
2.	Bacon E.N. (1974) <i>Design of Cities</i> , England, Penguin Books
3.	Barry A Berkus (2000) <i>Architecture, Art – Parallels and Connections</i> , Australia, Watson-Guptill Publications
4.	Ching Francis, D. K. (2007) <i>Architecture: Form Space & Order</i> , New Jersey, John Willy and Sons
5.	Ching Francis, D. K. (1999) <i>Visual Dictionary of Architecture</i> , New Jersey, John Willy and Sons
6.	Edward De Bono (1990) <i>Lateral Thinking</i> , London, Penguin Books
7.	Gupta Neerja (2017), <i>A Student's Handbook of Indian Aesthetics</i> , Cambridge Scholars Publishing
8.	Nick Bunn (2010) <i>Architectural Model Making</i> , London, Laurence King Publishing
9.	Paul Jackson, Angela A Court, Marion Elliot (1993) <i>The Ultimate Papercraft and Origami Book</i> , United Kingdom, Acropolis Books
10.	ShirishVasantBapat (1993) <i>Basic Design and Anthropometry</i> , Pune, Bela Books
11.	Thompson I (1999) <i>Frank Lloyd Wright: A Visual Encyclopedia</i> , London, Grange Book Plc
12.	YatinPandya (2014) <i>Elements of Space Making</i> , Ahmedabad, Mapin Publishing

First Year B Arch.

Elective -I

CourseCode:KHMU18	Course Category: Open elective		Semester: I
Credits :	2	Internal Assessment	100 Marks
Lectures per week	1	Terminal Paper	-
Studio Projects per week	-	Sessional Oral (SO	-
Workshops or studio exercises / week	1	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	36 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	30 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	06 Hours

Course Objectives:

1. To facilitate the students to learn out of a pool of specialised courses, which provides extended scope or which enables exposure to discipline-centric courses as well as cross-disciplinary courses.
2. To encourage interdisciplinary learning and imbibe values as learners
3. To give students an opportunity to develop their attitudes and skills in a subject they may opt for making carrier

Course Outcomes:

CO No.	Affective levels	On successful completion of course the learner will be able to:
1.	Receiving	Identify And describe the aspects or issues of offered contents
2.	Responding	Report case study
3.	Valuing	Justify their ideas /opinions in relation to contents of elective
4.	Organization	Document And present the data collected in a systematic way.
5.	Internalizing	Display a technical base through in depth study

Course Contents:

Units	Contents of The Course	Hours
	The detailed course contents will vary as per options selected for elective and expert teaching. The course will frame the contents at the beginning of semester along with objectives, outcomes, references and details for assignments.	
Total Contact Hours		

Learning Resources:

1.	As per topic chosen
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SEMESTER-II

First Year B Arch.

Architectural Design -II

CourseCode:KHMU21	Course Category: Professional Core		Semester: II
Credits :	6	Internal Assessment	40 Marks
Lectures per week	2	Terminal Paper	-
Studio Projects per week	2	Sessional Oral (SO	60 Marks
Workshops or studio exercises / week	2	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	108 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	90 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	18 Hours

Course Objectives:

1. To make the students familiar with design and the architectural design process as a synthesis of factors such as climate, comfort, land, technology
2. To equip the students with communication and presentation skills
3. To inculcate sensitivity towards environment through climate responsive design

Course Outcomes:

CO No.	Cognitive levels	On successful completion of course the learner will be able to:
1.	Remembering	Represent built/unbuilt spaces in graphic form
2.	Understanding	Understand the concept of form, space and structure through documentation
3.	Applying	Use isometric, axonometric, and rendering techniques and demonstrate their ideas and observations graphically as well as verbally
4.	Applying	Develop understanding to respond to the climate in order to achieve human comfort
5.	Analysing	Analyse Measured drawing with respect to structure, form, material, climate etc.
6.	Creating	Design multi activity space
7.	Creating	Make 3D views of design proposal

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Documentation Measured drawing of a well-articulated structure with its surrounding context	18
Unit -II	Pre-study: place, climate, scale, people and their activities - Study of place and climate - Site analysis, activity and/or function analysis (Learning from primary and secondary resources such as case-studies and site visits, books, reports, articles, films and documentaries, etc.)	12
Unit -III	Analysis Analysis and presentation of measured drawing with respect to structure, material, planning, context, climate, geography, resources, form, function, elements of design, aesthetics, etc.	18
Unit-IV	Architectural Design - Context based multi-activity architectural design project (approximately up to 300 sq. m.)	30
Unit-V	Time bound project - Single-activity architectural design project: this project shall be based on values in architecture (e.g. universal design, etc.)	12
Total Contact Hours		90

Learning Resources:

1.	Akiko Busch (1991) <i>The Art of Architectural Models</i> , Hong Kong, Design Press
2.	Ching Francis, D. K. (1999) <i>Visual Dictionary of Architecture</i> , New Jersey, John Willy and Sons
3.	Ching Francis, D. K. (2007) <i>Architecture: Form Space & Order</i> , New Jersey, John Willy and Sons
4.	Krishnan Arvind (2017), <i>Climate Responsive Architecture: A Design Handbook for Energy Efficient Buildings</i> , McGraw Hill Education
5.	Neufert Ernst (1970) <i>Neufert Architects data</i> , Bauwelt-Verlag (German 1 st Ed.), Lockwood (English 1 st Ed.)
6.	Nick Bunn (2010) <i>Architectural Model Making</i> , London, Laurence King Publishing
7.	Pandya Yatin (2014) <i>Elements of Space Making</i> , Ahmedabad, Mapin Publishing
8.	Pramar V. S. (1973) <i>Design Fundamentals in Architecture</i> , Somaiya Publication
9.	Rapoport Amos (1969), <i>House, form and culture</i> , Pearson
10.	Thakkar Jay, Morrison Skye, (2008) <i>Matra: Ways of Measuring Vernacular Built Forms of Himachal Pradesh</i> , SID research Cell, CEPT University

First Year B Arch.

Building Construction and Materials -II

CourseCode:KHMU22	Course Category: BSAE		Semester: II
Credits :	6	Internal Assessment	40 Marks
Lectures per week	2	Terminal Paper	-
Studio Projects per week	-	Sessional Oral (SO	60 Marks
Workshops or studio exercises / week	4	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	108 Hours
No.s of Weeks for Teaching + Sessional Work	15	No.s of Hours for Teaching + Sessional Work	90 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	18 Hours

Course Objectives:

1. To enable students to understand materials, principles and methods of construction
2. To introduce timber construction and its elements in detail.

Course Outcomes:

CO No.	Cognitive levels	On successful completion of course the learner will be able to:
1.	Remembering	Know timber as materials in depth and its elements in building construction.
2.	Remembering	Define terms of different timber elements
3.	Understanding	Describe different flooring and roofing materials and understand the concept of spanning for roof element
4.	Applying	Apply appropriate type of timber elements such as door windows, staircase, floor, and roof in design considering form.
5.	Analyzing	Classify different timber elements used in construction and compare different types of materials for roofing, flooring etc
6.	Evaluating	Evaluate suitable joinery for openings
7.	Creating	Summarise knowledge gained in this subject to the architecture design and create drawings and models

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Introduction <ul style="list-style-type: none"> · Introduction to timber construction · Properties, strength, defects and preservation of timber. · Various timber joints: widening joints, halved joints, cogged joints, bearing joints, oblique joints, etc. 	7
Unit -II	Materials <ul style="list-style-type: none"> · Mud blocks, rammed earth blocks · Roofing materials - types, purpose, characteristics, advantages and disadvantages · Flooring and paving - different flooring and paving materials 	7
Unit -III	Timber doors and windows <ul style="list-style-type: none"> · Terminology and construction aspects of doors and windows · Timber doors & Partitions - Design consideration and construction for single and double shutters, partly glazed and partly panelled, fully glazed, fully panelled, flush doors, ledged, braced and battened doors. · Timber windows -Design considerations, principles and construction for sash types-panelled, fixed, partly glazed, fully glazed and louvered. · Timber windows -Types of opening- centrally pivoted, top hung, side hung, casement, bay window and sliding. · Hardwares used for doors and windows 	28
Unit-IV	Timber roofs and trusses <ul style="list-style-type: none"> · Timber roofs - Types of roof construction with respect to slope, span and spanning members · Terminology of sloping roof and members · Need and types of sloping roofs : lean to roof, couple roof, close couple roof and collar roof. · Timber trusses – Principles and considerations of trusses. Forces in truss members. Construction of trusses such as king post, queen post truss, mansard roof and trusses for various spans 	28
Unit-V	Timber floors <ul style="list-style-type: none"> · Timber flooring - General idea of timber floors in relation to spans, load transmission · Types :Single joist, double joist, triple joist 	15
Unit-VI	Staircase <ul style="list-style-type: none"> · Design Consideration and components · Types of staircases · Timber staircase 	5
Total Contact Hours		90

Learning Resources:

1.	Rangwala S.C.(2007) Engineering Materials, Gujarat, Charator Publication House
2.	Duggal S.K.(2009) Building materials, New Delhi, New Age International
3.	Don A. Watson,(1972) Construction Materials and Processes, New York, McGraw Hill
4.	W.B. McKay (1981)Building Construction Vol. I,II, UK, Longmans Green and Co.
5.	Barry(1958)The construction of buildings, Vol.I,II, Blackwell science
6.	Roy Chudley, Roger Greeno (1988), Buildings Construction handbook, Routledge

First Year B Arch.

Theory of Structures -II

CourseCode:KHMU23	Course Category: BSAE		Semester II
Credits :	2	Internal Assessment	40 Marks
Lectures per week	1	Terminal Paper	-
Studio Projects per week	-	Sessional Oral (SO	-
Workshops or studio exercises / week	1	Sessionals(SS)	60 Marks
No.s of Weeks in Semester	18	No.s of hours in Semester	36 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	30 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	6 Hours

Course Objectives:

1. To understand the structural concepts and behaviour of structural element
2. To introduces forces acting on members in structures

Course Outcomes:

CO No.	Cognitive levels	On successful completion of course the learner will be able to:
1.	Remembering	Recognize the significance of shear force and Bending moment diagram in structural analysis
2.	Understanding	Categorise the forces acting on members in structural analysis
3.	Applying	Develop an understanding of stresses and strain on members
4.	Analysing	Analyse the behaviour and response of structural system to various loading consideration
5.	Evaluating	Justify the dimensions assigned to structural elements of structure for serviceability and safety criteria
6.	Creating	Calculate the load for various load combinations and nature of load (Dead load, Live load)

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Introduction to Shear Force Diagram (SFD) and Bending Moment Diagram (BMD) for Simply supported, cantilever, and overhang. Definition of Shear Force (SF), Bending Moment (BM), Sign convention, sagging, hogging, Point of contra flexure, contra shear, effect of couple on beams	04
Unit -II	Details of Shear Force Diagram (SFD) and Bending Moment Diagram (BMD). Details for simply supported, cantilever, overhang beam for a combination of uniformly distributed load (UDL) and point load.	06
Unit -III	Theory of Simple Bending: - Theory of simple bending and bending stress. Details based on the standard section with bending stress distribution diagrams.	06
Unit-IV	Shear Stress of Beam: - Shear stress. Details based on the standard section with shear stress distribution diagram. Introduction to shear centre.	06
Unit-V	Slope And Deflection: - slope and deflection in beams based on standard cases (no derivations).	04
Unit-VI	Arches: - Introduction to arches as structural element, two hinged, three hinged and fixed.	04
Total Contact Hours		30

Learning Resources:

1.	S B Junnarkar & Dr. H J Shah,(2012).Mechanics of Structures Vol. I &II.Anand Charotar Publishing
2.	Deo S.S.(2013).Engineering Mechanics.Pune, Nirali Prakashan
3.	Deo S.S.(2013).Strength of Materials. Pune, Nirali Prakashan
4.	Ramamrutham S. Narayan.R.(2014) <i>Theory of Structures (for Engineering Degree ,Diploma)</i> .New Delhi, Dhanpatrai Publications P.Ltd
5.	Timoshenko Stephen.(2002) <i>Strength of materials part I. (elementary theory and problems) IIIrd ed.</i> New Delhi, CBS Publishers..Timoshenko Stephen.(2002) <i>Strength of materials part II (elementary theory and problems) IIIrded.</i> NewDelhi,CBS Publishers.

First Year B Arch.

History of Architecture -II

CourseCode:KHMU24	Course Category: Professional Core		Semester: II
Credits :	3	Internal Assessment	40 Marks
Lectures per week	1	Terminal Paper	60 Marks
Studio Projects per week	-	Sessional Oral (SO	-
Workshops or studio exercises / week	2	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	54 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	45 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	09 Hours

Course Objectives:

1. To learn from the wisdom of traditional knowledge systems.
2. To imbibe the fundamental knowledge of the built environment
3. To study the history of architecture as a response to climate, culture and socio-political conditions.

Course Outcomes:

CO No.	Cognitive levels	On successful completion of course the learner will be able to:
1.	Remembering	Identify issues with reference to cultures, civilizations, and settlements across the world at different periods of time
2.	Remembering	Know technology and its impact on built environment and building form
3.	Understanding	Understand evolution of various styles of art and architecture
4.	Understanding	Differentiate between various styles and elements of development and describe prominent historic buildings
5.	Applying and Analysing	Develop ability to analyse the evolutionary aspects of stage of progress
6.	Evaluating	Compare architectural style across culture of that time with reference to location -geography , Social Systems, Religion ,climate, art etc.
7.	Evaluating	Appraise structures as a developmental process rather than simply as a product and critique building forms, structure
8.	Creating	Design buildings in historic architectural styles

Course Contents:

Units	Contents of The Course	Hours
Unit -I	<p>Evolution of -Hindu Temple Architecture Evolution of architectural style, principles and major influences on development of form, Spatial organisation, structural development and ornamentation style and other architectural elements during.</p> <ul style="list-style-type: none"> - Gupta period (suggestive examples Temple no 17 , Sanchi, Dashavatara Temple Deogarh etc) - Early and later Chalukyan Temple Development at Airhole , Badami Pattadakal. (suggestive examples Ladkhan and Durga temples-Aihole , Cave temple-Badami, Virupaksha and Papanatha temple- Pattadakal, etc)3. - Temple Development by Rashakutas. (Suggestive example Kailash Temple Ellora) - Temple Development by Pallava - Rock cut and Structural Temples (suggestive examples Rathas, Rock cut caves, Shore temple at Mamallapuram Etc) 	9
Unit -II	<p>Introduction to Dravidian style (Development in South India) Evolution of architectural style, principles and major influences on development of form, Spatial organisation, structural development and ornamentation style and other architectural elements during</p> <ul style="list-style-type: none"> - Hoysala Temple Development. (suggestive example Keshava temple at Somnathpur) - Temple development by Cholas. (suggestive example - Brihadeshwara temple, ThanjavoreEtc - Development of gopuram during Pandya Period. - Vijayanagara Period. (suggestive example -Vittalaswami temple, Hampi, column orders etc) - Development of Temple cities during Madura period. (suggestive examples - Meenakshi temple at Madurai, Sri Ranganatha swamy temple at srirangam etc) 	9
Unit -III	<p>Introduction to Nagara style (Development in North India) Evolution of architectural style, principles and major influences on development of form, Spatial organisation, structural development and ornamentation style and other architectural elements in</p> <ul style="list-style-type: none"> - Orissa -(suggestive examples Mukteshwar Temple, Lingaraja temples at Bhubaneswar, Sun temple at Konark) - Khajuraho- (suggestive examples –Kandariya Mahadeo temple, Khajuraho etc) - Western regions of Gujarat -(suggestive example Sun temple, Modhera, etc) - Jain Temple Development in Western India. (suggestive examples Vimal Shah at Mount Abu, Chaumukh Temple at Ranakpur, etc) 	9
Unit-IV	Early Christian and Byzantine Architecture	6

	Introduction to the social systems, aspects of Spatial organisation, structural development, planning principles and ornamentation elements in the Evolution of Church form. Introduction to the special elements like timber trusses, clerestory, pendentives, dome construction, surface treatment, materials of construction etc. (suggestive examples -St. Peters at Rome (earlier one) Hagia Sophia at Constantinople etc)	
Unit-V	Romanesque Introduction to the social systems, aspects of Spatial organisation, structural development, planning principles and ornamentation elements in the Evolution of Church form. Introduction to the special elements like Wall passages, raking arcades, triforium gallery, vaulting systems etc(suggestive examples – St. Michelle Pavia, Campus at Pisa etc)	6
Unit-VI	Gothic Phase Introduction to the Spatial organisation, planning principles and ornamentation elements in the Evolution of Church form. Introduction to the special elements like buttresses with Structural innovations, pointed arches, vaulting systems, window traceries, flying buttresses etc.(suggestive examples -Amines Cathedral, Notre dame cathedral, Salisbury cathedral, West Ministers Abbey, castles etc)	6
Total Contact Hours		45

Learning Resources:

1.	Percy Brown, (1983) Indian Architecture (Hindu And Buddhist). Bombay, Taraporevala and Sons.
2.	Henri Stierlin, (2002) Hindu India. ISBN 3-8228-1767-8. Taschen GmbH.
3.	George Michell, (1995) Architecture of the Islamic World. London, Thames and Hudson Ltd.
4.	Sandra Forty, (2004) Architecture. Rochester, Grange books
5.	Sir Banister Fletcher, (1996) A History of Architecture. Delhi, CBS Publishers.
6.	DhanpatRai Publications (P) Ltd, 16th Reprint

First Year B Arch.

Architectural Drawing and Graphics -II

CourseCode:KHMU25	Course Category: Professional Core		Semester: II
Credits :	5	Internal Assessment	40 Marks
Lectures per week	1	Terminal Paper	60 Marks
Studio Projects per week	-	Sessional Oral (SO	-
Workshops or studio exercises / week	4	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	90Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	75 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	15 Hours

Course Objectives:

1. To introduce various techniques of three-dimensional presentation of simple, complex objects and building elements.
2. To enable the students to understand and express Composite three-dimensional built forms through additive and interpenetrated elements using various graphical projection systems through sections
3. To understand scale proportions in buildings and communication through architectural drawings

Course Outcomes:

CO No.	Cognitive levels	On successful completion of course the learner will be able to:
1.	Remembering	Recognize , three-dimensional drawing and its importance in architectural drawing
2.	Understanding	Understand interpenetration of solids and explain concept of isometric, axonometric projections
3.	Applying	Develop understanding of Sciography and apply in plan and elevations of design
4.	Analysing Evaluating	Analyse And relate the graphics content with Architectural Design
5.	Creating	Create 3D views using isometric and axonometric

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Advanced orthographic projections <ul style="list-style-type: none">- To draw and compose composite solids and its orthographic projection- Drawing Plan/s, Section/s, Elevation/s of building elements by using methods of orthographic projection	15
Unit -II	Three dimensional drawings-I <ul style="list-style-type: none">- Drawing of isometric, axonometric and oblique views of solid objects and their compositions	15
Unit-III	Three dimensional drawings - II <ul style="list-style-type: none">- Drawing of isometric, axonometric and oblique views of building elements	10
Unit -IV	Interpenetration of objects <ul style="list-style-type: none">- Intersection and interpenetration of solid geometric objects and their compositions- Intersection and interpenetration of architectural elements and their compositions	15
Unit-V	Introduction to Sciography <ul style="list-style-type: none">- Introduction to Sciography of simple objects- Representation of shade and shadows in plans and elevations	8
Unit-VI	Architectural drawings. <ul style="list-style-type: none">- Learning to make architectural drawings of Master Architect's building drawings (referred from books) in terms of plans, elevations and sections.- Architectural representation of trees, hedges, foliage, human figures, cars, etc.,- Building Elements: Techniques of representing building elements such as doors, windows, steps, chajja, porch, canopy, etc.	12
Total Contact Hours		75

Learning Resources:

1.	F. D K. Ching (2009) Architectural Graphics, New Jersey, John and Wiley and Sons.
2.	Manual of Section, David J. Lewis, Marc Tsurumaki, and Paul Lewis.
3.	Architectural Drawing Course: Tools and Techniques for 2D and 3D Representation, by Mo Zell.
4.	N.D.Bhatt (2012) Engineering Drawing, Gujrat, Charotar Publishing House.
5.	Hugh C. Browning (1996) The Principles of Architectural Drafting, New York, Watson-Guptill Publications.
6.	Calvin F. Schmid, Stanton E. Schmid, (1954) Handbook on Graphic Presentation, New York, The Ronald Press Company
7.	David Littlefield (2012) Matric Handbook, London and New York, Routledge Taylor and Francis Group.
8.	Sleeper R.(2000)Architectural Graphic Standards, New York, John Wiely and Sons.
9.	Gill R.W.(2011) Rendering with Pen and Ink, London, Thames & Hudson ltd.

First Year B Arch.

Climatology

CourseCode:KHMU26	Course Category: Professional Core		Semester: II
Credits :	3	Internal Assessment	40 Marks
Lectures per week	1	Terminal Paper	-
Studio Projects per week	-	Sessional Oral (SO)	-
Workshops or studio exercises / week	2	Sessionals(SS)	60 Marks
No.s of Weeks in Semester	18	No.s of hours in Semester	54 Hours
No.s of Weeks for Teaching + Sessional Work	15	No.s of Hours for Teaching + Sessional Work	45 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	09 Hours

Course Objectives:

1. To understand climate and its impact on Architectural Design
2. To encourage sensitivity towards environments

Course Outcomes:

CO No.	Cognitive levels	On successful completion of course the learner will be able to:
1.	Remembering	Outline elements of climate, nature of climate and its zone and recognize importance of climate in architecture
2.	Understanding	Understand the climatic influences on built environment and comfort conditions for inhabitants
3.	Applying	Use the surrounding environment as one of the strategic design parameters
4.	Applying	Employ solar charts and sun path and apply fundamentals of climatology in building design
5.	Analysing	Analyse characteristic of climatic zone in India
6.	Evaluating	Justify opening position, its size in building design by considering air movement
7.	Creating	Relate climate, other environmental parameters and built form at individual and settlement level
8.	Creating	Design climate responsive building

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Introduction: <ul style="list-style-type: none"> - Climate, weather, earth- sun relationship - Elements of climate: Temperature, rainfall, humidity, wind, solar radiation etc. - Importance of climate in Architecture - Global, Macro and Microclimate 	6
Unit -II	Human Comfort: <ul style="list-style-type: none"> - Human heat balance and comfort - Thermal comfort and means of thermal comfort - Heat stress, Effective temperature 	6
Unit -III	Comfort conditions: <ul style="list-style-type: none"> - Bioclimatic chart - Subjective variables - Thermal Comfort Indices - Active & Passive means of thermal control - Degree of control. 	9
Unit-IV	Solar charts & Sun-path: <ul style="list-style-type: none"> - Study of Sun-path, Azimuth & Altitude Angle - Structural control: Sun control and shading devices 	9
Unit-V	Ventilation & Air movement: <ul style="list-style-type: none"> - Study of ventilation & its functions in buildings - Air flow through buildings - Position & size of opening 	6
Unit-VI	Study of Climatic zones & Built environment: <ul style="list-style-type: none"> - Study of nature of climate, its physiological objectives and design criteria - Planning Principles of internal and external spaces, surface treatments and openings etc. for various climatic zones 	9
Total Contact Hours		45

Learning Resources:

1.	Koenigsberger, Ingersoll, Mayhew, Szokolay, (1996) Manual of Tropical Housing and Building - Climatic Design, Orient Longman Limited
2.	G. Z. Brown and Mark Dekay, John Wiley and Sons, (2001) Sun, Wind and Light, 2nd Edition, New York
3.	Baruch Givoni, (1976) Man, Climate and Architecture, U.K., Applied science Publishers, 2nd Edition
4.	T. N. Sheshadri, (2001) Climatological and Solar Data for India, Meerat, Sarita Prakashan
5.	A. Krishan, (2001), Climate Responsive Architecture, Tata Mcgraw Hill

First Year B Arch.

Basic Design-II

CourseCode:KHMU27	Course Category: Professional Core		Semester: II
Credits :	3	Internal Assessment	40 Marks
Lectures per week	1	Terminal Paper	-
Studio Projects per week	-	Sessional Oral (SO	60 Marks
Workshops or studio exercises / week	2	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	54 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	45 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	09 Hours

Course Objectives:

1. To introduce to the design process as a synthesis of a variety of factors, analysed and studied.
2. To enhance creative thinking skill

Course Outcomes:

CO No.	Cognitive levels	On successful completion of course the learner will be able to:
1.	Remembering	Acquire ,creative thinking and theory of Rasa
2.	Understanding	Understand various techniques for improving creativity
3.	Applying	Use the sources of inspiration for creating concepts for design
4.	Analyzing	Select tools for concept Building
5.	Evaluating	Decide inspiration for concept Building
6.	Creating	Synthesis knowledge gained in this subject with Architectural Design

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Techniques for improving Creativity I: <ul style="list-style-type: none"> - Theories by Edward De Bono: Six thinking hats, lateral thinking - Brainstorming, - Random Combinations - Tree of Possibilities 	08
Unit -II	Techniques for improving Creativity II <ul style="list-style-type: none"> - Abstraction - Transformation - Matrix of Ideas 	08

Unit -III	Sources of inspiration for Creativity: - Role of experience - Mimesis - Literature	08
Unit-IV	Inspiration for concept building: - Material - Geometry - History	08
Unit-V	Tools for Concept building: - Nature and geometry - Visual Memory - Association with other arts	08
Unit-VI	Indian Aesthetics: Introduction to theories of Indian aesthetics specifically the 'Rasa' theory by Abhinavgupta, Bharatmuni, Abhinavbharati, etc., with examples from Natyashastra	05
Total Contact Hours		45

Learning Resources:

1.	Akiko Busch (1991) <i>The Art of Architectural Models</i> , Hong Kong, Design Press
2.	Bacon E.N. (1974) <i>Design of Cities</i> , England, Penguin Books
3.	Barry A Berkus (2000) <i>Architecture, Art – Parallels and Connections</i> , Australia, Watson-Guptill Publications
4.	Ching Francis, D. K. (2007) <i>Architecture: Form Space & Order</i> , New Jersey, John Willy and Sons
5.	Ching Francis, D. K. (1999) <i>Visual Dictionary of Architecture</i> , New Jersey, John Willy and Sons
6.	Edward De Bono (1990) <i>Lateral Thinking</i> , London, Penguin Books
7.	Gupta Neerja (2017), <i>A Student's Handbook of Indian Aesthetics</i> , Cambridge Scholars Publishing
8.	Nick Bunn (2010) <i>Architectural Model Making</i> , London, Laurence King Publishing
9.	Paul Jackson, Angela A Court, Marion Elliot (1993) <i>The Ultimate Papercraft and Origami Book</i> , United Kingdom, Acropolis Books
10.	ShirishVasantBapat (1993) <i>Basic Design and Anthropometry</i> , Pune, Bela Books
11.	Thompson I (1999) <i>Frank Lloyd Wright: A Visual Encyclopedia</i> , London, Grange Book Plc

First Year B Arch.

Elective-II

CourseCode:KHMU28	Course Category: Open Elective		Semester: II
Credits :	2	Internal Assessment	100 Marks
Lectures per week	1	Terminal Paper	-
Studio Projects per week	-	Sessional Oral (SO	-
Workshops or studio exercises / week	1	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	36 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	30 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	06 Hours

Course Objectives:

1. To facilitate the students to learn out of a pool of specialised courses, which provides extended scope or which enables exposure to discipline-centric courses as well as cross-disciplinary courses.
2. To encourage interdisciplinary learning and imbibe values as learners
3. To give students an opportunity to develop their attitudes and /or skills in a subject they may opt for making carrier

Course Outcomes:

CO No.	Affective levels	On successful completion of course the learner will be able to:
1.	Receiving	Identify and describe the aspects or issues of offered contents
2.	Responding	Report case study
3.	Valuing	Justify their ideas /opinions in relation to contents of elective
4.	Organisation	Document And present the data collected in a systematic way.
5.	Internalising	Display a technical base through in depth study

Course Contents:

Units	Contents of The Course	Hours
	The detailed course contents will vary as per options selected for elective and expert teaching. The course will frame the contents at the beginning of semester along with objectives, outcomes, references and details for assignments.	
Total Contact Hours		

Learning Resources:

1.	As per topic chosen
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S.Y.B. ARCH (CBCS 2020)
(Contents Semester III & IV)
For
Bachelor of Architecture (B. Arch) Programme

Bharati Vidyapeeth (Deemed to be University)
College of Architecture, Pune



Prof. Dr. Shivajirao Kadam
M.Sc., Ph.D.
Chancellor

Prof. Dr. M. M. Salunkhe
M.Sc., Ph.D., FR.S.C.
Vice Chancellor

Bharati Vidyapeeth
(Deemed to be University)
Pune, India.

Founder Chancellor : Dr. Patangrao Kadam

★ Accredited with "A" Grade (2017) by NAAC ★
★ Category-I University Status by UGC ★
★ NIRF Ranking - 63 ★

"Social Transformation Through Dynamic Education"



Dr. Vishwajeet Kadam
B.Tech., M.B.A., Ph.D.
Pro Vice Chancellor
G. Jayakumar
M.Com., Dip.Pub.Admin.
Registrar

NOTIFICATION NO. 1107

It is hereby notified for the information of all concerned that the Academic Council, at its 64th meeting held on 29-11-2021 has resolved to approve the revised course structure, rules of examinations and syllabi of the First Year B.Tech (2021 Batch) Second Year B.Tech. (2020 Batch) and Second year B.Arch (2020 Batch) programmes under CBCS for its implementation from the academic year 2021-22 :

Sr. No.	Name of the Programme	First year 2021 batch	Second year 2020 batch
1	Architecture	-	B Arch Second Year
2	Chemical	B Tech First year	B Tech Second year
3	Civil	B Tech First year	B Tech Second year
4	Computer : CE	B Tech First year	B Tech Second year
	Computer : IT	B Tech First year	B Tech Second year
	Computer : CSE	B Tech First year	B Tech Second year
	Computer : CSE (AI&ML)	B Tech First year	
	Computer : CSBS	B Tech First year	B Tech Second year
	Computer : CSBS (18 Batch)	B Tech Final year syllabus	
5	Electrical	B Tech First year	B Tech Second year
6	Electronics : ECE	B Tech First year	B Tech Second year
7	Electronics : ETC	B Tech First year	B Tech Second year
8	Electronics : B Voc : MC	B Voc First year Mobile Computing	
9	Mechanical : Mech	B Tech First year	B Tech Second year
10	Mechanical : RAC	B Tech First year	B Tech Second year
11	Mechanical : B Voc : AS	B Voc First year Automobile Servicing	
12	Mechanical : B Voc : RAC	B Voc First year Refrigeration and Air Conditioning	

This is for the information of all concerned.

Ref. No. BVDU/2021-22/2879
Date: December 7, 2021

G. Jayakumar
Registrar

To,

1. The Principal, College of Engineering, Pune
2. The Dean, Faculty of Engineering & Technology, College of Engineering, Pune
3. The Controller of Examinations, BVDU, Pune
4. The IT Cell for uploading in the Website.

Notification-AC29-11-2021(6+5-12)

SEMESTER III

Second Year B.Arch.

Architectural Design -III

CourseCode:KHMU31	Course Category: Professional Core		Semester: III
Credits :	6	Internal Assessment	40 Marks
Lectures per week	2	Terminal Paper	-
Studio Projects per week	4	Sessional Oral (SO	60 Marks
Workshops or studio exercises / week	-	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	108 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	90 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	18 Hours

Course Objectives:

1. To recognise the importance of the site and its surroundings.
2. To understand and apply various grid/modular systems of planning.
3. To understand various determinants which help shape the rural/semi-urban characters.
4. To apply knowledge of various materials (sustainable) traditional/contemporary in their designs.

Course Outcomes:

CO No.	Cognitive levels	On successful completion of course the learner will be able to:
1	Remembering	Recognize the importance of the site and its surroundings.
2	Understanding	Comprehend the use of various contemporary materials.
3	Applying	Introduce the concept of margins, floor area, etc.in the given context.
4	Analysing	Analyse the aspects related to material, character and grid/modular system of design.
5	Evaluating	Relate knowledge of rural/semi-urban character, material and grid/modular system of design.
6	Creating	Design a multi activity space which demonstrates use of material, character and grid/ modular system of design. Create a final project and 3D model with views.

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Introduction to concepts of <ul style="list-style-type: none"> – Margins, floor area, etc. for the given site and context of the surroundings. – Various materials – Grid/modular system of design. 	12
Unit -II	Pre-study of multi-activity spaces <ul style="list-style-type: none"> – Precedent study through the lens of location, material, climate and grid/modular system, etc. 	12
Unit -III	Exploration of Various forms and materials <ul style="list-style-type: none"> – Forms can be explored basis geometry, grid, etc. and with use of contemporary material such as RCC, Stone, Timber, etc. 	12
Unit-IV	Analysis: <ul style="list-style-type: none"> – Site analysis, activity and/or function analysis, circulation analysis, programme analysis (activity and occupancy patterns) – Analysis of urban variables and constraints with respect to material, climate, site, resources etc. – Grid/modular based planning, form and rural/semi-urban aesthetics. 	12
Unit-V	Design <ul style="list-style-type: none"> – Context based multi-activity architectural design project demonstrating the appropriate use of studied materials and technology. – Projects such as: Crèche, Pre-Primary School, Police Stations, etc. (Built up area not more than 800 sq. m.) 	30
Unit-VI	Create Spaces for Multi-Function <ul style="list-style-type: none"> – Multi-function architectural design project: This project shall be based on values in architecture. Motels with restaurants, offices and residence, Banks, etc. (Built up area up to 200 sq. m) 	12
Total Contact Hours		90

Learning Resources:

1.	Akiko Busch (1991) <i>The Art of Architectural Models</i> , Hong Kong, Design Press
2.	Ching Francis, D. K. (1999), <i>Visual Dictionary of Architecture</i> , New Jersey, John Willy and Sons
3.	Ching Francis, D. K. (2007), <i>Architecture: Form Space & Order</i> , New Jersey, John Willy
4.	Krishnan A., (2017), <i>Climate Responsive Architecture: A Design Handbook for EnergyEfficient Buildings</i> , McGraw Hill Education
5.	Neufert Ernst (1970), <i>Neufert Architects data, Bauwelt-Verlag (German 1st Ed.)</i> , Lockwood(English 1st Ed.)
6.	Nick Bunn (2010), <i>Architectural Model Making</i> , London, Laurence King Publishing
7.	Pandya Y. (2014), <i>Elements of Space Making</i> , Ahmedabad, Mapin Publishing
8.	Pramar V. S. (1973) <i>Design Fundamentals in Architecture</i> , Somaiya Publication
9.	Rapoport A. (1969), <i>House, form and culture</i> , Pearson
10.	Thakkar J., Morrison S., (2008) <i>Matra: Ways of Measuring Vernacular Built Forms of Himachal Pradesh</i> , SID research Cell, CEPT University

Second Year B.Arch.

Building Construction and Materials -III

CourseCode:KHMU32	Course Category: BSAE		Semester: III
Credits :	6	Internal Assessment	40 Marks
Lectures per week	2	Terminal Paper	-
Studio Projects per week	-	Sessional Oral (SO	60 Marks
Workshops or studio exercises / week	4	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	108 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	90 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	18 Hours

Course Objectives:

1. To introduce the techniques of cavity walls and retaining walls.
2. To understand the principles of soil behaviour, method of spanning of openings and techniques of shuttering.

Course Outcomes:

Co. No.	Cognitive Levels	On Successful Completion of course the learner will be able to:
1.	Remembering	Describe various materials as well as its elements in building construction and define technical terms in regards to cavity wall, retaining wall and door –windows.
2.	Understanding	Understand the principles of cavity walls and retaining walls.
3.	Applying	Demonstrate door and windows choosing ‘Aluminium’ as material and apply the knowledge of retaining walls in architecture.
4.	Analysing	Analyse arches and lintels as per span of openings.
5.	Evaluating	Summarise shuttering and guniting.
6.	Creating	Create drawings and models with respect to cavity wall, retaining wall, door and windows.

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Materials <ul style="list-style-type: none"> – Fly ash brick, Stabilised earth block, Rammed earth block, Ferro-Crete, Concrete debri block. 	06
Unit -II	Cavity walls <ul style="list-style-type: none"> – Principles and advantages of cavity wall construction – Precautions in cavity wall construction – Cavity walls in brick and composite – Purpose of insulation 	20
Unit -III	Retaining wall <ul style="list-style-type: none"> – Retaining walls and its terminology – Mass retaining wall in bricks, stones etc. – Cantilever retaining wall in R.C.C. 	20
Unit -IV	Aluminium doors and windows <ul style="list-style-type: none"> – Design considerations – Principles and constructional aspects – Advantages and disadvantages – Sliding and sliding folding doors in aluminium – Sliding windows in aluminium 	20
Unit-V	Spanning of Openings <ul style="list-style-type: none"> – Arches -Terminology, load transfer, construction, centering, spanning of openings by arches like flat, segmental, semi-circular, corbel, etc. using stone, bricketc. – Lintels - Construction, form work, spanning of openings by lintels using brick, stone, timber, built up sections, etc. 	18
Unit-VI	Shuttering <ul style="list-style-type: none"> – Need and process – Types of shuttering – Materials used for shuttering – Advantages and disadvantage Guniting <ul style="list-style-type: none"> – Need and Process – Materials used for Guniting – Advantages and disadvantages 	6
Total Contact Hours		90

Learning Resources:

1.	Barry R.(1958), <i>The Construction of Buildings</i> , Volume 1,4,Affiliated East West Press Private Limited, New Delhi
2.	Roy C.(1973), <i>Construction Technology</i> , Volume 1,2,4, Longman Group,Ltd.England.
3.	Mckay J.(1970), <i>Building Construction</i> ,Volume1,2 and 4, Dorling Kindersley(India) Pvt.Ltd.
4.	Sushil Kumar(1965), <i>Building Construction</i> , Standard Publishers Distributors, Delhi.
5.	Rangwala S.C.(1966), <i>Building Construction</i> , Charotar Publishing House Pvt.Ltd., Gujarat India.

Second Year B.Arch.

Theory of Structures-III

CourseCode:KHMU33	Course Category: BSAE		Semester: III
Credits :	2	Internal Assessment	40 Marks
Lectures per week	2	Terminal Paper	60 Marks
Studio Projects per week	-	Sessional Oral (SO	-
Workshops or studio exercises/ week	-	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	36 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	30 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	06 Hours

Course Objectives:

1.To introduce indeterminate structure such as continuous beam, fixed beam, propped cantilever beams, etc.
2. To understand the behaviour of different structural elements for loading conditions.

Course Outcomes:

Co . No .	Cognitive Levels	On Successful Completion of course the learner will be able to:
1.	Remembering	Recognize the significance of direct and bending stress in structural analysis of load bearing and framed structure in Reinforced Cement Concrete (R.C.C.), Steel and Timber.
2.	Understanding	Explain structural concepts for fixed beam and continuous beam. Describe the various loading conditions acting on the structure. Illustrate the concept of truss or frame of structures and analysis of various methods such as method of joints and section. Behaviour of column under axial & eccentric load.
3.	Applying	Calculate fixed end moments, support reactions, support moments of beams for various loading conditions. Also calculate the forces in the members of the truss. Develop an ability to analyse internal response of structure under the various loading conditions.
4.	Analysing	Compare response of structural system for various materials such as RCC, Steel, Timber and loading conditions
5.	Evaluating	Evaluate the support moments and reactions of load bearing and framed structures.
6.	Creating	Compile the application of various structural tension members subjected to various loading conditions.

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Direct and Bending Stress on Column - Introduction of direct and bending stresses for column, eccentricity in one direction, Importance of kernel of section for rectangle and circle (Theory)	4
Unit -II	Fixed Beams - Combination of Uniformly Distributed load and point load. - (No derivation) Shear Force & Bending Moment & Deflection. (Theory and Simple Numericals)	4
Unit -III	Continuous Beam - Three span continuous beam with uniformly distributed load and Point load to find out support moments and draw Shear force and Bending Moment Diagram based on simple Clapeyron's theorem. - Comparison of Simply supported beam, Fixed beam and continuous beam.(Theory and Simple Numerical)	6
Unit-IV	Analysis of Truss /Frame by Method of Joint - Assumptions in analysis of truss. Condition of Perfect, redundant and deficient truss. Analysis of perfect frames/truss. by method of joints. (Analytical only) Member forces of simply supported & cantilever truss. (simple problems)	6
Unit-V	Analysis of Truss by Method of Section - Analysis of perfect frames/truss by method of sections. Member forces of simply supported & cantilever truss.(simple numerical)	6
Unit-VI	Analysis of Column - Analysis of columns by Euler's and Rankine's theory. Assumptions and limitations of Euler's theory. Effective length for standard of end conditions of columns. Slenderness ratio and its importance. (Theory and simple numerical)	4
Total Contact Hours		30

Learning Resources:

1.	Ramamrutham S. Narayan.R,(2014). <i>Theory of structures</i> . New Delhi, Dhanpat Rai Publishing Company.
2.	Parikh Janak P,(2012). <i>Understanding Concept of Structural Analysis and Design</i> .Anand,Charotar Publishing
3.	R.S.Khurmi,(2020), <i>Theory of structures</i> , Chand & Company Ltd. New Delhi-110055
4.	Dr. R K Bansal.(2010). <i>Strength of Material</i> .Laxmi Publications.
5.	Dr. H.J. Shah. and S.B.Junnakar,(2016 32 nd edition). <i>Mechanics of Structures</i> . (Vol.I).Charotar Publishing house private limited.

Second Year B.Arch.

History of Architecture -III

CourseCode:KHMU34	Course Category: Professional Core		Semester: III
Credits :	3	Internal Assessment	40 Marks
Lectures per week	2	Terminal Paper	-
Studio Projects per week	-	Sessional Oral (SO	60 Marks
Workshops or studio exercises/ week	1	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	54 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching Sessional Work	45 Hours
No.of weeks for Assessment	3	No. of Hours for Assessment	09Hours

Course Objectives:

1. To imbibe technology and its impact on the built environment and building form.

Course Outcomes:

Co. No.	Cognitive Levels	On Successful Completion of course the learner will be able to:
1.	Remembering	Know contemporary technology and its impacts on built environment and building form
2.	Understanding	Understand the development of architecture as a process through a holistic approach of contextual and cultural evolution. Describe prominent historic buildings & typology.
3.	Applying	Differentiate various styles and elements of development .
4.	Analysing	Develop ability to analyse the evolutionary stages.
5.	Evaluating	Compare architectural styles with reference to location - Geography, Social Systems, Religion, Climate, Art etc. Appreciate issues with reference to influence of cultures, civilizations and settlements across the world at different historic times.
6.	Creating	Derive materials, construction techniques & architectural features in design from historic styles.

Course Contents:

Units	Contents of The Course	Hours
Unit -I	<ul style="list-style-type: none"> – Introduction to Spatial organisation - structural development and ornamentation of Architecture in Indian subcontinent –Indo Islamic Architecture in India. A brief introduction to the origin and characteristics of Islamic architecture: building types, elements, structural systems, construction techniques. <p>Imperial styles:</p> <ul style="list-style-type: none"> – Development of mosques, development of tombs and their developing architectural elements and features. – (probable examples of architectural and building typology are Qutb complex, Quwat-ul-Islam Mosque, Qutb Minar, Sultan Ghari, Tomb of Iltutmish, Tomb of Balban , Alai Darwaja., Jamaat Khana masjid etc.) 	8
Unit -II	<p>Provincial styles:</p> <ul style="list-style-type: none"> – Introduction to various provincial features of Punjab, Sind, Bengal, Gujrat, Kashmir, Jaunpur, Malwa, Deccan etc. and their influencing factors. – (probable examples are Mosque: Jami – Ahmedabad, Gulbarga, Tomb: Gol Gumbaj, Ibrahim Rauza, Bijapur, Civic work: Dada Hari step well, Adalaj etc.) <p>The Mughal phase:</p> <ul style="list-style-type: none"> – Evolution of Mughal style and the different eras of Mughal rule with their unique characteristics and variety of buildings. – (probable examples are Mosque: Jami at Fatehpur Sikri , Delhi - Tomb: Humayun, Akbar, Itmadud-daulla, Mumtaj Mahal – Fort: Fatehpur Sikri, Red Fort at Agra and Delhi, Regal Buildings: Administrative and Residential buildings like Birbal’s house, Jodhabai’s palace and other important monuments.) 	8
Unit -III	<p>Introduction to Development of structural systems, Architectural and ornamental elements and spatial organisation principles of Renaissance Phase –</p> <ul style="list-style-type: none"> – Revived column orders, rusticated masonry, grand cornices, and public architecture. – (probable examples of architectural and building typology and features like Piazzas- St Mark, Churches – St. Peters Rome, St Paul’s, Palladian villas, buildings with respect to architects etc.) 	7

Unit-IV	<p>Introduction to Development of structural systems, Architectural and ornamental elements and spatial organisation principles of Baroque Art, Rococo Art -</p> <ul style="list-style-type: none"> - (probable examples of architectural and building typology and features like French Baroque: Versailles, English baroque – Sir Christopher Wren; Rococo Art and Architecture, interiors-hotels) 	7
Unit-V	<p>Introduction to Development of structural systems, Architectural and ornamental elements and spatial organisation principles of Neoclassical Art and Architecture</p> <ul style="list-style-type: none"> - Beginnings of modernity –Origin and development of Neo Classicism Structural , Neoclassical architecture , Neo classicists: - (Probable examples architectural and building typology and features like Laugier, Soufflot, Schinkel, Labrousse - Romantic Neo classicists: Ledoux, Boulle, Durand, Jefferson etc.) 	7
Unit-VI	<p>Introduction to Development of structural systems, Architectural and ornamental elements and spatial organisation principles of Industrial Revolution</p> <ul style="list-style-type: none"> - Causes, consequence and impact in Architecture – Urbanisation in Europe and America- split of design education into architecture and engineering streams- Emergent new building / space types. Growing need for mass housing .Its influences in building, technology and modern building materials Steel, glass, RCC etc. - (Probable examples are architectural and building typology and features like Industrial exhibitions- Chicago School and skyscraper development.) 	8
Total Contact Hours		45

Learning Resources:

1.	Michell G., (1995) <i>Architecture of the Islamic World</i> . London, Thames and Hudson Ltd
2.	Forty S.,(2004) <i>Architecture</i> .Rochester, Grange books
3.	Fletcher B., (1996) <i>A History of Architecture</i> . Delhi, CBS Publishers.
4.	Hiraskar, (2009), <i>The Great Ages of World Architecture</i> . New Delhi,

Second Year B.Arch.

Architectural Drawings and Graphics -III

CourseCode:KHMU35	Course Category: Professional Core		Semester: III
Credits :	5	Internal Assessment	40 Marks
Lectures per week	1	Terminal Paper	-
Studio Projects per week	-	Sessional Oral (SO)	-
Workshops or studio exercises / week	4	Sessionals(SS)	60 Marks
No.s of Weeks in Semester	18	No.s of hours in Semester	90 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	75 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	15 Hours

Course Objectives:

1. To understand the relation between depth of building elements and shades and shadows.
2. To develop three-dimensional visualisation skills of students through perspective drawing techniques.
3. To develop manual skills for rendering techniques and presentation.

Course Outcomes:

Co. No.	Cognitive Levels	On Successful Completion of course the learner will be able to:
1.	Remembering	Define and describe anatomy of perspective.
2.	Understanding	Explain different types of perspectives.
3.	Applying	Use various methods of drawing perspectives such as direct projection method, measuring point method, approximation method. Demonstrate Sciography in perspective and architectural drawings such as site plan, plan and elevations.
4.	Analysing	Distinguish shades and shadows and relate Sciography with source of light.
5.	Evaluating	Compare parallel and Angular Perspectives. Select appropriate type and method of manual rendering for presentation.
6.	Creating	Sketch perspectives of Interior and exterior.

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Introduction to Perspective: <ul style="list-style-type: none">- Anatomy of perspective: Station point, Eye level, Cone of vision, Picture plane, Horizon line, Ground line, Vanishing points.	5
Unit -II	Types of perspectives: <ul style="list-style-type: none">- Parallel perspective (One point perspective)- Angular perspectives (Two point perspective)	10
Unit -III	Methods of Perspective: <ul style="list-style-type: none">- Measuring point method- Direct projection method- Approximation method	15
Unit-IV	Sciography and Sciography in Perspective <ul style="list-style-type: none">- Sciography of complex geometrical objects and different types of building element.- Representation of Sciography (shades and shadows) for buildings on plans, elevations and 3d views.- Sciography in perspective of simple geometrical objects, complex objects and building elements.	20
Unit-V	Manual Rendering Techniques: <ul style="list-style-type: none">- Introduction to architectural manual rendering using three mediums such as pencil shading ,colour pencil and water color	10
Unit-VI	Perspective Drawings: <ul style="list-style-type: none">- Perspectives for simple and complex Building elements- Perspectives for simple household furniture items.- Rendered Perspectives for interiors and exterior view of Residences.	15
Total Contact Hours		75

Learning Resources:

1.	Ching F. D K (2009), <i>Architectural Graphics</i> , New Jersey, John and Wiley and Sons.
2.	Lewis D.J., Tsurumaki M.(2016), <i>Manual of Section</i> , Princeton Architectural press.
3.	Mozell (2008) <i>Architectural Drawing Course: Tools and Techniques for 2D and 3D Representation</i> , Bes publishing.
4.	Bhatt N.D. (2012) <i>Engineering Drawing</i> , Gujrat, Charotar Publishing House.
5.	Browning H.C.(1996), <i>The Principles of Architectural Drafting</i> , New York, Watson-Guptill Publications.
6.	Schmid C.F., Schmid S.E, (1954), <i>Handbook on Graphic Presentation</i> , New York, The Ronald Press Company
7.	Littlefield D.(2012) <i>Matric Handbook</i> , London and New York, Routledge Taylor and Francis Group.
8.	Sleeper R. (2000), <i>Architectural Graphic Standards</i> , New York, John Wiely and Sons.
9.	Gill R.W.(2011) <i>Rendering with Pen and Ink</i> , London, Thames &Hudson ltd.

Second Year B Arch.

Building Services -I

CourseCode:KHMU36	Course Category: Professional Core		Semester: III
Credits :	3	Internal Assessment	40 Marks
Lectures per week	2	Terminal Paper	60 Marks
Studio Projects per week	-	Sessional Oral (SO	-
Workshops or studio exercises week	1	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	54 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	45 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	09 Hours

Course Objectives:

1. To be aware of the importance, installation and working of essential services in buildings.
2. To impart knowledge about design principles for water supply and sanitation services in built spaces.
3. To familiarise students with a way building services help in generating a cleaner and healthier built environment.

Course Outcomes:

Co. No.	Cognitive Levels	On Successful Completion of course the learner will be able to:
1.	Remembering	Define and describe various terminologies related to plumbing and drainage systems. Recognize purpose, principles, collection, treatment and disposal of water supply and sanitation.
2.	Understanding	Understand laying and fixing of apparatus involved in plumbing and drainage systems.
3.	Applying	Illustrate equipment of water supply and distribution systems in regards to Detached Building, Multi-storeyed building and at Community level and City level. Illustrate different types of sanitation systems such as conservancy lane and water carriage system, sanitary fittings.
4.	Analysing	Analyse sanitary and water supply fittings with respect to function, types, materials, forms, associated equipment and design consideration. Compare types of drainage system and sanitation system such as dry and wet systems.
5.	Evaluating	Relate building services design aspects of water supply and Sanitation systems with Architectural Design.
6.	Creating	Create House drainage layout, Toilet layout, Illustrate Water supply connections, House connections etc.

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Water supply <ul style="list-style-type: none"> – Introduction of Surface sources for water supply schemes (i.e. lakes & streams, Ponds, rivers, storage reservoirs) – Introduction to Water treatment - Purification plants. 	6
Unit -II	Water Distribution <ul style="list-style-type: none"> – Water Distribution pipes, their sizes, materials, jointing, fixing and laying. – Pipe appurtenances: valves, taps, faucets, mixing units for wash hand basins, kitchen sinks, shower units, baths etc. – Water Distribution patterns - City Network – Water distribution equipment's: Water storage tanks (Ground and overhead), Estimation of water consumption, their capacity and location. 	8
Unit -III	House connections <ul style="list-style-type: none"> – Tapping of water mains on street by means of ferrule – Lifting of water from the sump tank to the overhead water storage tank with the use of Pumps – Systems of hot water supply using conventional and non-conventional energy sources. – Direct systems, In-direct systems, components and equipment used for the same. 	8
Unit-IV	Sanitation <ul style="list-style-type: none"> – Introduction to sanitation: Purpose and principles of sanitation. – Introduction of various terminologies used in sanitation: Sullage, Sewage, Sewerage, Garbage, Refuse etc. 	8
Unit-V	Sanitary Drainage Systems <ul style="list-style-type: none"> – Various sanitary fittings and fixtures like washbasins, WC's, bathtubs, sink, urinals, bidets, flushing cistern etc. – Various types of traps and their functions. – Locations and use of appurtenances i.e. I.C, manholes, disconnecting chambers – Types of Sewerage Systems: Dry conservancy method Water carriage systems. – Types of Drainage system : Underground drainage system, above ground drainage system and their types. – Types of sanitary pipes : Soil Pipe, waste pipe, vent pipe, rain water pipe, Anti-siphonage pipe – Types of joining, fixing and laying. Pipes and piping network. – Testing of drains – Self-cleansing velocity. 	8

Unit-VI	<p>House Drainage</p> <ul style="list-style-type: none"> - Sewage collection and disposal system for individual house of urban areas. - Sewage disposal system for individual house of rural areas or un-sewered localities (Septic tank, soak pit, cesspools, aqua privy, leeching pits) - Disposal within the Premises. <ul style="list-style-type: none"> - Septic tanks, its function and design. - Bio gas plants and their functioning. - Garbage Disposal. - Introduction to sewage treatment plants. 	7
Total Contact Hours		45

Learning Resources:

1.	Rangwala, S.C. (1989), <i>Water supply and sanitary engineering</i> , Gujarat, Charotar publishing house.
2.	Stein B.andRenolds J. (2006), <i>Mechanical and Electrical Equipment for Building</i> , New York, John Wiley and Sons.
3.	AFE Wise, JA Swaffied Water,(2002) <i>Sanitary & Waste Services in buildings</i> . V Edition, Los Angeles, Mitchell Publishing, Co. Ltd.
4.	Shah C. (1999), <i>Water supply and sanitary engineering</i> , Delhi,Galgotia publishers.
5.	CIBSE journal http://www.cibsejournal.com/ Building Services Engineering Research and Technology (bse.sagepub.com) Energy and buildings-Journal-Elsevier (www.journals.elsevier.com/energy-and-buildings/) Technical journals- CIBSE- (www.cibse.org/knowledge/technical-journals/technical-journals-bsert-lr-t)

Second Year B.Arch.

Computer Skill -I

CourseCode:KHMU37	Course Category:SEC		Semester: III
Credits :	3	Internal Assessment	100 Marks
Lectures per week	1	Terminal Paper	-
Studio Projects per week		Sessional Oral (SO	-
Workshops or studio exercises / week	2	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	54 Hours
No.s of Weeks for Teaching + Sessional Work	15	No.s of Hours for Teaching + Sessional Work	45 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	09 Hours

Course Objectives:

1. To enable students to understand and apply basic skills to enhance and present ideas in a professional manner required in architectural offices
2. To introduce students to various skills necessary in architectural documentation such as to create and present documents, reports, and presentations
3. To introduce raster computer graphics and provide an opportunity to learn, practice, and become familiar with image processing, compositions and illustrations

Course Outcomes:

Co. No.	Psychomotor Levels	On Successful Completion of course the learner will be able to:
1.	Imitation	Attain terminology and tools necessary to use various computer applications
2.	Manipulation	Replicate design presentation and report making using digital tools
3.	Precision	Demonstrate the ability to apply knowledge and skills learned
4.	Articulation	Integrate digital and traditional methods of graphics and written compositions in architecture
5.	Naturalisation	Create persuasive and informative digital and traditional posters, presentations and report

Course Contents:

Units	Contents of The Course	Hours
Unit -I	<ul style="list-style-type: none"> – Introduction to Computers and applications relevant to architectural communication and documentation. – Computer terminology and operating principles, – Introduction to hardware and software. – Use and types of printers, scanner, plotter, etc. 	6

Unit -II	Report Preparation I: <ul style="list-style-type: none"> – Word Processing and desktop publishing using softwares to create professional and academic documentation, – Articles, research papers, project reports etc. – Learning to insert images, illustrations, captions; organising documents with proper headers and footers. – Preparations of templates for regular repetitive functions. 	9
Unit -III	Report Preparation II: <ul style="list-style-type: none"> – Data Processing using spreadsheets for professional and academic documentation – Creating charts, graphs etc. Learning to insert charts and analytical illustrations with captions; organising documents with proper headers and footers. 	6
Unit-IV	Presentation Techniques : <ul style="list-style-type: none"> – Presentation and Image / Photo Editing Use of different software for making presentations / slideshows. – To present data and information by using text, images, diagrams with animations, transitional effects and audio movie input, etc. 	12
Unit-V	Info-graphics, Posters, Presentation boards : <ul style="list-style-type: none"> – Compositions using images, graphics, texts, tables, charts for architectural presentations of various types Photo editing software to manipulate or enhance digital images. – Understanding images and vector graphics, image size and resolution. Basic tools for editing and creating graphics. – Use of different layer styles, non-destructive filters, curves and levels, blending modes, etc. to enhance images. – Taking effective prints and plots. 	12
Unit-VI	Making presentation and report: <ul style="list-style-type: none"> – Learning to formulate academic reports, report contents, providing references – Learning to prepare presentation boards, composition types – Learning to compose a comprehensive architectural portfolio 	12
Total Contact Hours		45

Learning Resources:

1.	Faulkner, A., & Chavez, C. (2017). <i>Adobe Photoshop CC Classroom in a Book</i> (2018 release). Adobe Press.
2.	Anton, K. K., & Cruise, J. (2016). <i>Adobe InDesign CC Classroom in a Book</i> (2017 release). Adobe Press.
3.	Wood, B. (2016). <i>Adobe Illustrator CC Classroom in a Book</i> (2017 release). Adobe Press.
4.	White, A. W. (2011). <i>The elements of graphic design: space, unity, page architecture, and type</i> . Skyhorse Publishing, Inc.
5.	Samara, T. (2007). <i>Design elements: A graphic style manual</i> . Rockport publishers.
6.	Ambrose, G., Harris, P., & Ball, N. (2019). <i>The fundamentals of graphic design</i> . Bloomsbury Publishing.
7.	Leborg, C. (2006). <i>Visual Grammar: A Design Handbook (Visual Design Book for Designers, Book on Visual Communication)</i> . Princeton Architectural Press.

Second Year B Arch.

Elective -III

CourseCode:KHMU38	Course Category: PE		Semester: III
Credits :	2	Internal Assessment	100 Marks
Lectures per week	1	Terminal Paper	-
Studio Projects per week	-	Sessional Oral (SO)	-
Workshops or studio exercises / week	1	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	36 Hours
No.s of Weeks for Teaching + Sessional Work	15	No.s of Hours for Teaching + Sessional Work	30 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	06 Hours

Note: Following is the list of electives under various streams for semester III to facilitate choice to learners in selecting courses of their own interest. Any one of the following electives of any stream can be chosen by the learner. Course details of Electives chosen are in **Annexure I**

Course Objectives:

1. To facilitate the students to learn out of a pool of specialised courses, which provides extended scope or which enables exposure to discipline-centric courses as well as cross-disciplinary courses.
2. To encourage interdisciplinary learning and imbibe values as learners
3. To give students an opportunity to develop their attitudes and skills in a subject they may opt for making a career.

Course Outcomes:

CO No.	Affective levels	On successful completion of course the learner will be able to:
1.	Receiving	Identify and describe the aspects or issues of offered contents
2.	Responding	Report case study
3.	Valuing	Justify their ideas /opinions in relation to contents of elective
4.	Organisation	Document and present the data collected in a systematic way.
5.	Internalising	Display a technical base through in depth study

Electives:

Semesters	Design	Technology and Management	Allied (Art, legalities, culture, environment, etc)
Sem-III	A Vernacular Architecture	Alternative Building Materials and Technology	Sketching
	B Theory of Design	Presentation Techniques in Architecture	Horticulture

Learning Resources:

As per topic chosen

SEMESTER IV

Second Year B.Arch.

Architectural Design-IV

CourseCode:KHMU41	Course Category: Professional Core		Semester: IV
Credits :	6	Internal Assessment	40 Marks
Lectures per week	2	Terminal Paper	-
Studio Projects per week	4	Sessional Oral (SO	60 Marks
Workshops or studio exercises / week	-	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	108 Hours
No.s of Weeks for Teaching Sessional Work	15	No.s of Hours for Teaching Sessional Work	90 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	18 Hours

Course Objectives:

1. To familiarise tribal/rural/semi urban settlement/community for their architectural character.
2. To analyse and document the built elements, open spaces and street character in regards to climate and architectural character
3. To design in the context of the location studied, with emphasis on all the aspects that would influence the design solution.

Course Outcomes:

CO No.	Cognitive levels	On successful completion of course the learner will be able to:
1	Remembering	Recognize the character of the place.
2	Understanding	Comprehend the influence of various factors in making the architecture of the place.
3	Applying	Application of aspects studied in design solutions.
4	Analysing	Analyse and document the built elements, open spaces and street character in regards to climate and architectural character
5	Evaluating	Relate knowledge of architectural character, material and climate for design insert.
6	Creating	Design a multi activity space final project and 3D model with views.

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Study of: <ul style="list-style-type: none"> – Architectural Character of tribal/rural/semi urban settlement/community. – Study of climate, climate variables and response to climate. 	12
Unit -II	Pre-study based on settlement: place, material, form, people and their activities <ul style="list-style-type: none"> – Study of settlement patterns, site, climate, geography such as landforms, history, road patterns, demographics (population density, occupation, age, gender etc.), resources such as water, electricity, open spaces etc. – Social and economic characteristics of the settlement. 	12
Unit -III	Exploration of: <ul style="list-style-type: none"> – Various tribal/rural/semi urban settlement/community aesthetics. 	12
Unit-IV	Analysis: <ul style="list-style-type: none"> – Site analysis, activity and/or function analysis, climate analysis at site and building level. – Zoning and circulation with respect to climate and architectural character. 	12
Unit-V	Design: <ul style="list-style-type: none"> – Context based multi-activity architectural design integrating the acquired knowledge of the above project. like gram panchayat office, primary health centre, school, temple and dharmshala, etc. (Built up area up to 1200 sq. m.) 	30
Unit-VI	Create Multi activity space of temporary nature: <ul style="list-style-type: none"> – Temporary structures such as a shed for camping, bus stop, yatras and relocation for disaster affected people including mobile toilets, mobile schools, mobile libraries, mobile wedding halls, and/or any other space suggested by Gram Panchayat etc. (Built up area up to 300 sq. m.) 	12
Total Contact Hours		90

Learning Resources:

1.	Busch A. (1991) <i>The Art of Architectural Models</i> , Hong Kong, Design Press
2.	Ching Francis, D. K. (1999) <i>Visual Dictionary of Architecture</i> , New Jersey, John Willy and Sons
3.	Ching Francis, D. K. (2007) <i>Architecture: Form Space & Order</i> , New Jersey, John Willy
4.	Krishnan Arvind (2017), <i>Climate Responsive Architecture: A Design Handbook for Energy Efficient Buildings</i> , McGraw Hill Education
5.	Neufert Ernst (1970) <i>Neufert Architects data</i> , Bauwelt-Verlag (German 1st Ed.), Lockwood (English 1st Ed.)
6	Nick Bunn (2010) <i>Architectural Model Making</i> , London, Laurence King Publishing
7	Pandya Y. (2014) <i>Elements of Space Making</i> , Ahmedabad, Mapin Publishing
8	Pramar V. S. (1973) <i>Design Fundamentals in Architecture</i> , Somaiya Publication
9	Rapoport A. (1969), <i>House, form and culture</i> , Pearson
10	Thakkar J., Morrison S., (2008) <i>Matra: Ways of Measuring Vernacular Built Forms of Himachal Pradesh</i> , SID research Cell, CEPT University

Second Year B.Arch.

Building Construction and Material -IV

CourseCode:KHMU42	Course Category:BSAE		Semester: IV
Credits :	6	Internal Assessment	40 Marks
Lectures per week	2	Terminal Paper	-
Studio Projects per week	-	Sessional Oral (SO	60 Marks
Workshops or studio exercises / week	4	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	108 Hours
No.s of Weeks for Teaching + Sessional Work	15	No.s of Hours for Teaching + Sessional Work	90 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	18 Hours

Course Objectives:

1. To make students to understand different RCC framed constructions
2. To make students understand the working principles of steel doors and windows

Course Outcomes:

Co. No.	Cognitive Levels	On Successful Completion of course the learner will be able to:
1.	Remembering	Know RCC as materials in depth and its elements in building construction. Recognize steel and waterproofing material.
2.	Understanding	Understand the structural behaviour of various RCC elements and components
3.	Applying	Apply the knowledge of soil behaviour in design of foundations
4.	Analysing	Analyse the performance of waterproofing and damp proofing materials
5.	Evaluating	Evaluate the performance of various materials and shuttering types in RCC framed buildings
6.	Creating	Design doors and windows as per steel as a building material

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Materials <ul style="list-style-type: none"> - Reinforced brick work - Steel as a construction material - Additives and admixtures in R.C.C. - Paints on masonry and on wooden surfaces - Varnishes 	5
Unit-II	RCC elements <ul style="list-style-type: none"> - R. C. C. Lintels and Chajja projections - R. C. C. Slab – one way, two way, single span, continuous spans, coffered slabs, flat slabs and waffle slabs 	18

	<ul style="list-style-type: none"> - R. C. C. Beams – singly and doubly reinforced, single and continuous spans, cantilever beams R.C.C. columns 	
Unit -III	<p>Soil types and its behaviour under different loading conditions.</p> <ul style="list-style-type: none"> - Significance of bulb of pressure and soil loading conditions for R.C.C. framed construction - Principles of R.C.C. Framed construction and its components, potential and application - R.C.C. footing for columns, isolated footing, combined R.C.C. footing , cantilever R.C.C. footing & eccentric footing - R.C.C. Plinth beam and plinth formation Raft foundation, cellular and edge beam - Pile foundation and its types 	20
Unit-IV	<p>Waterproofing and damp-proofing</p> <ul style="list-style-type: none"> - Need and importance of water proofing - Systems of waterproofing - Various waterproofing materials - Need and importance of Damp proofing - Various damp proofing treatments - Various damp proofing materials including bricks, Shahabad stone, bitumen sheets, plastic sheets and other proprietary materials 	12
Unit-V	<p>R.C.C. components</p> <ul style="list-style-type: none"> - R.C.C., Balconies, Canopies, fins, parapets - Details of junctions of slab and beam, slab-beam- column, primary, secondary beams - R.C.C. staircase 	15
Unit-VI	<p>Steel doors and windows</p> <ul style="list-style-type: none"> - Advantage of steel as a material over timber in door and window construction - Steel doors - construction details, component details for safety or grilled door, collapsible door and rolling shutter - Steel window construction details, component details using Z sections and box sections 	20
Total Contact Hours		90

Learning Resources:

1.	Sushil Kumar (1965), <i>Building Construction</i> , Standard Publishers Distributors, Delhi.
2.	Francis D.K.Ching(2008), <i>Building Construction Illustrated</i> , John Wiley and Sons, Inc., Hoboken, New Jersey.
3.	Rangwala S.C.(1966), <i>Building Construction</i> , Charotar Publishing House Pvt.Ltd., Gujarat India.

Second Year B Arch

Theory of Structures -IV

CourseCode:KHMU43	Course Category: BSAE		Semester: IV
Credits :	2	Internal Assessment	40 Marks
Lectures per week	2	Terminal Paper	60 Marks
Studio Projects per week	-	Sessional Oral (SO	-
Workshops or studio exercises / week	-	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	36 Hours
No.s of Weeks for Teaching + Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	30 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	06 Hours

Course Objectives:

1.To understand basic structural design concepts in Reinforced Cement Concrete (R.C.C)
2.To understand behaviour of R.C.C/P.C.C/Precast as a material for framed structure
3. To understand the fundamental design of structural elements like beam, column, slab for various loading such as Point loads, uniformly distributed loads, uniformly varying loads, Imposed and dead load.

Course Outcomes:

Co. No.	Cognitive Levels	On Successful Completion of course the learner will be able to:
1.	Remembering	Recognize the significance of standard R.C.C. section in structural analysis based on IS456.
2.	Understanding	Explain types of loads in structural concepts, and describe the basic concept of Limit state method for various loading conditions acting on the structure. Illustrate the concept of design of R.C.C. slab, beams and staircase for various loading conditions.
3.	Applying	Calculate dead load, live load; wind load, snow load for various loading conditions for design of slab, beams, and staircase. Develop an ability to analyse internal response of structure
4.	Analysing	Compare the response of the structural system for various materials and the loading conditions.
5.	Evaluating	Evaluate the structural elements viz. slab, beams and staircases in load bearing and framed structures.
6.	Creating	Design the simple slab, beams and staircase

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Introduction to Standard Reinforced Cement Concrete (R.C.C.) section as per IS 456 <ul style="list-style-type: none"> – Concepts of cover to steel bars in R.C.C. members, main steel, distribution steel, stirrups, links, dowel bars, bent up bars, curtailment (based on IS 456) (Theory Only) 	4
Unit -II	Limit State Method (LSM) <ul style="list-style-type: none"> – Types of Design Loads - Different types of design load (Dead load, – Live load, wind load, earthquake load and snow load) on structure. – Basic concept of limit state method (LSM). Explain why LSM is adopted today and other methods of design such as Working stress Method, Ultimate load Theory are obsolete. (Theory on Basic Concepts only) 	4
Unit -III	Design of R.C.C. Slabs <ul style="list-style-type: none"> – Design of one way, two way, cantilever slabs by LSM (Theory and simple numerical) 	6
Unit-IV	Design of R.C.C. Beams <ul style="list-style-type: none"> – Design of singly reinforced beam IS456 simply supported and cantilever (Theory and simple numerical) by LSM 	6
Unit-V	Doubly reinforced beam and Flanged Beam <ul style="list-style-type: none"> – Introduction to <ul style="list-style-type: none"> - doubly reinforced (Theory) - Flanged beam & significance Theory) 	4
Unit-VI	Design of R.C.C. Staircase <ul style="list-style-type: none"> – Design of dog legged staircase using IS456 and LSM (Theory and simple numericals) 	6
Total Contact Hours		30

Learning Resources:

1.	Parikh J. P, (2002). <i>Understanding the concept of structural design and analysis</i> . Anand, Charotar Publishing house
2.	Shah V.L. and. Karve S.R., (2014). <i>R.C.C. Theory and Design</i> . Pune, Structures Publishers
3.	Shah H.J., (2013). <i>Design of Reinforced Concrete Structures</i> . Anand, Charotar Publishing house.
4.	Sinha S.N., (2014). <i>Reinforced Concrete Design</i> . New Delhi, Tata McGraw-Hill Publishing Company limited.
5.	Varghese P.C. (2001). <i>Limit state design of reinforced concrete</i> . New Delhi, Prentice-Hall of India.
6.	IS: 456-2000 code of practice for plain and reinforced concrete, SP:16-Design aids for reinforced concrete

Second Year B. Arch.

History of Architecture -IV

CourseCode:KHMU44	Course Category: Professional Core		Semester: IV
Credits :	3	Internal Assessment	40 Marks
Lectures per week	2	Terminal Paper	-
Studio Projects per week	-	Sessional Oral (SO	60 Marks
Workshops or studio exercises / week	1	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	54 Hours
No.s of Weeks for Teaching Sessional Work	15	No.s of Hours for Teaching Sessional Work	45 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	09 Hours

Course Objectives:

1.	To analyse the development of a specific building typology of a given period.
2.	To understand the development of architecture as a process through a holistic approach of contextual and cultural evolution.
3.	To Compare and analyse architectural style across culture of 19th and 20th century.
4.	To gain knowledge of technology impact on the building form.

Course Outcomes:

Co. No.	Cognitive Levels	On Successful Completion of course the learner will be able to:
1.	Remembering	Know contemporary technology and its impacts on built environment and building form
2.	Understanding	Understand the development of architecture as a process through a holistic approach of contextual and cultural evolution
3.	Applying	Differentiate between various styles and elements of development and describe prominent historic buildings & typology.
4.	Analysing	Develop ability to analyse the evolutionary aspects of stage of progress Appreciate issues with reference to influence of cultures, civilizations and settlements across the world at different historic times
5.	Evaluating	Compare architectural style across culture of that time with reference to location -geography , Social Systems, Religion ,climate, art etc.
6.	Creating	Derive materials, construction techniques & architectural features in design from historic styles.

Course Contents:

Units	Contents of The Course	Hours
Unit -I	<ul style="list-style-type: none"> – Introduction to Development of structural systems, Architectural and ornamental elements and spatial organisation principles of Arts and Crafts movement in Europe and America- – Art and craft philosophies (probable examples- Morris, Webb works etc.) – Introduction to Development of structural systems, Architectural and ornamental elements and spatial organisation principles of Art Nouveau. – Causes, consequence and impact in Architecture Opposition to industrial arts and production – (probable examples Horta, Van De Velde, Gaudi, Guimard, Mackintosh Hoffman, Olbrich- Wright’s early works etc.) 	8
Unit -II	<p>Colonial Architecture in India -Portuguese and French</p> <ul style="list-style-type: none"> – Introduction to Colonial Architecture under British, Portuguese and French with reference to industrial revolution and emergence of new materials and construction techniques. – The Characteristics and Impact of Portuguese Colonial architecture in India: Features, elements and typological developments. – (probable examples - Goa-Bom Jesus Cathedral Complex-Old Goa, Portuguese forts in India , etc) – The Characteristics and Impact of French Colonial architecture in India: Features, elements and typological developments. – (Probable examples from various building typology at Puducherry, Maheetc, French forts in India.) 	7
Unit -III	<p>British Colonial Architecture in India-</p> <ul style="list-style-type: none"> – The styles and trends of architecture brought by British to India and their evolution. The impact of Indo-Saracenic style on the British Architecture in India. – (probable examples from work of Edwin Lutyens, British forts in India, British Cantonments etc.). 	7
Unit-IV	<p>Introduction to Modern Architecture and international style</p> <ul style="list-style-type: none"> – Various new approaches in architecture, new theories and new philosophies put forth by the Architects. The need and Importance. 	8

	<ul style="list-style-type: none"> – (probable examples Bauhaus- Gropius, Meyer and Mies. Bauhaus School, Chicago School of Architecture and Taliesin School of Architecture – Great masters like Louis Sullivan, Frank Lloyd Wright) 	
Unit-V	<p>Postmodernism-</p> <ul style="list-style-type: none"> – Critiquing Modernism - Brutalism- projects of Smithsons and Aldo Van Eyck – writing of Jane Jacobs, Robert Venturi, Aldo Rossi and Christopher Alexander – Deconstructivism –Critical regionalism – Innovation and ideas of Archigram – postmodern architects like Peter Cook, Paolo Soleri, Robert Venturi – Contemporary architects: Norman Foster, Richard Rogers, James Sterling, Peter Eisenman, Renzo Piano, Daniel leibskind, Zahahadid, Frank O Gehry, Santiago Calatrava, , Rem koolhaas 	8
Unit-VI	<p>Indian Master architects and their work in the 19th and 20th century</p> <ul style="list-style-type: none"> – Major Works and theories of B.V.Doshi, Raj Rewal, A.P.Kanvinde, LauriBaker, Charles Correa etc. 	7
Total Contact Hours		45

Learning Resources:

1.	Kenneth Frampton, (1994) <i>Modern Architecture:A Critical History</i> . London, Thames & Hudson.
2.	Kenneth Frampton, Richard Ingersoll, (2000) <i>World Architecture-A Critical Mosaic 19002000 Vol 1</i> . New York , China Architecture and Building Press
3	ManfredoTafuri, (1980) <i>Modern Architecture</i> . New York, Harry N. Abrams Inc.
4.	William Jr. Curtis,(1988) B.V.Doshi, <i>An Architecture for India</i> . New York, Rizzoli Publication. James Steele,(1985) Hassan Fathy. London, Academy Editions.
5.	Sandra Forty, (2004) <i>Architecture</i> . Rochester, Grange books
6.	Andreas.Papadakis, (1991) <i>A New Spirit in Architecture</i> . London, Academy Editions

Second Year B.Arch.

Surveying and Levelling

CourseCode:KHMU45	Course Category:BSAE		Semester: IV
Credits :	3	Internal Assessment	40 Marks
Lectures per week	1	Terminal Paper	-
Studio Projects per week	-	Sessional Oral (SO	-
Workshops or studio exercises / week	4	Sessionals(SS)	60 Marks
No.s of Weeks in Semester	18	No.s of hours in Semester	90 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	75 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	15 Hours

Course Objectives:

1. To understand surveying and levelling as a technical subject and its relevance to Architecture.
2. To acquaint the student with field work necessary so as to measure and document built and unbuilt spaces
3. To study and analyse the various landforms and topography and the importance of this topic in Architecture.

Course Outcomes:

CO No.	Cognitive levels	On successful completion of course the learner will be able to:
1.	Remembering	Recognize the significance of Principles of surveying with respect to ground profiles.
2.	Understanding	Explain the basic concepts and technical terms of plane and geodetic surveying and describe the various surveying instruments required for land surveying. Illustrate the concept of surveying and levelling.
3.	Applying	Calculate bearing of lines, bearings of closed and open traverse, closing error, Elevation/Levels of various ground features and to admeasure the plot. Ability to understand various land forms and surveying instruments
4.	Analysing	Compare response of various conventional and advanced surveying instruments with respect to ground profiles.
5.	Evaluating	Examine plot sizes for modern structures; road network and the use of advanced surveying instruments
6.	Creating	Plan and measure closed traverse with area statement for selected plot up to 400 sq.m and approach road within the campus.

Course Contents:

Units	Contents of The Course	Hours
Unit -I	<p>Introduction to surveying</p> <ul style="list-style-type: none"> – Definition of surveying and levelling, – Importance of surveying, Principle of surveying, classification of surveying, Difference between Plan and Map. Scale and Units. Various sign conventions. 	10
Unit -II	<p>Linear measurement & Instruments</p> <ul style="list-style-type: none"> – Methods for direct measurement and Instruments such as chain, tape, arrows, pegs, ranging rods, plumb bob. – Brief note on ranging. Methods of ranging by such as ranging by eye and ranging by line rangers. – Principle of chain survey. Survey station, location sketch, baseline, tieline & checkline. – Definition of Offsets types of offsets. Instruments for laying offsets i) optical square ii)open cross staff iii)French cross staff. 	15
Unit -III	<p>Levelling and Instruments</p> <ul style="list-style-type: none"> – Definition. Important basic terms used in levelling such as datum surface, mean sea level, benchmark, – Types of benchmark, Reduced Level (RL). – Study, and use of dumpy level and its temporary adjustments. Study and use of levelling staff. – Meaning of the term and abbreviations used in levelling work, i)back sight(BS),ii)Foresight(FS) iii)Intermediate sight(IS) iv)Height of Instrument (HI) v)Change point(CP). – Methods of finding reduced level i)Ht of instrument and ii)Rise and fall method. Simple Numericals. Contour study:-Definition, contour intervals, uses and properties of contour lines, methods of locating contours. – Uses of contour maps. Introduction to Topo sheet. – Understanding land topography and its relevance to Architecture & Topo sheet study. – Computation of contour Area. 	15
Unit-IV	<p>Angular measurement and Instruments:-</p> <ul style="list-style-type: none"> – Open & Closed traverse. – Bearing of line, types of Bearing Whole Circle & Reduced Bearing with simple numericals of conversion. Fore bearing and back bearing, study of Prismatic compass, local attraction & its adjustment. 	15

	<ul style="list-style-type: none"> – Theodolite, Use, classification, components of transit theodolite (20second) & their functions. – Temporary adjustment of transit theodolite/vernier theodolite. – Measurement of horizontal angle and vertical angle by transit theodolite. – Introduction to Plane table surveying (Introduction and demonstration only) 	
Unit-V	Advanced Surveying Instruments:- <ul style="list-style-type: none"> – Auto level, Digital level, Digital Planimeter, Total station, electronic distance meter, Digital theodolite, Laser level. (Introduction and demonstration only) 	10
Unit-VI	Emerging trends in Surveying and Levelling <ul style="list-style-type: none"> – Introduction to Remote sensing, Global Positioning Systems(GPS) & Geographic Information Systems(GIS),Google Maps, Aerial photography(Theory only) 	10
Total Contact Hours		75

Learning Resources:

1.	T. P. Kanetkar and S. V. Kulkarni,(2010 edition). Surveying and levelling: part. I and II :A text book on surveying and levelling "for engineering students and practising engineers."PuneVidyarthiGrihaPrakashan,Pune
2.	Dr. B. C. Punmia, Ashok Kr. Jain, Arun Kr. Jain,(2016 edition) Surveying (Vol. I and Vol II). Laxmi Publications(P)Limited,New Delhi
3.	Dr A. M. Chandra.(2005)Plane Surveying and Higher Surveying, New age international publishers New Delhi.
4.	S.K.Duggal,(2019 5 th edition) Surveying Vol. I & II (2013) Mcgraw Hill Education(India)Private limited,New Delhi
5.	R. Subramanian,(2015 2 nd edition) Surveying & levelling Paperback illustrated. Oxford University Press.
6.	N.N.Basak,(2017,2 nd edition).Surveying and Levelling. McGraw Hill Education,India,Private Ltd.
7.	A.Leick, L.Rapoport, D.Tatarnikov,(2015,4 th edition), GPS Satellite Surveying.John Wiley and sons Inc.
8.	Peter A. Burrough, Rachael A. McDonnell, and Christopher D. Lloyd,(2015 3 rd edition). Principles of Geographical Information Systems. Oxford University Press
9.	SatheeshGopi, R. Sathikumar and N. Madhu,(2017 2 nd edition). Advanced Surveying -Total Station, GIS and Remote Sensing.Pearson Education.
10.	Mimi Das Saikia,(2010 1 st edition). Surveying. Prentice Hall India Learning Private Limited.

Second Year B Arch.

Building Services -II

CourseCode:KHMU46	Course Category:BSAE		Semester: IV
Credits :	3	Internal Assessment	40 Marks
Lectures per week	2	Terminal Paper	60 Marks
Studio Projects per week	-	Sessional Oral (SO	-
Workshops or studio exercises / week	1	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	54 Hours
No.s of Weeks for Teaching + Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	45 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	09 Hours

Course Objectives:

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|--|
| 1.To Study basics of electricity and wiring systems within domestic buildings. |
| 2.To Study fundamentals of lighting and lighting design. |

Course Outcomes:

Co. No.	Cognitive Levels	On Successful Completion of course the learner will be able to:
1.	Remembering	Know various types of generation of electrical energy and various electrical installations.
2.	Understanding	Understand the use of Electrical control, safety devices, Electrical fittings and appliances.
3	Applying	Develop the knowledge of various types of lamps and types of illumination schemes for indoor and application.
4	Analysing	Analyse design of Daylight apertures and shading devices to control glare .
5	Evaluating	Relate the knowledge of Electrical Services and lighting with Architectural Design.
6.	Creating	Design detailed electrical layout for residences.

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Day lighting -I – Day lighting, sky condition, daylight availability graph, sky condition square. Luminance levels for various sky conditions as a function of solar altitude, daylight factor, daylight factor standards, components of daylight factor, functional objectives of daylight.	6

Unit -II	Day lighting -II <ul style="list-style-type: none"> – Site criteria, building configuration, building orientation. – Daylight apertures, glare control, shading devices- external and internal, measurement of day lighting. 	8
Unit -III	Illumination (Artificial lighting) <ul style="list-style-type: none"> – Lighting fundamentals - Luminous intensity, Luminous flux, Illuminance etc. – Light sources - various types of lamps and their characteristics – Types of luminaires for interior and exterior. – Types of illumination schemes –direct, semi direct, diffused lighting and their design consideration. 	8
Unit-IV	Electrification- I <ul style="list-style-type: none"> – Types of generation of electrical energy – conventional and nonconventional. – Introduction to general distribution of electric power in urban areas, substations for small schemes in industrial units. 	6
Unit-V	Electrification-II <ul style="list-style-type: none"> – Electrical installations in a building from the supply company mains to individual outlet points including meter board, distribution board and layout of points. – Electrical wiring systems for small and large installations including different materials involved. 	7
Unit-VI	Electrification-III <ul style="list-style-type: none"> – Electrical control and safety devices – switches, fuse, circuit breakers earthing, lightning conductors etc. – Electrical fittings and appliances. – Detailed electrical layout for residences. 	10
Total Contact Hours		45

Learning Resources:

1.	Benjamin Stein and John Renolds.(2006) <i>Mechanical and Electrical Equipment for Building</i> , New York, John Wiley and Sons.
2.	E.P. Ambrose,(1968) <i>Electric Heating</i> . New York, John Wiley & Sons Inc.
3.	Philips,(1964) <i>Lighting in Architectural Design</i> . New York, McGraw Hill.
4.	R. G. Hopkenson& J. D. Kay, (1969) <i>The lighting of Buildings</i> , London, Faber& Faber.
5.	National Building Code of India, 2005 (NBC 2005)

Second Year B.Arch.

Computer Skill -II

CourseCode:KHMU47	Course Category:SEC		Semester: IV
Credits :	3	Internal Assessment	100 Marks
Lectures per week	1	Terminal Paper	-
Studio Projects per week	-	Sessional Oral (SO	-
Workshops or studio exercises / week	2	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	54 Hours
No.s of Weeks for Teaching + Sessional Work	15	No.s of Hours for Teaching + Sessional Work	45 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	09 Hours

Course Objectives:

1. To understand and apply: Basic CAD skills to create simple and complex two dimensional geometric forms, to produce architectural plans, sections, and elevations
2. To be able to create technically correct and presentable drawings

Course Outcomes:

Co. No.	Psychomotor Levels	On Successful Completion of course the learner will be able to:
1.	Imitation	Grasp 2D CAD drafting to transform sketches and manually drafted drawings to 2-dimensional CAD drawings
2.	Manipulation	Demonstrate drafting skills to generate appropriate layouts for various architectural documentation purposes
3.	Precision	Visualise building / transform sketches and 2-dimensional CAD drawings to 3-dimensional building models - create basic 3D models using SketchUp
4.	Articulation	Create 3D models using tools such as SketchUp
5.	Naturalisation	Prepare plots and drawing documentation with the help of computer software

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Introduction to 2d Drafting – – Introduction to computer aided 2-D drafting. – Basics - Work environment, toolbar, commands and shortcuts etc. – Setting up workspace, drawing organisation, viewing and inquiry commands, layers etc.	6
Unit -II	2D Drafting Tools - Basics – Creating basic objects such as lines, curves, squares, circles, triangles, using various commands and their sub tools including draw, edit, modify, etc. and using precision tools	6

	<p>units, snaps, tracking etc. Assigning properties and using layers.</p> <ul style="list-style-type: none"> – Learning to use Modification tools, to manipulate and alter objects, move, copy, mirror, patterns, resizing, trimming, extending, etc 	
Unit -III	<p>2D Drafting Tools</p> <ul style="list-style-type: none"> – Reusable and Additional objects - Working with polylines, splines, tables; – Using blocks, palettes; Annotating, Dimensioning, Hatching, Incorporating human figures, vegetation, vehicles, sciography, legend etc. – Attributes and extraction. 	12
Unit-IV	<p>Preparation of drawing</p> <ul style="list-style-type: none"> – compositions, layouts, documentation - CTB/Printing - using page setup, viewports, etc. formatting to ensure annotations, line-weights, dimensioning reflects necessary scale. – Creating templates, taking test print and preparing final plots of well-composed layouts to various standardised scales used in architectural practice. 	9
Unit-V	<p>3D modeling–</p> <ul style="list-style-type: none"> – Introduction to 3D modelling - interface and workspace setup, units, location, snaps, etc. – Using various commands and their sub tools including draw, edit, modify, etc. – Creating, editing and applying materials. Using layers, importing from and exporting to other platforms. – Ability to convert 2D drawing into 3D models. 	12
Unit-VI	<p>3D Drafting of building and site:</p> <ul style="list-style-type: none"> – Using Warehouse, creating groups, components. – Preparing site, building and interior layouts, using scenes and styles, providing scale, Dimensions, Updating model reference. Introduction to 3D rendering with basic renders, materials, textures, using camera tools, basic lighting, shadows. – Introduction to analysis using 3D on both site and building level, eg. site analysis, climate analysis, circulation 	9
Total Contact Hours		45

Learning Resources:

1.	Faulkner, A., & Chavez, C. (2017). <i>Adobe Photoshop CC Classroom in a Book</i> (2018 release). Adobe Press.
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Second Year B Arch.

Elective -IV

CourseCode:KHMU48	Course Category: PE		Semester: IV
Credits :	2	Internal Assessment	100 Marks
Lectures per week	1	Terminal Paper	-
Studio Projects per week	-	Sessional Oral (SO	-
Workshops or studio exercises / week	1	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	36 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	30 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	06 Hours

Note: Following is the list of electives under various streams for semester III to facilitate choice to learners in selecting courses of their own interest. Any one of the following electives of any stream can be chosen by the learner. Course details of Electives chosen are in **Annexure II**

Course Objectives:

1. To facilitate the students to learn out of a pool of specialised courses, which provides extended scope or which enables exposure to discipline-centric courses as well as cross-disciplinary courses.
2. To encourage interdisciplinary learning and imbibe values as learners
3. To give students an opportunity to develop their attitudes and skills in a subject they may opt for making a career.

Course Outcomes:

CO No.	Affective levels	On successful completion of course the learner will be able to:
1.	Receiving	Identify and describe the aspects or issues of offered contents
2.	Responding	Report case study
3.	Valuing	Justify their ideas /opinions in relation to contents of elective
4.	Organisation	Document and present the data collected in a systematic way.
5.	Internalising	Display a technical base through in depth study

Electives:

Semesters		Design	Technology and Management	Allied (Art, legalities, culture, environment, etc)
Sem IV	A	Climate Responsive Building Design	Glass Uses and Application	Visual Communication
	B	Graphic Design	Sustainable Water Management	Introduction to Indology

Learning Resources:	As per topic chosen
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ANNEXURE 1

Elective III

1. Design A_ Vernacular Architecture

Course Contents:

Units	Contents of The Course
1	Defining Vernacular architecture : <ul style="list-style-type: none"> – Definitions and theories. – Contextual responsiveness: Climatic, Geographical, Anthropological and Cultural influences
2	<ul style="list-style-type: none"> – Relation between regional vernacular style with culture, tradition, society, climate and shelter.
3	<ul style="list-style-type: none"> – Study of influence of vernacular style on the house form. – Vernacular architecture around the globe.
4	Study of vernacular building materials and techniques <ul style="list-style-type: none"> – Typical building materials, built form & elements, construction techniques & environmental performance.
5	<ul style="list-style-type: none"> – Study of settlement pattern, dwelling typology, symbolism, typical features, construction materials and techniques.

2. Design B_ Theory of Design

3. Course Contents:

Units	Contents of The Course
1	Intangible channels to architectural creativity <p>The process of creativity :</p> <ul style="list-style-type: none"> – Defining creativity – Creativity in architecture <p>The Channel of Transformations.</p> <ul style="list-style-type: none"> – The theory of transformation – An Attitude for transformation <p>The Exotic and Multicultural</p> <ul style="list-style-type: none"> – The multicultural environment – Gains from the multicultural experience – the need for rigorous involvement with exotic projects
2	Tangible channels to architectural creativity <ul style="list-style-type: none"> – History, Historicism, and the Study of Precedents. – Appreciation of Architectural history – The recent emphasis on precedents – History vs Historicism
3	Mimesis and Literal Interpretation. <ul style="list-style-type: none"> – Attitudes towards mimesis – Inclusivity, imitations and associated concepts
4	Geometry and Creativity. <ul style="list-style-type: none"> – The appeal of geometry

	<ul style="list-style-type: none"> – Geometric forms – Complex buildings and Geometric fields
5	<p>Focus on Materials.</p> <ul style="list-style-type: none"> – Mortality of construction – Structural and esthetic dimensions in the use of materials – Attitudes of architects towards materials – The educational environment and the use of materials
6	<p>The Role of Nature in Architectural Creativity.</p> <ul style="list-style-type: none"> – The primordial influence of nature – Disciplining the intangible into the naturally tangible. – Architectural influences from nature.

4. Technology and Management A _Alternative Building Materials and Technology

Course Contents:

Units	Contents of The Course
1.	– Introduction to various alternative natural & manmade building Materials like ‘Mud’, ‘Bamboo’, ‘Fly Ash’, ‘Straw’, ‘Paper’, ‘Glass’, ‘Pet bottles’, ‘Recycled material’, ‘Cloth’ Etc.
2.	– Properties of Materials
3.	– Documentation of selected materials and its use in practice & alternative construction Technique.
4.	– Analysis of the construction techniques of materials.
5.	– Inference from the study of use of chosen material & technology
6.	– 3d Model/ hands of workshop /design using the material /documentation of alternative use of materials & technology

5. Technology and Management B_ Presentation Techniques in Architecture

Course Contents:

Units	Contents of The Course
1.	– Introduction to various manual presentation techniques in architecture.
2.	– Knowing various mediums of presentation of architectural drawings such as variety of papers and colours (Papers: cartridge, handmade, tracing papers, gateway, texture paper, tinted, cardboard, etc. Colours: Pencil, ink, pens, charcoal, water markers and colours, poster colours, oil paints, glass markers, etc)
3.	– Using different mediums to present architectural drawings/portfolio in 2D and 3D.
4.	– Using sketching, caricature, cartoon, collage, pop-art, models to present architectural work

6. Allied A_ Sketching

Course Contents:

Units	Contents of The Course
1.	– Introduction to architectural sketching using various grades of graphite pencil or any other medium
2.	– Principles of free hand sketching such as proportions, with primary thrust on sketching of building elements and built environment, landscape & interiors.
3.	– Indoor and outdoor sketching: An immersive experience of live drawing in various contexts to develop a professional level ability to draw existing objects.
4.	– Free-hand perspective drawing of imagined objects.
5.	– Shading of drawn sketches.

7. Allied B _ Horticulture

Course Contents:

Units	Contents of The Course
1.	– Fundamental of horticulture- Definition, branches, importance and scope.
2.	– Classification of horticultural crops - vegetables, fruits, medicinal, flowering and Ornamental.
3.	– Parameters affecting the growth and development of horticultural crops - climate , soil ,geographical location , water source , cultural , economic etc
4.	– Plant Propagation (definition, basic concepts) and Nursery Management
5.	– Organic farming concept -soil preparation, cropping system, manuring ,protection , harvest and storage
6.	– Advance technologies

Annexure 2

Elective IV

1. Design A_ Climate Responsive Building Design

Course contents:

Units	Contents of The Course
1	– An Introduction to Climate Responsive design, Climate responsive built environment and need of climate Responsive Building Design
2	– Integration of climate responsive design for various climatic zones in India. Study of macro, micro and local climatic conditions. Factors affecting the climate variables such as temperature, humidity etc
3	– Design integration and study of building elements for climate responsive Design. Climate responsive design strategies for various types of buildings such as residential, commercial etc
4	– Climate responsive concepts at site scale, layout of building on the site, design in plan and section, building form, orientation, envelope design, day lighting, ventilation and heating/cooling systems.
5	– Examples and analysis of climate responsive design in various climates.

2. Design B_ Graphic Design

Course contents:

Units	Contents of The Course
1	– Introduction to graphic design and its core Principles such as framing, scale, hierarchy, grids.
2	– Introduction to Typography design
3	– Introduction to colour palette and colour terminologies – Explore various textures and mediums.
4	– Study of background, foreground, scan settings etc

3. Technology and Management A_ Glass: Uses and Application

Course contents:

Units	Contents of The Course
1	– Introduction to glass as a material, properties of glass, types of glass.
2	– Relating to different types of glass used in different building typologies such as residential, commercial, educational buildings etc. by presenting examples. For example, These buildings (focus on use of glass) can be historical buildings or modern buildings and can have a timeline
3	– Identifying glass for special purposes in buildings by suitable examples such as large size glass fixed with spider fittings etc. for malls, IT buildings etc. Exterior uses of glass.
4	– Importance and relevance of glass for interior spaces in various applications such as residential, commercial, institutes.
5	– Importance and need of studying glass available in the market in terms of brochures, samples.

4. Technology and Management B _Sustainable Water Management

Course contents:

Units	Contents of The Course
1	<ul style="list-style-type: none">– Introduction to traditional water management methods adopted in historical times in reference specific to the region.– Sustainable water management principles and practices in recent times
2	<ul style="list-style-type: none">– Its importance and relevance in Design
3	<ul style="list-style-type: none">– Wastewater conservation principles - grey water and sewage water, treatment process and reusing in landscape and service areas in a campus
4	<ul style="list-style-type: none">– Importance of Ground water recharge -natural and artificial– Rainwater Harvesting, rainfall pattern its collection and management, design parameters of RWH and working of this system, Importance of drip irrigation
5	<ul style="list-style-type: none">– Layout study for water management system with a relevant case
6	<ul style="list-style-type: none">– Design implementation of water management system for a small campus

5. Allied A - Visual Communication

Course contents:

Units	Contents of The Course
1	<ul style="list-style-type: none">– Introduction to visual communication.
2	<ul style="list-style-type: none">– Need for and importance of visuals in Design.
3	<ul style="list-style-type: none">– Theories of Visual communication.
4	<ul style="list-style-type: none">– Study the Impact of colours, Symbolism, icons, dance, images, associations, culture and Design in visual communication for eg - Colour theory , Psychological implications of Colours, Symbolism, icons, dance, images, associations, culture and Design etc.
5	<ul style="list-style-type: none">– Study of different tools / medium of visual communication.
6	<ul style="list-style-type: none">– Design a small project w.r.t. to visual communication in the age of social media.

6. Allied B Introduction to Indology

Course contents:

Units	Contents of The Course
1	– The Importance and Need to study Indology. Significance of geography on the History of ancient India.
2	– Sources of History. (study of important sources) Types and Significance with relevant examples. Introduction to Archaeology, Indian Epigraphy and Indian Numismatics etc as important sources of History.
3	– Introduction to the various Indian Religious Literature and Epics. Their Contents, Main Teachings.
4	– Introduction and significance Social, political, economic Institutions in Ancient India. Their role.
5	– History of Urbanisation in ancient times. The various dynasties that ruled India and their contribution to the art and architecture of the period.
6	– India and Southeast Asia.



Proposed Draft Structure for CBCS-2020
For
Bachelor of Architecture (B. Arch) Programme
(Contents Semester V&VI)

Bharati Vidyapeeth (Deemed to be University)
College of Architecture, Pune

NOTIFICATION

SEMESTER V

Third Year B Arch.

Architectural Design - V

CourseCode:KHMU51	Course Category:Professional Core		Semester:V
Credits :	8	Internal Assessment	40 Marks
Lectures per week	1	Terminal Paper	-
Studio Projects per week	6	Sessional Oral (SO	60 Marks
Workshops or studio exercises / week	1	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	144 Hours
No.s of Weeks for Teaching Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	120 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	24 Hours

Course Objectives:

1. To understand and apply campus planning principles
2. To understand and design architectural spaces according to culture.
3. To develop in the students, aptitude of designing in time bound solutions.

Course Outcomes:

Co. No.	Cognitive Levels	On Successful Completion of course the learner will be able to:
1.	Remembering	Recognize the importance of campus planning.
2.	Understanding	Comprehend the use of campus planning principles and sensitise them to specific requirements.
3.	Applying	Apply knowledge gained in given aspects of culture, in the design process.
4.	Analysing	Analyse relationship of multiple buildings in campus with each other in context to establish continuity of form, construction, materials, design theme, climate, etc
5.	Evaluating	Relate knowledge of studied/learnt architectural character, campus planning principle & human habitat as mere expression of multiple aspects and its resultant effect on visual form of the building.
6.	Creating	Designing of progressively complex spaces and buildings in terms of area, a specific community, typology, function etc, with emphasis on either scale or complexity of the project, or both.

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Study of Campus planning fundamentals <ul style="list-style-type: none"> To recognize and understand the fundamentals of the campus planning and its importance in the built environment. 	08
Unit -II	Pre-study based on the Campuses <ul style="list-style-type: none"> To study activities around the buildings within a campus and understand the same in context to built form ,open spaces, elements of landscape, pedestrian and vehicular movement, their segregation, managing sloping sites, contours, etc. 	16
Unit -III	Exploration of : <ul style="list-style-type: none"> Functions, structure and services in a building with relevant structural system and its resultant effect on visual form / character of building 	16
Unit-IV	Analyse: <ul style="list-style-type: none"> Analyse relationship of multiple built forms in campus with each other in context to establish continuity of form, construction, materials, design theme, climate, etc. 	16
Unit-V	Design: <ul style="list-style-type: none"> Campus Design comprising multiple built forms with emphasis on site planning & relationship of built and open spaces, circulation and movement pattern, activity pattern, architectural character.. Designing of buildings with different functions, requiring spaces of different scales and employing suitable structural systems and services. Example: Museum, Institute campus, Community centre, Resort, Community housing, cultural centre, etc. Built-up area consideration: 1500-3000 Sq.m 	40
Unit-VI	Create: <ul style="list-style-type: none"> Designing a multi-activity spaces in given time weightage 25% Examples: Exhibition centre, Library, Convenience shopping, Diagnostic centre, book cafe, etc. Built-up area consideration:300-500 Sq.m 	24
Note:-	Sessional work should consist of two design project (long & short) basis units (5 & 6) in the weightage of 75% and 25%.	
Total Contact Hours		120

Learning Resources:

1.	Correa, C. (2010). A Place in Shade. Delhi: Penguin Books
2.	Kanvinde, A., & Miller, H. (1969). Campus Design in India. Topeka: ostens/American Yearbook Co. .
3.	Lynch, K. (1962). Site Planning. MIT Press.
4.	Pandya, Y., & Foundation, V. S. (2007). Elements of Space Making. Ahmedabad: Mapin Publishing Pvt Ltd.
5.	White, S. (1995). Building in the Garden: Architecture of Joseph Allen Stein in India and California. Delhi:Oxford India Paperbacks.

Third Year B Arch. Building Construction and Materials -V

CourseCode:KHMU52	Course Category:BSAE		Semester:V
Credits :	5	Internal Assessment	40 Marks
Lectures per week	2	Terminal Paper	60 Marks
Studio Projects per week	-	Sessional Oral (SO	-
Workshops or studio exercises / week	3	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	90 Hours
No.s of Weeks for Teaching + Sessional Work	15	No.s of Hours for Teaching + Sessional Work	75 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	15 Hours

Course Objectives:

1. To enable students to understand the various materials, structures and allied construction activities
2. To introduce steel structure including foundations, advanced steel roofing structure, curtain walling techniques and standardized structure systems

Course Outcomes:

Co. no.	Cognitive Levels	On Successful Completion of course the learner will be able to:
1.	Remembering	Know various properties of structural steel, excavation issues and mass repetitive construction
2.	Understanding	Understand principles of steel structures, building expansion and movement.
3.	Applying	Apply principles studied above in actual construction detail
4.	Analysing	Analyze performance of construction detail in practice
5.	Evaluating	Compare and evaluate the typical construction details of steel structures, joints in buildings, modular construction
6.	Creating	Create drawings with respect to foundations, framed structures, curtain wall and precast systems

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Foundation <ul style="list-style-type: none"> ● Foundation for steel structures and fixing of foundation bolts in chemicals. ● Introduction to grillage foundations ● Fixing of steel stanchions on RCC stub columns 	15
Unit -II	Framed steel structures <ul style="list-style-type: none"> ● Study of portal frames, its various types and connection details ● Study of castellated beam, veradale girder, portal frames and lattice construction with connection details Introduction to steel decking	18

Unit -III	Curtain wall and cladding <ul style="list-style-type: none"> ● Curtain Walls- Construction Details of and Structural Glazing Including External Fixing and Cladding details. ● Wet cladding systems and dry cladding systems for stone, RC panels, FRP and GRC elements with fixing details 	12
Unit-IV	Materials <ul style="list-style-type: none"> ● Structural steel ● Aluminum sections Movements in buildings: <ul style="list-style-type: none"> ● Expansion/isolation/settlement joints in Load bearing, RCC and Steel structures 	10
Unit-V	Construction allied activities <ul style="list-style-type: none"> ● Timbering and shuttering for trench excavation in various soils ● Shoring and underpinning ● Flying, raking and dead shoring 	9
Unit-VI	Precast Systems and modular coordination <ul style="list-style-type: none"> ● Introduction to CBRI systems and modular coordination ● Precast R.C.C. components (floor, roof,walls) and roof systems, channel unit for floor and roof, prefabricated brick and panel systems ● Precast junctions at plinth, floor and roof between columns,beams,walls and lintels. ● Introduction to proprietary systems of precast construction. 	11
Total Contact Hours		75

Learning Resources:

1.	Barry, R. Building construction vol 2,3,4 (Vols. 2,3,4).
2.	Chudley. Building construction vol 3,4.
3.	Rangwala. Engineering materials. Charator publishing house, Gujrat.
4.	Sushilkumar. Building construction.
5.	T.D Ahuja and G.S. Birdie (1996)Fundamentals of Building Construction New Delhi,DhanpatRai Publishing Company Pvt. Ltd
6	J. S. Foster, Roger Greeno(2007)Mitchell's Structure & Fabric: Part 2.New York,Taylor and Francis group
7	CBRI. Building research note. Retrieved from www.cbri.org

Third Year B Arch.

Theory of Structures -V

CourseCode:KHMU53	Course Category:BSAE		Semester:V
Credits :	2	Internal Assessment	40 Marks
Lectures per week	1	Terminal Paper	-
Studio Projects per week	-	Sessional Oral (SO	-
Workshops or studio exercises / week	1	Sessionals(SS)	60 Marks
No.s of Weeks in Semester	18	No.s of hours in Semester	36 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	30 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	06 Hours

Course Objectives:

1.To understand basic structural concepts in steel design
2.To understand the behaviour of steel as a structural material
3.To develop the understanding of steel connection and riveted, bolted & welded jointing
4. To apply principles of design in structural drawing for steel structure project

Course Outcomes:

Co. No.	Cognitive Levels	On Successful Completion of course the learner will be able to:
1.	Remembering	Recognize the significance of standard steel section in Structural analysis based on IS800-2007.
2.	Understanding	Explain types of loads in structural concepts, and describe the basic concept of Limit state method for various loading conditions acting on the structure. Types of shallow foundation relevant to design of footing Illustrate the concept of design of Steel Girder or steel beam as tension member; steel column and R.C.C column as a compression member for various loading conditions.
3.	Applying	Calculate dead load, live load; wind load, snow load for various loading conditions for design of steel girder or steel beam, steel & R.C.C column Develop an ability to analyse internal response of steel Structure as a whole.
4.	Analysing	Compare response of structural system for various Materials and the loading conditions.
5.	Evaluating	Evaluate the structural elements viz steel girder, steel trusses steel stanchions & R.C.C column in load bearing and steel framed structures.
6.	Creating	Design the simple steel girder, steel column and R.C.C column considering material efficiency and cost effectiveness

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Design R.C.C. Column – <ul style="list-style-type: none"> • LSM Design of RCC column using IS-456 rectangle/circular (Simple numerical) • Explanation of basic concepts and correlate upper points course outcomes. 	4
Unit -II	Design of Footing – <ul style="list-style-type: none"> • Types of shallow foundation. LSM Design of footings IS456 rectangular isolated, RCC Pad footing (Design step only) 	4
Unit -III	Design of Truss Members – <ul style="list-style-type: none"> • Design of tension and compression members of truss using single angle section. (Simple numerical by LSM based on IS 800). Introduction to arrangement of sections. Identification of sections as per compact, semi compact and plastic (Theory only) 	6
Unit-IV	Bolted and Welded Connections – <ul style="list-style-type: none"> • Connections for steel structures bolted and welded (Theory& Simple numerical). 	6
Unit-V	Design of Steel Beam – <ul style="list-style-type: none"> • Design of steel beam (LSM IS800) Using single I section. Design of purlins (Simple numerical) 	6
Unit-VI	Design of Steel Column – <ul style="list-style-type: none"> • Design of steel column (LSM IS800) single section and compound stanchions. Codal provisions for lacing, battening (Design step only) 	4
Total Contact Hours		30

Learning Resources:

1.	Fundamentals of Structural Steel Design Paperback – 1 July 2017by Gambhir (Author).McGraw Hill Education. 3rd Edition Limit State Design of Steel Structures
2.	Steel Structures: Design and Practice: Theory and Practice Paperback – 27 August 2010 by N. Subramanian (Author).Limit State Design of Steel Structures 3rd Edition.McGraw-Hill
3.	Design of Reinforced Concrete Structures Paperback – Illustrated, 26 December2013.Third edition.Oxford Publication
4.	R.C.C. Designs Paperback – 1 January 2015 by B.C. Punmia (Author), Ashok Kumar Jain (Author), Arun Kumar Jain (Author) Third edition.Laxmi Publications
5.	Illustrated Reinforced Concrete Design (IS: 456- 2000); Dr. S.R. Karve&Dr. V.L. Shah 5 th edition.Structure Publications.

Third Year B Arch.

Specification Writing

CourseCode:KHMU54	Course Category: Professional Core		Semester:V
Credits :	3	Internal Assessment	40 Marks
Lectures per week	2	Terminal Paper	60 Marks
Studio Projects per week	-	Sessional Oral (SO	-
Workshops or studio exercises/ week	1	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	54 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	45 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	09 Hours

Course Objectives:

1. To inculcate the skill of writing specification of materials and items of works.
2. To develop technique of writing specifications for materials and works with emphasis on the required qualities of materials, process of construction and proper sequence of execution for the smooth flawless construction.
3. To encourage use of contemporary & sustainable materials, techniques & technologies and better understanding of specification writing of it.

Course Outcomes:

Co. No.	Cognitive Levels	On Successful Completion of course the learner will be able to:
1.	Remembering	Know the formats and units for specification writing of building materials and items of works in construction.
2.	Understanding	Understand the concept of material specifications with respect to performance, quality and durability,for describing works for effective building contracts and tenders.
3.	Applying	Use of standards specifications as integral part of contract document for various types of building /projects
4.	Analysing	Compare the different materials in the same functional category with respect to use and various building items.
5.	Evaluating	Judge the materials as per their finishes, ratings, sustainable properties along with market valuation and cost.
6.	Creating	Write specifications with reference to building trades, materials, workmanship and performance of different items of works in construction to achieve good quality & durability.

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Introduction to specifications writing. <ul style="list-style-type: none"> • Definition, need and importance of specification, role for architect. • Principles and practices. • The relation between specification, quantities and working drawing. 	6
Unit -II	Types of Specifications <ul style="list-style-type: none"> • Classification, types of specifications and their applications. General abbreviations used in specifications.	6
Unit -III	Material Specifications <ul style="list-style-type: none"> • Detailed technical specification of common building materials, labour & construction technologies. 	12
Unit-IV	Introduction to IS codes. <ul style="list-style-type: none"> • Standard Specifications by various Govt. and other Organizations. 	6
Unit-V	Items of Works and its Specifications <ul style="list-style-type: none"> • Detailed and brief specifications for general works of construction and special items. 	12
Unit-VI	Introduction of building services specifications- <ul style="list-style-type: none"> • Overview of services such as Water Supply, Drainage, and Electrical and HVAC installations along with brief specifications. 	3
Total Contact Hours		45

Learning Resources:

1.	Patil S. (2013) Civil Engineering Contracts and Estimates. Anand. Orient Blackswan, Bangalore
2.	Datta B.N. (2011) Estimation and Quantity Surveying, UBS Publishers & Distributors Ltd. Mumbai.
3.	Willis, C. & A. Willis (1997) Specification writing for architects and surveyors, Blackwell Science, United Kingdom
4.	Bureau of India Standards.
5.	District Schedule Rates

Third Year B Arch.

Landscape Architecture-I

CourseCode:KHMU55	Course Category: Professional Core		Semester:V
Credits :	3	Internal Assessment	40 Marks
Lectures per week	1	Terminal Paper	-
Studio Projects per week	1	Sessional Oral (SO	60 Marks
Workshops or studio exercises/ week	1	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	54 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	45 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	09 Hours

Course Objectives:

1. To understand the role and importance of landscape architecture in developing relationships between indoors and out-door spaces.
2.To acknowledge and interpret from history, design principles which respond aptly to the various character man made landscapes with reference to Geography , Economy, Socio-cultural, Religion etc. at different periods of time -.
3. To understand the site and its context while site planning.
4. To create responsible and dedicated individuals who are intellectually mature, emotionally sensitive and self-motivated towards a sustainable built and unbuilt environment.
5.To understand development of landscape architecture as a process of contextual and cultural evolution rather than simply as a product

Course Outcomes:

Co . No .	Cognitive Levels	On Successful Completion of course the learner will be able to:
1.	Remembering	Recognize the importance of Landscape in sustainable development of spaces.
2.	Understanding	Comprehend the use of landscape planning principles and sensitize them to specific requirements.
3.	Applying	Apply knowledge gained in given aspects of Macro and micro consideration in the design process.
4.	Analysing	Analyse the site potential for the integration of indoor and outdoor spaces with location, climatic, hydrology, geology, vegetation, topography, culture, people, religion etc.
5.	Evaluating	Relate knowledge of studied landscape architecture as a process of contextual and cultural evolution rather than simply as a product.
6.	Creating	Designing -campus landscape spaces which response aptly to the various character man made landscape with reference to Geography, Economy, Sociocultural ,art ,architecture etc.

Course Contents:

Units	Contents of The Course	Hours
Unit -I	<p>Introduction to landscape architecture</p> <ul style="list-style-type: none"> ● Importance, need and scope of landscape architecture Man and nature Landscape elements – vegetation, landform, water and architecture. ● Plant element: various aspects of - trees, shrubs, lawns, climbers, hedges, Indoor plants as elements. Basic idea about plants, plant selection, planting design and care of plants. Importance and use of NATIVE vegetation ● Land element: various aspects –soils, topography, levels, grading, earth forms, and foundations. ● Water elements: Fountains, waterfalls, pools, cascades, channels, irrigation etc. ● Architectural elements: sculptures, curbs, walls, steps, fence, furniture et 	6
Unit -II	<p>Historical Landscape development</p> <ul style="list-style-type: none"> ● History and design principles of landscape architecture Eastern , central and western world landscape history and respective design principles with basic background of Geography, Politics, Economy, Social Systems, Religion, Paintings , Sculptures and its influence on landscape Architecture at different periods of time - study the various examples around the world. 	6
Unit -III	<p>Landscape graphics and terminologies</p> <ul style="list-style-type: none"> ● Various terminologies used in landscape architecture with reference to macro ,micro projects ● Graphics – vegetation , shadows , hardscape , various symbols /legend ,etc. 	3
Unit-IV	<p>Landscape site analysis</p> <ul style="list-style-type: none"> ● Landscape project -Macro and micro consideration – manmade and natural location, climatic, hydrology, geology , vegetation , topography culture, people etc. 	9
Unit-V	<p>Site planning -Design-</p> <ul style="list-style-type: none"> ● Landscape project Zoning, concept formulation, design principles, circulation pedestrian &vehicular, and integration of indoor and outdoor spaces. <p>(Landscape project approx. -1500-2000sqm open spaces)</p>	15
Unit-VI	<p>Introduction to Landscape services and construction</p> <ul style="list-style-type: none"> ● Irrigation , lighting , drainage , water features , landform ,pathways road sections , architectural features - gazebo , kiosk , sculptures etc 	6
Total Contact Hours		45

Learning Resources:

1.	Design with nature by Ian McHarg
2.	Landscape Graphics by Grant Reid
3.	The landscape of man by Geoffrey Jellicoe and Susan Jellicoe
4.	Landscape Architecture In India Mohammad Shaheer
5.	Landscape Architecture: History, Ecology and Patterns I P Singh , Minakshi Jain
6	INDIAN SOCIETY OF LANDSCAPE ARCHITECTS Publications
7	Jungle Trees of Central India: A Field Guide for Tree Spotters by PradipKrishen
8	Trees of Delhi: A Field Guide by PradipKrishen
	websites
1	www.flowersofindia.net
2	https://www.cseindia.org/
3	https://indiabiodiversity.org/
4	http://www.indiaenvironmentportal.org.in/

Third Year B Arch.

Building Services-III

CourseCode:KHMU56	Course Category: BSAE		Semester:V
Credits :	3	Internal Assessment	40 Marks
Lectures per week	2	Terminal Paper	-
Studio Projects per week	-	Sessional Oral (SO	-
Workshops or studio exercises/ week	1	Sessionals(SS)	60 Marks
No.s of Weeks in Semester	18	No.s of hours in Semester	54 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	45 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	09 Hours

Course Objectives:

1. To acquaint the students with the fundamentals & principles of acoustics in designing various built environments.
2. To acquaint students with natural & mechanical ventilation systems and their applications.
3. To understand various air- conditioning systems and their applications with sustainable aspects.

Course Outcomes:

Co. No.	Cognitive Levels	On Successful Completion of course the learner will be able to:
1.	Remembering	Recognize concepts & ideas of Acoustics, air- conditioning systems.
2.	Understanding	Understand Principles of acoustical design for auditorium and ventilation systems.
3.	Applying	Develop an ability to analyse the requirement of sound insulation materials to control noise.
4.	Analysing	Analyse factors affecting indoor air flow.
5.	Evaluating	Compare fans characteristics and its applications with respect to their efficiency.
6.	Creating	Design Ventilation and air conditioning layout considering cost effective aspects.

Course Contents:

Units	Contents of The Course	Hours
Unit -I	<p>Sound in enclosed spaces :</p> <ul style="list-style-type: none"> ● Definition of sound, sound frequency range of Audible sound. Characteristics of audible sound. Brief history of architectural Acoustics. Acoustical phenomenon in an enclosed space. Sound reflection, absorption, sound diffusion, sound diffraction, reverberation, room resonance etc. Defects due to reflected sound-formation of echoes, reverberation, sound foci, dead spots etc. ● Airborne and structure borne sound. 	08

Unit -II	Acoustical Design considerations: <ul style="list-style-type: none"> • General principles and factors in acoustical design , Reverberation Time Calculation , Principles of Acoustical design for auditorium - site selection, dimensions, shape, seats and seating arrangement, treatment of interior surfaces, reverberation and sound absorption etc. . 	06
Unit -III	Noise control <ul style="list-style-type: none"> • Recommended background Noise criteria for rooms. Principles of noise reduction. Floor and ceiling construction for noise insulation. Floating floors, outdoor barriers for noise Control, Space layout consideration and Buffer zones, Sound amplifications systems. 	8
Unit-IV	Natural Ventilation <ul style="list-style-type: none"> • Ventilation functions and requirements. Factors affecting indoor air flow -Orientation External features, Position of opening, Size of opening etc. Natural ventilation strategies – cross ventilation , stack ventilation , venturi effect , wind catchers etc. 	8
Unit-V	Mechanical Ventilation <ul style="list-style-type: none"> • Types of Components of Mechanical Ventilation. • Systems of Mechanical Ventilation and its design consideration. 	6
Unit-VI	Principles of air-conditioning systems. <ul style="list-style-type: none"> • Components of air-conditioning systems- such as chilling plants, cooling towers, air handling units etc.Refrigeration cycle and its components. <p>Different types of air conditioning systems.</p> <ul style="list-style-type: none"> • Unit AC's, split AC's, packaged AC's, Central AC's etc. • Air distribution systems, ducts and ducting layout. <p>Air-conditioning layout design for office building (approximate Area 50-100Sq.m)</p>	9
Total Contact Hours		45

Learning Resources:

1.	1. Benjamin Stein and John Renolds.(2006)Mechanical and Electrical Equipment for Building, New York, John Wiley and Sons.
2.	Leslie, Doelle. Environmental Acoustics. McGraw Hill.1972
3.	National Building Code of India, 2005 (NBC 2005)
4.	Sun, Wind, and Light: Architectural Design Strategies by Mark DeKay (Author), G. Z. Brown .

Third Year B Arch.

Working Drawing-I

CourseCode:KHMU57	Course Category: SEC		Semester:V
Credits :	4	Internal Assessment	40 Marks
Lectures per week	1	Terminal Paper	-
Studio Projects per week	-	Sessional Oral (SO	60 Marks
Workshops or studio exercises/ week	3	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	72 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	60 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	12 Hours

Course Objectives:

- 1.Impart skill to students to read and prepare working drawings for load bearing structure and Detailed drawings such as doors, windows, toilets, kitchen, flooring etc.
- 2.Study of drawing numbering and management

Course Outcomes:

Co. No.	Cognitive Levels	On Successful Completion of course the learner will be able to:
1.	Remembering	Define working drawing as architects; medium of communication
2.	Understanding	Understanding role of working drawing in construction field
3.	Applying	Applying working drawing techniques to architectural design drawing
4.	Analysing	Analyzing the details of architectural design from execution viewpoint
5.	Evaluating	Assessing changes needed to enable students to prepare working drawing.
6.	Creating	Making working drawing of given project

Course Contents:

Units	Contents of The Course	Hours
Unit -I	<ul style="list-style-type: none"> ● Introduction to WD, their significance, study of Example of Working Drawings and its implementation on site 	4
Unit -II	<ul style="list-style-type: none"> ● Translating architectural design to working drawing 	4
Unit -III	<ul style="list-style-type: none"> ● Centreline plan, setting out plan of load bearing structure 	12
Unit-IV	<ul style="list-style-type: none"> ● Plans, elevation and section of load bearing structure 	20
Unit-V	<ul style="list-style-type: none"> ● Details of components like toilet, kitchen, door and windows etc 	16
Unit-VI	<ul style="list-style-type: none"> ● Method of drawing numbering and management 	4
	Total Contact Hours	60

Learning Resources:

1.	Wakita, Osamu A., Richard M. Linde, and Nagy R. Bakhom (2011). "The Professional Practice Of Architectural Working Drawings"
2.	Drawings from ISO certified architect office

Third Year B Arch.

Elective – V

CourseCode:KHMU58	Course Category: PE		Semester:V
Credits :	2	Internal Assessment	100 Marks
Lectures per week	1	Terminal Paper	-
Studio Projects per week	-	Sessional Oral (SO	-
Workshops or studio exercises/ week	1	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	36 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	30 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	06 Hours

Note: Following is the list of electives under various streams for semester V to facilitate choice to learners in selecting courses of their own interest. Any one of the following electives of any stream can be chosen by the learner. Course details of Electives chosen are in **Annexure 3**.

Course Objectives:

1. To facilitate the students to learn out of a pool of specialized courses, which provides extended scope or which enables exposure to discipline-centric courses as well as cross-disciplinary courses.
2. To encourage interdisciplinary learning and imbibe values as learners
3. To give students an opportunity to develop their attitudes and skills in a subject they may opt for making a career.

Course Outcomes:

CO No.	Affective levels	On successful completion of course the learner will be able to:
1.	Receiving	Identify and describe the aspects or issues of offered contents
2.	Responding	Report case study
3.	Valuing	Justify their ideas /opinions in relation to contents of elective
4.	Organization	Document and present the data collected in a systematic way.
5.	Internalizing	Display a technical base through in depth study

Electives:

Semesters		Design	Technology and Management	Allied (Art, legalities, culture, environment, etc)
Sem-V	A	Universal Design	Building Automation	Rural development
	B	Light in Architecture	Sustainable Waste Management	Architectural Journalism
	C	Water Architecture in	Cost Effective Construction	Ekistics

Learning Resources:	As per topic chosen
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SEMESTER VI

Third Year B Arch.

Architectural Design -VI

CourseCode:KHMU61	Course Category:Professional Core		Semester:VI
Credits :	8	Internal Assessment	40 Marks
Lectures per week	1	Terminal Paper	-
Studio Projects per week	6	Sessional Oral (SO	60 Marks
Workshops or studio exercises / week	1	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	144 Hours
No.s of Weeks for Teaching Sessional Work	15	No.s of Hours for Teaching Sessional Work	120 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	24 Hours

Course Objectives:

1. To develop skill to design service intensive multi - storied building in urban context
2. To explore and demonstrate 'technology and services as major determinants of Architectural form' and understand correlation between function, structure, services and form.
3. To develop in the students, aptitude of designing in time bound solutions.

Course Outcomes:

Co . No .	Cognitive Levels	On Successful Completion of course the learner will be able to:
1.	Remembering	Recognize the significance of multifunctional built forms in urban context.
2.	Understanding	Understand the building by stacking different functions vertically and addressing various concerns such as coordinating various building services and technology.
3.	Applying	Apply coordination of various building services such as water supply, lifts, drainage, garbage, disposal, lighting, air conditioning etc. in multi-storey buildings.
4.	Analysing	Analyse building as a complex set of arrays, comprising multiple spaces, form, circulation, services and technology.
5.	Evaluating	Evaluate architectural design with various building services and technology
6.	Creating	Design services intensive, multi-storeyed, buildings in urban spatial context.

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Study of: <ul style="list-style-type: none"> Building construction techniques and intensive services involved in similar buildings with an emphasis on development control rules and regulations of local authority. 	08
Unit -II	Prestudy based on the : <ul style="list-style-type: none"> Study of projects built with similar context, need, services, technology, circulations etc. Relationship between built, unbuilt and open spaces. Understand site movements in more 	16

	specific ways like, pedestrian, vehicular, emergency vehicles and their segregation.	
Unit -III	Exploration of : <ul style="list-style-type: none"> ● Design with services and building technology. 	16
Unit-IV	Analyse: <ul style="list-style-type: none"> ● The challenges of functionally complicated building, having a complex set of array of services and activities. 	16
Unit-V	Design focuses on: <ul style="list-style-type: none"> ● Interior environment - closed environment with emphasis on interior spaces, integration of services and regulatory norms. External environment - to take in consideration circulation of emergency vehicles and parking optimization. ● Design of intensive service and technology oriented buildings like: multi-storied office buildings, shopping malls, hotels, hospitals, commercial complex, Industry, Processing unit, etc. ● Built Up considerations :3000-4500 Sq.m 	40
Unit-VI	Create: <ul style="list-style-type: none"> ● Designing of spaces and buildings with emphasis on technology and services ● Projects like: vaccination centre, veterinary clinic, dance School /drama school, sports centre, fuel stations with cafe/takeaways/drive- thru theatres etc (The list of projects building types is only suggestive and not exhaustive). ● Built up considerations : 500-750 Sq.m 	24
Total Contact Hours		120
Note:	Sessional work should consist of two design projects (long & short) basis unit (5 & 6) in the weightage of 75% and 25%.	

Learning Resources:

1.	Gauzin-Muller, D. (2002). Sustainable Architecture and Urbanism: Concepts, Technologies, Examples. 1st Ed. Basel : BirkhäuserVerlag AG
2.	Kloft, E. and Johann, E. (2003). High-rise Manual: Typology and Design, Construction and Technology, 1st Ed. Basel :BirkhauserVerlag AG.
3.	Parker, D. And Wood, A. (2013). The Tall Buildings Reference Book. New York :Routledge.
4.	Chiara, J. D. and Michael, J. C. 2001. Time Savers Standards for Building Types. Singapore : McGraw Hill Professional.
5.	Huxtable, A-L. (1984). Tall Buildings Artistically Reconsidered
6.	Wood, A. and Ruba, S. (2012). Guide to Natural Ventilation in High Rise Office Buildings. New York :Routledge.

Third Year B Arch.

Building Construction and Materials –VI

CourseCode:KHMU62	Course Category:BSAE		Semester:VI
Credits :	5	Internal Assessment	40 Marks
Lectures per week	2	Terminal Paper	60 Marks
Studio Projects per week	-	Sessional Oral (SO	-
Workshops or studio exercises / week	3	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	90 Hours
No.s of Weeks for Teaching + Sessional Work	15	No.s of Hours for Teaching + Sessional Work	75 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	15 Hours

Course Objectives:

1. To acquaint students with long span structures and swimming pools
2. To introduce students to multi-level basements and it's techniques of construction

Course Outcomes:

Co . No .	Cognitive Levels	On Successful Completion of course the learner will be able to:
1.	Remembering	Know various properties of materials like glass, insulating materials, lightweight concrete blocks, swimming pool definitions,
2.	Understanding	Understand the mechanism of long span structures, working of swimming pool, basement construction, auditorium sightlines
3.	Applying	Show the application of principles to construction long span structures, basements and auditoriums
4.	Analysing	Analyse The case studies of long span structures, swimming pools, high rise structures
5.	Evaluating	Check and summarise the performance of case studies done in course outcome 4
6.	Creating	Design a basement, long span structure and swimming pool

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Long span structures <ul style="list-style-type: none"> ● Pneumatic - Air inflated structures ● Shells ● Space frames ● Folded plates and folded slabs 	15
Unit -II	Materials <ul style="list-style-type: none"> ● Study of Glass and its types ● Insulating materials purpose and types ● Siporex blocks, AAC blocks 	10
Unit -III	Advanced building technologies	12

	<ul style="list-style-type: none"> ● Pre-stressed and post-tensioning methods pros and cons. ● Pre-stressed and post-tensioning slabs and design considerations ● Introduction to structural systems for high rise buildings in steel and concrete 	
Unit-IV	Swimming pool <ul style="list-style-type: none"> ● Components of the swimming pool like basin, drain, filter, deck, ladder, diving board, lane and lane marking etc. ● Types like private, recreational, sports etc. ● Materials used for swimming pool like brick, concrete, fibre reinforced etc. ● Techniques used for constructions of swimming pool like underground, above ground, elevated, etc. 	15
Unit-V	Multi-Level-basement <ul style="list-style-type: none"> ● Soil bearing capacity and excavation techniques for basement ● Different uses of the basement, it's planning criteria, techniques of construction techniques like retaining wall, diaphragm wall, caissons, cofferdam, etc. 	15
Unit-VI	Auditorium <ul style="list-style-type: none"> ● Auditorium sightlines ● Auditorium balcony support systems 	8
Total Contact Hours		75

Learning Resources:

1.	Everett, A. (1994). Mitchell's Materials. United Kingdom: Taylor & Francis.
2.	www.iccsiporex.com
3.	Stephen Emmit, C. G. (2006). Barry's Advanced construction of buildings
4.	Time-saver standards for building types. (1990). United Kingdom: McGraw-Hill.
5.	Neufert, P., Neufert, E., Kister, J. (2012). Architects' Data. United Kingdom: Wiley.
	Ching, F. (2001). <i>Building construction illustrated</i> . Van Nostrand Reinhold, 1975.
7	Barry Building Construction Vol 1 to 4

Third Year B Arch.

Theory of Structures -VI

CourseCode:KHMU63	Course Category:BSAE		Semester:VI
Credits :	2	Internal Assessment	40 Marks
Lectures per week	1	Terminal Paper	-
Studio Projects per week	-	Sessional Oral (SO	-
Workshops or studio exercises / week	1	Sessionals(SS)	60 Marks
No.s of Weeks in Semester	18	No.s of hours in Semester	36 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	30 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	06 Hours

Course Objectives:

1.To understand behaviour of different types of soils and selection of suitable type of foundation and appropriate techniques To understand the behaviour of foundations for complex building structures and large span.
2. To identify Earthquake Zoning and provide Ductile Detailing based on IS 13920.
3 To understand the importance of software for structural analysis, designing and the need for structural modelling.
4. Application of concepts of ductile detailing to understand behaviour of high-rise structures.

Course Outcomes:

Co. No.	Cognitive Levels	On Successful Completion of course the learner will be able to:
1.	Remembering	Recognize index properties of soil to understand engineering properties of it which is relevant to different types of foundations.
2.	Understanding	Explain –a) suitable types of foundation for various multi-storey buildings in various earthquake zones. b) Significance of retaining structures for various soil conditions. c) Structural serviceability and stability of roof structures for a long span having different materials.
3.	Applying	Calculate the stability check of gravity Develop an ability to analyse internal response of structure
4.	Analysing	Compare response of structural system for various Materials and the loading conditions with respect to Earthquake Zoning.
5.	Evaluating	Evaluate the type of foundation based on Earthquake Zoning and Ductile Detailing based on IS 13920.
6.	Creating	Suitability of type of foundation and design of it with ductile reinforcement.

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Mechanics of Soil – <ul style="list-style-type: none"> Type and index properties of soil relevant to foundation for different types of soil. What is Safe bearing capacity of soil, uniform and differential settlement of footing, and liquefaction of soil. Types of pile foundation, group of piles and pile cap. (Theory only) 	4
Unit -II	Earth Pressure – <ul style="list-style-type: none"> Introduction to Rankine's theory of earth pressure 1) Types of retaining walls 2) stability check of gravity & RCC cantilever retaining wall. 3) Drainage in retaining wall importance. What are weep holes (Theory & simple numerical on stability check) 	4
Unit -III	Earthquake Zoning and Ductile Detailing – <ul style="list-style-type: none"> Significance of earthquake zoning and behaviour of wind load relevant to low rise and high rise structure. Base shear, lateral forces based on IS 1893. Introduction to shear wall, structural behaviour, details. Ductile detailing of beam, column and junction based on IS 13920. 	6
Unit-IV	Advance types of Roof Structures - <ul style="list-style-type: none"> Introduction to flat slabs, (beam-less) and its RCC details. Introduction to shell roof/dome/space frame, understanding space frame and space truss. 	6
Unit-V	Long span Structures- <ul style="list-style-type: none"> Introduction to long span structure: plate girder, castellated girder, open web sections, bowstring girders (no numerical). Introduction to pre-stressing of structural elements. Simple numerical based on calculation of extreme fibre stresses for simply supported pre-stressed beam with rectangular section. Behaviour of hinged base and fixed base portal frame (no numerical). 	6
Unit-VI	Emerging Trends in Structures – <ul style="list-style-type: none"> Emerging trends in the modelling and analysis of structure on STAADPRO software 	4
Total Contact Hours		30

Learning Resources:

1.	Soil Mechanics and Foundations (, Dr.Punmia B. C.17 thedition.Laxmi publication
2.	Geotechnical Engineering Paperback – 1 September 2018 by C Venkataramaiah (Author) 6th edition .New Age International Publisher
3.	Theory of Structures SMTS - II: S.I. Units Paperback – 1 January 2017.Laxmi publicationby B.C. Punmia (Author), Ashok Kumar Jain (Author), Arun Kumar Jain (Author)
4.	Reinforced Concrete Vol.II by Dr.H.J.Shah.6th revised & enlarged edition: 2012.Charotar Publishing House Pvt.Ltd.
5.	Building Construction Paperback – 1 January 2016 by B.C. Punmia (Author), Ashok Kumar Jain (Author), Arun Kumar Jain (Author) 11 th edition Laxmi Publications

Third Year B Arch.

Estimation Costing

CourseCode:KHMU64	Course Category: Professional Core		Semester:VI
Credits :	3	Internal Assessment	40 Marks
Lectures per week	2	Terminal Paper	60 Marks
Studio Projects per week	-	Sessional Oral (SO	-
Workshops or studio exercises/ week	3	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	54 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	45 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	09 Hours

Course Objectives:

1.To equip students with necessary technical drawings for calculating estimates and detailed costing for small to medium scale building project
2. To understand and apply the concept of quantification of works of construction and procedure to derive estimated cost of construction work items.
3. To acquaint students to analyse the rate of building items, making them conscious of the economy in construction.

Course Outcomes:

Co. No.	Cognitive Levels	On Successful Completion of course the learner will be able to:
1.	Remembering	Know purpose, type and procedure of estimation and costing; Recognize units of measurement of work items; List out various construction work items.
2.	Understanding	Comprehend various methods of Estimation.
3.	Applying	Compute the quantities of items of load bearing construction as well as R.C.C. framed construction, Relate the quantity computation and costing to AD Projects.
4.	Analysing	Analyse rate for items of work to be executed.
5.	Evaluating	Compare market rates, District schedule rates ; Evaluate the rate of load bearing and framed structure
6.	Creating	Generate ‘Bill of Quantities’and Produce ‘Abstract sheet’for small or medium scale design projects of earlier semesters.

Course Contents:

Units	Contents of The Course	Hours
1	<p>Introduction: Estimation and Costing:</p> <ul style="list-style-type: none"> Meaning, purpose of estimation and costing. Factors affecting estimation and costing. Data required for preparing an estimate and costing. Understanding Price, Cost and Value Procedure of estimating or method of estimating .Types of Estimates such as Preliminary or approximate and detailed estimate and their types, basic difference and advantage. 	4

2	<p>Mode and units of Measurement:</p> <ul style="list-style-type: none"> Introduction to measurement of various construction work items and its Units of measurements, rules of measurement. And mode of measurement as per Indian Standards for various items of work. 	4
3	<p>Quantity Computation:</p> <ul style="list-style-type: none"> Calculating quantities from drawing. Detailed Quantity Estimation: Methods of deriving detailed quantities of various constructions work items such as Long Wall and short wall method, centreline method. 	12
4	<p>Rate analysis:</p> <ul style="list-style-type: none"> Analysis of rate for different items of work. Factors affecting the rate analysis of an item. Purpose of rate analysis. Rates of Labour and material. Use of PWD/CPWD schedule of Rates .Cost index. Market Rates. Indent of works. 	11
5	<p>Abstract sheet:</p> <ul style="list-style-type: none"> Preparation of Abstract of estimated cost. Deriving construction cost with respect to design project. <u>Bill of Quantities (BOQ)</u>: Description and significance of items in bill of quantities ,Preparation of Bill of Quantities. Study of tenders. 	11
6	<p>Quantity Computation: Approximate:</p> <ul style="list-style-type: none"> Quantity Estimation: Methods of approximate estimate such as Plinth area Method, Cubic content method Service unit method, running metre method. 	3
Total Contact Hours		45

Learning Resources:

1.	Dutta B.N., (2016), Estimation and Costing in Civil Engineering Theory and Practice, UBS Publishers' Distributors Ltd
2.	Patil B. S. (2006), Civil Engineering Contracts and Estimates (Third Edition), Orient Blackswan.
3.	National Building Code(N.B.C.)2005,Bureau of India Standards
4.	Standard Schedule of Rates ,PWD/CPWD
5.	Chakraborti M.(2010),Estimating, Costing, Specification & valuation In Civil Engineering, M. Chakraborti
6	Birdie G.S.(2014),Estimating and Costing (Civil Engineering) 6 th Edition , DhanpatRai Books

Third Year B Arch.

Landscape Architecture-II

CourseCode:KHMU65	Course Category: Professional Core	Semester: VI
Credits :	3	Internal Assessment
Lectures per week	1	Terminal Paper
Studio Projects per week	1	Sessional Oral (SO)
Workshops or studio exercises/ week	1	Sessionals(SS)
No.s of Weeks in Semester	18	No.s of hours in Semester
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work
No.of weeks for Assessment	3	No.of Hours for Assessment
		40 Marks
		-
		60 Marks
		-
		54 Hours
		45 Hours
		09 Hours

Course Objectives:

1. To understand the complex issues related to landscape architecture for urban context and respond comprehending the natural, man-made and social environment.
2. To understand development of landscape architecture as a process of contextual and cultural evolution rather than simply as a product.
3. To understand the various innovations in the field of landscape architecture.

Course Outcomes:

Co. No.	Cognitive Levels	On Successful Completion of course the learner will be able to:
1.	Remembering	Recognize the complex issues related to landscape architecture at the urban level
2.	Understanding	Understand the development of landscape architecture as a process of contextual and cultural evolution rather than simply as a product.
3.	Applying	Apply the learning for processing /framing the requirements of the specific case.
4.	Analysing	Analysing holistic approach for the macro project
5.	Evaluating	Relate with current need of environmental impact.
6.	Creating	Creating -conceptual landscape proposal for urban spaces.

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Landscape site analysis –urban level <ul style="list-style-type: none"> Physical factors such as topography, geology, site features, hydrology, surrounding land-use, buildings and soil conditions - Environmental factors such as climate, existing flora and fauna , Socio-cultural such as existing use, structures of historic or religious importance if any , Aesthetics such as views from and within site 	6
Unit -II	Role of landscape in energy conservation	6

	<ul style="list-style-type: none"> • Role of vegetation -Role of water bodies -Role of land form -Effect on temperature, air movement, noise and pollution 	
Unit -III	<p>The Importance of Urban open spaces</p> <ul style="list-style-type: none"> • To study the importance and effect of and on open spaces in various levels and sizes of settlements / cities , based on the historical, geographical , climate , physical, social, cultural , ecological , economic , environmental aspects etc 	6
Unit-IV	<p>Landscape Typology</p> <ul style="list-style-type: none"> • Study various scales of landscape projects and landscape interventions to understand the approach for design solution such as healing landscape , conservation , sustainability , religious , cultural etc 	9
Unit-V	<p>Landscape Development Approaches</p> <ul style="list-style-type: none"> • Creating Design solution for landscape projects and landscape interventions based on the case studies and site studies . (Project such as campus design , parks ,water front , heritage conservation , pavilion , streetscape , etc.) 	12
Unit-VI	<p>Innovation in landscape technologies and services</p> <ul style="list-style-type: none"> • Alternative techniques for vegetation , slope stabilisation, storm water management , water harvesting ,water body etc. 	6
Total Contact Hours		45

Learning Resources:

1.	Design with nature by Ian McHarg
2.	Landscape Graphics by Grant Reid
3.	The landscape of man by Geoffrey Jellicoe and Susan Jellicoe
4.	Landscape Architecture In India Mohammad Shaheer
5.	Landscape Architecture: History, Ecology and Patterns I P Singh , Minakshi Jain
6	INDIAN SOCIETY OF LANDSCAPE ARCHITECTS Publications
7	Jungle Trees of Central India: A Field Guide for Tree Spotters by PradipKrishen
8	Trees of Delhi: A Field Guide by PradipKrishen
9	Social Life of Small Urban Spaces by William H. Whyte
10	A History of Garden Art: From the Earliest Times to the Present Day by Marie-LuiseGothein
11	A Place in the Shade: The New Landscape & Other Essays by Charles Correa
12	landscape_journal_
13	Site planning by Kevin A. Lynch
12	The Image of the City by Kevin A. Lynch
13	www.flowersofindia.net
14	https://www.cseindia.org/
15	https://indiabiodiversity.org/
16	http://www.indiaenvironmentportal.org.in/
17	https://worldlandscapearchitect.com
18	https://climateknowledgeportal.worldbank.org/country/india
19	https://scholar.google.com/

Third Year B Arch.

Building Services-IV

CourseCode:KHMU66	Course Category: BSAE		Semester:VI
Credits :	2	Internal Assessment	40 Marks
Lectures per week	2	Terminal Paper	-
Studio Projects per week	-	Sessional Oral (SO	-
Workshops or studio exercises/ week	1	Sessionals(SS)	60 Marks
No.s of Weeks in Semester	18	No.s of hours in Semester	36 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	30 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	06 Hours

Course Objectives:

1.To Understand fire safety, fire fighting, fire prevention and installations in buildings including codal requirements
2. To familiarize students with plumbing services in high rise areas, resource optimization.
3. To study various aspects of vertical communication systems.
4. Explore various services including core and building automation systems.

Course Outcomes:

Co. No.	Cognitive Levels	On Successful Completion of course the learner will be able to:
1.	Remembering	Know Fire triangle-Fire rating class of fire and describe Causes and spread of fire in buildings, fire resistance Active control systems of fire.
2.	Understanding	Understand Codes and standards for Firefighting.
3.	Applying	Develop an ability to analyse Water distribution systems in High rise buildings.
4.	Analysing	Relate building design with automation.
5.	Evaluating	Compare Building core arrangement for vertical systems for application in design.
6.	Creating	Design service layout for high rise buildings considering sustainable aspects.

Course Contents:

Units	Contents of The Course	Hours
Unit -I	Fire Fighting <ul style="list-style-type: none"> ● Fire triangle-Fire rating class of fire ● Fire detection system ● fire suppression systems ● Causes and spread of fire in buildings, fire resistance ● Active control systems of fire: fixed and portable fire fighting equipment. 	6
Unit -II	Fire fighting in high rise buildings, - <ul style="list-style-type: none"> ● Passive control of fire, Codal provision and standards for Fire fighting. 	4

Unit -III	Water supply systems in High Rise Building <ul style="list-style-type: none"> ● Water Requirement for High Rise Building ● Water distribution systems in High rise buildings- down feed water distribution, pumped up feed distribution, constant pressure up feed, gravity down feed system. ● Hot water requirement, generation and supply in high rise buildings. ● Rainwater Harvesting for high Rise 	4
Unit-IV	Sewerage systems in High rise buildings <ul style="list-style-type: none"> ● Service floor for high rise buildings e.g. Hospitals, hotels etc. ● Introduction to sewage treatment systems and recycling 	8
Unit-V	Vertical Transportation Systems in High Rise Buildings <ul style="list-style-type: none"> ● Building core arrangement for vertical systems, Vertical communication systems for high rise buildings-Types of Elevators, Sky lobby Elevator system, double- deck elevator system, Hydraulic Elevators and Escalators-travelators. 	4
Unit-VI	Introduction to Building automation systems. <ul style="list-style-type: none"> ● Building automation systems for mechanical, electrical and plumbing services. 	4
Total Contact Hours		30

Learning Resources:

1.	Benjamin Stein and John Renolds.(2006)Mechanical and Electrical Equipment for Building, New York, John Wiley and Sons.
2.	Fire Safety: National Building Code of India 1983 published by Bureau of Indian Standards.
3.	National Building Code of India, 2005 (NBC 2005)

Third Year B Arch.

Working Drawing-II

CourseCode:KHMU67	Course Category: SEC		Semester:VI
Credits :	4	Internal Assessment	40 Marks
Lectures per week	1	Terminal Paper	-
Studio Projects per week	2	Sessional Oral (SO	60 Marks
Workshops or studio exercises/ week	1	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	72 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	60 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	12 Hours

Course Objectives:

1. Impart skill to prepare working drawings for RCC Framed structure with details.
2. Study of services such as water supply and drainage.
3. Study of various aspects of Municipal submission drawing.

Course Outcomes:

Co. No.	Cognitive Levels	On Successful Completion of course the learner will be able to:
1.	Remembering	Know working drawing technique for RCC work
2.	Understanding	Understand DCR
3.	Applying	Apply DCR to given project
4.	Analysing	Analysing requirements of working drawing set
5.	Evaluating	Relate working drawing to other relevant subjects
6.	Creating	Prepare municipal submission and detailed working drawings

Course Contents:

Units	Contents of The Course	Hours
Unit -I	<ul style="list-style-type: none"> Introduction and importance of DCR, Introduction to "submission" drawing as part of procedure to get building permission, 	4
Unit -II	<ul style="list-style-type: none"> Preparation of Municipal submission drawing 	8
Unit -III	<ul style="list-style-type: none"> Study of technique of making working drawing of RCC frame building 	12
Unit-IV	<ul style="list-style-type: none"> All plans, elevations and section of RCC building of approx. 100 sq.m 	16
Unit-V	<ul style="list-style-type: none"> Technical details of staircase, planning of staircase. Risers, treads and handrail details. Finishes. 	8
Unit-VI	<ul style="list-style-type: none"> Services layout such as water supply, drainage, electrical 	12
Total Contact Hours		60

Learning Resources:

1.	1.Wakita, Osamu A., Richard M. Linde, and Nagy R. Bakhoum (2011). "The Professional Practice Of Architectural Working Drawings.
2.	Journals: Gawne, Eleanor. "Cataloguing architectural drawings." Journal of the Society of Archivists 24.2 (2003): 175-187

Third Year B Arch.

Elective – VI

CourseCode:KHMU68	Course Category: PE		Semester:VI
Credits :	2	Internal Assessment	100 Marks
Lectures per week	1	Terminal Paper	-
Studio Projects per week	-	Sessional Oral (SO	-
Workshops or studio exercises/ week	1	Sessionals(SS)	-
No.s of Weeks in Semester	18	No.s of hours in Semester	36 Hours
No.s of Weeks for Teaching+ Sessional Work	15	No.s of Hours for Teaching+ Sessional Work	30 Hours
No.of weeks for Assessment	3	No.of Hours for Assessment	06 Hours

Note: Following is the list of electives under various streams for semester VI to facilitate choice to learners in selecting courses of their own interest. Any one of the following electives of any stream can be chosen by the learner. Course details of Electives chosen are in **Annexure 4**.

Course Objectives:

1. To facilitate the students to learn out of a pool of specialized courses, which provides extended scope or which enables exposure to discipline-centric courses as well as cross-disciplinary courses.
2. To encourage interdisciplinary learning and imbibe values as learners
3. To give students an opportunity to develop their attitudes and skills in a subject they may opt for making a career.

Course Outcomes:

Co No.	Affective levels	On successful completion of course the learner will be able to:
1.	Receiving	Identify and describe the aspects or issues of offered contents
2.	Responding	Report case study
3.	Valuing	Justify their ideas /opinions in relation to contents of elective
4.	Organization	Document and present the data collected in a systematic way.
5.	Internalizing	Display a technical base through in depth study

Electives:

Semesters		Design	Technology and Management	Allied (Art, legalities, culture, environment, etc)
Sem-VI	A	Furniture Design	Auditorium Acoustics and Services	Affordable Housing
	B	Gendered Spaces	Fenestrations in Buildings	Building Economics
	C	Architects and Their Philosophies	Facility Management	Introduction to Archaeology

Learning Resources:	As per topic chosen
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ANNEXURE 3

Elective V

1. Design A_ Universal Design

Course contents:

Units	Contents of The Course
1	<ul style="list-style-type: none"> ● Orientation to Disability, types of impairments, their needs and barriers and role of environment in creating disabilities.
2	<ul style="list-style-type: none"> ● Study of National and International Legal and policy framework for Universal Access and Disability inclusion.
3	<ul style="list-style-type: none"> ● Understanding Accessibility, Universal Design and UD Principles along with examples.
4	<ul style="list-style-type: none"> ● Study of MOUD's Harmonised Guidelines for creating barrier free built environment covering all building typologies.
5	<ul style="list-style-type: none"> ● Introduction to tools for evaluating accessibility and safety in a built environment.

2. Design B_ Light in Architecture

Units	Contents of The Course
1	<ul style="list-style-type: none"> ● Understanding the importance of light in Architecture, types of light fixtures based on use, function, location etc.
2	<ul style="list-style-type: none"> ● Introduction to indoor lighting systems for aesthetics, focus lighting, task lighting, ambient lighting and accent lighting.
3	<ul style="list-style-type: none"> ● Introduction to outdoor lighting systems for aesthetics, task lighting, functional lighting, Spotlights, Flood Lights, Up/Down lights, Step Lights, Garden Lights, Bollard Lights, String Lights etc.
4	<ul style="list-style-type: none"> ● Efficient lighting systems with energy conservation features and application in a small residence. Evaluating the energy consumption for different types of lighting with a case study.
5	<ul style="list-style-type: none"> ● Design of lighting system for Indoor areas/outdoor area depending on the use and function ex: display gallery of museum, mood lighting for a Bar, landscape lighting in a public park, outdoor water fountain, etc.

3. Design C_ Water in Architecture

Course contents:

Units	Contents of The Course
1	<p>Introduction to Water in Architecture</p> <ul style="list-style-type: none"> ● The impact of water in architectural thinking ● Indian water context ● Conventional water context
2	<p>Water in Architecture & its Cultural heritage</p> <ul style="list-style-type: none"> ● Water in outdoor space ● Water in Indoor space ● Water & in between spaces
3	<p>Water Source & its Reflection on Architecture</p> <ul style="list-style-type: none"> ● Types of water sources ● Use in architecture /landscape as its reflection
4	<p>Introduction to</p> <ul style="list-style-type: none"> ● Architecture – water – technology relationship ● Architecture – water – art relationship

5	Role of Water in Architectural Design <ul style="list-style-type: none"> ● Underwater Architecture ● Waterfront Architecture
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4. Technology and Management A_ Building Automation

Course Contents:

Units	Contents of The Course
1	Introduction to Automation System. <ul style="list-style-type: none"> ● Scope of Automaton ● Benefits to Owner, Builders, Installers & Service Contractors ● Fundamentals of Automation. ● Power line carrier control, Time Controllers, Computer controllers & Wireless Remote Controller
2	Basic Electronics <ul style="list-style-type: none"> ● Introduction to Electronics from vacuum tubes to large scale, classification of electronic signals, digital and analogue, role of A/D and D/A converters, electronic components, symbols and identifications, semi conductivity. ● Diodes and Diode circuits ● Semiconductors and their applications ● Analysis of basic simple circuits using Ohm's law, Kirchoff's laws and network theorems
3	Control Standards Or Protocols/Modules <ul style="list-style-type: none"> ● X-10 standards, CEBus Standards ● Z wave, Zigbee, BLE(Bluetooth Low energy) ● UPB (Universal Powerline Bus) & WI-FI ● Home automation Platforms
4	Smart Home Devices <ul style="list-style-type: none"> ● Software & Hardware for Smart Homes ● HUB ● Sensors ● Actuators
5	Home Automation <ul style="list-style-type: none"> ● Home Entertainment & lighting ● Home Security ● Home Plumbing & HVAC

5. Technology and Management B _ Sustainable Waste Management

Course contents:

Units	Contents of The Course
1	● Introduction to solid Waste, contents, sources, types and classifications.
2	● Rules and Regulations related to solid waste management.
3	● Sustainable solid waste management, practices at various level- small residential to campus level
4	● Integrated solid waste management (ISWM)
5	● Understanding SWM and ISWM with case study.

6. Technology and Management C: _Cost Effective Construction

Course Contents

Units	Contents of The Course
1	<ul style="list-style-type: none">● -Introduction to Cost Effective Construction concepts.
2	<ul style="list-style-type: none">● -Identification of construction process, Materials, and building components with regards to cost effective approach
3	<ul style="list-style-type: none">● -Environment friendly and cost effective Building Technologies - Different cost effective substitute for various building components as wall, floor, roof etc.
4	<ul style="list-style-type: none">● -Uses of different types of materials and their availability,
5	<ul style="list-style-type: none">● overview of various methods of cost effective construction through practicing of modular, precast, and composite building elements in building construction

7. Allied A - Rural development

Course contents:

Units	Contents of The Course
1	Introduction to rural development: Terminologies, concepts, objectives and elements of rural development such as livelihoods, education, housing, healthcare, employment, women empowerment etc.
2	Factors affecting rural settlement planning: Study a rural settlement based on physical, economic, social cultural, historical and etc. factors with examples of any settlement in Indian context
3	Rural Development Policies and Strategies Types of Rural Development Strategies; Rural Development: Major Initiatives
4	Rural Development Programmes in India - Current Rural Development Programmes like: National Rural Livelihood Mission; Pradhan Mantri, GraminAwaasYojana ; Pradhan Mantri Gram SadakYojana (PMGSY); DAY-NRLM; DDU-GKY ; SanasadAadarsh Gram Yojana (SAGY); etc.
5	Principles, planning and working of MODEL Villages: Resource planning and management, social and economic support, community participation, etc. with the help of studies of MODEL villages in India and Global examples.

8. Allied B - Architectural Journalism

Course contents:

Units	Contents of The Course
1	<ul style="list-style-type: none">● Structure of architecture Journals and Book reviews
2	<ul style="list-style-type: none">● Writing Descriptive and analytical reports
3	<ul style="list-style-type: none">● Editing write ups, Photo Journalism, Page compositions.
4	<ul style="list-style-type: none">● The public process
5	<ul style="list-style-type: none">● Electronic media

9. Allied C - Ekistics

Course contents:

Units	Contents of The Course
1	<ul style="list-style-type: none">● To study the emergence and scope of ekistics and its need in shaping the Human Settlements.
2	<ul style="list-style-type: none">● Settlement patterns in later periods of history; Changing form and pattern of human settlements in ancient, medieval, colonial and modern India.
3	<ul style="list-style-type: none">● Introduction to the study of complex, indigenous, old and new city fabrics w.r.t. demographics, land economics, sociology, environment, legislations, transportation and networks, regional planning and GIS.
4	<ul style="list-style-type: none">● Globalization and its impact on cities – Urbanization, emergence of new forms of developments – self sustained communities – SEZ – transit development – integrated townships (through case studies).
5	<ul style="list-style-type: none">● Emergence of the metropolitan phenomenon; planning problems of cities and Solutions.

ANNEXURE 4

Elective VI

1. Design A_ Furniture Design

Course contents:

Units	Contents of The Course
1	<ul style="list-style-type: none"> Aspects of Design for various types of outdoor and indoor furniture and anthropology.
2	<ul style="list-style-type: none"> Fundamentals of furniture design like form, structure, colour, geometry, material. And types as Modular furniture, built in furniture, foldable furniture.
3	<ul style="list-style-type: none"> Study of Eco Friendly climate responsive materials in furniture manufacturing
4	<ul style="list-style-type: none"> Furniture manufacturing technology, methods of joinery, fabrication and assembly
5	<ul style="list-style-type: none"> Various fittings and fixtures, furniture accessories, and modern techniques for fitting fixtures and assembly of furniture unit Scope case study of interior space of 200 sq. m. indoor or outdoor space analysing furniture design aspects in relation with material, functionality, and manufacturing analysis

2. Design B_ Gendered Spaces

Course contents:

Units	Contents of The Course
1	<ul style="list-style-type: none"> Understanding the definition of Gendered Spaces and determinants that shape gendered spaces.
2	<ul style="list-style-type: none"> Development of built spaces w.r.t. gender and space. <ul style="list-style-type: none"> Study of Gender differences that are shaped by several determinants other than the biological differences between men and women. such as history, culture, religion and environment
3	<ul style="list-style-type: none"> Study of Social, political, and economic forces and values that shape the built environment and its form basis Genders.
4	<ul style="list-style-type: none"> Public Spaces: Power and access
5	<ul style="list-style-type: none"> Domestic Spaces: Social Roles, hierarchy in space w.r.t privacy needs, work environments, beliefs, customs and rituals, etc.

3. Design C_ Architects and Their Philosophies

Course contents:

Units	Contents of The Course
1	<ul style="list-style-type: none"> Introduction to Design Philosophy different design philosophies and importance of philosophies in architecture
2	<ul style="list-style-type: none"> Principles of Architecture
3	<ul style="list-style-type: none"> Famous ten architects and their philosophies from ancient time
4	<ul style="list-style-type: none"> Examples based on Architect philosophies
5	<ul style="list-style-type: none"> Architects philosophies from contemporary time

4. Technology and Management A _ Auditorium Acoustics and Services

Course contents:

Units	Contents of The Course
1	Introduction to Auditorium Design <ul style="list-style-type: none">● General Principles of Auditorium design● Types of Auditorium design depending on shape, size & volume. Horizontal & vertical cone of vision.● Sight line, Seating arrangement-back to back & staggered seating, Back stage, rehearsal rm, changing rm
2	Acoustical Phenomenon <ul style="list-style-type: none">● Role of acoustic in Auditorium Architecture● Sound Intensity● Reverberation, Attenuation, Echo & Sound shadow● Acoustics Material & Properties
3	Other services for Auditorium design <ul style="list-style-type: none">● Stage lighting, Lighting controls● Column free/long span structure● Balcony supportive mechanism● Motorized curtain system● Fire Safety
4	Introduction to multiplex design. <ul style="list-style-type: none">● Sight line, Seating arrangements, project room, central aisle & side aisle in multiplex design● Design of multiplex depending upon seating capacity, arrangements its shape & size

5. Technology and Management B _ Fenestrations in Buildings (SUB)

Course contents:

Units	Contents of The Course
1	<ul style="list-style-type: none">● Identifying suitable examples of fenestration designs based on observation of different building typologies residential, commercial, institutional
2	<ul style="list-style-type: none">● Utility and sustainability aspects in fenestration design such as fins/louvers/jail etc. to be studied by students.
3	<ul style="list-style-type: none">● Building technology, installation detailing in cross section and 3d Views about the fenestration
4	<ul style="list-style-type: none">● Study about economy as cost and utility of providing fenestrations and the final finishes or aesthetics of fenestration

6. Technology and Management C _ Facility Management

Course contents:

Units	Contents of The Course
1	<ul style="list-style-type: none">Understanding Planning norms, working drawings and built environment for various Services & Utilities, Township facilities; Schools, Hospitals, Housing, Commercial Complexes etc.
2	<ul style="list-style-type: none">Importance of building services, type of services required to keep the facility usable.
3	<ul style="list-style-type: none">Planning of services, organization structures of services management.
4	<ul style="list-style-type: none">Role and administrative functions of Supervisors. Role and responsibilities of property managers.

7. Allied A - Affordable Housing

Course contents:

Units	Contents of The Course
1	<ul style="list-style-type: none">Introduction and Importance of housing in urban and regional development
2	<ul style="list-style-type: none">Critical issues in the affordable housing sector
3	<ul style="list-style-type: none">Affordable Housing demand, Typologies, finance, etc
4	<ul style="list-style-type: none">Structural concepts, use of traditional and new building materials, self-help housing, incremental housing.
5	<ul style="list-style-type: none">Affordable housing: Policy and practice in India

8. Allied B - Building Economics

Course contents:

Units	Contents of The Course
1	<ul style="list-style-type: none">Economics and the market: Definition of terms like goods, utility, value, Consumption, wants and needs and their characteristics. Concepts of economics: Opportunity cost; Laws of supply and demand; Laws of increasing, diminishing and constant returns
2	<ul style="list-style-type: none">Macroeconomics-Economic system in India. Economics in relation to Architecture, Meaning and scope of building economics, Issues and challenges associated with building projects. Building Efficiency, Building Life-cycle. Costs and Benefits of Building – Monetary Non-Monetary
3	<ul style="list-style-type: none">Standard of living. Analysis of the housing market in Indian cities to understand the dynamics of urban housing supply and demand
4	<ul style="list-style-type: none">Urban land values: Various factors affecting the value of urban land. Difference between land use and land cover. The characteristics of developed land in the city
5	<ul style="list-style-type: none">Building Costs: Cost and cost indices. Life cycle costs. Total cost of construction. Time value of money. Different sources of financing buildings
6	<ul style="list-style-type: none">Project Financing Equity, Financing Institutions in Financing Process, Interim Finance and Permanent Financing, Bank Loan - Simple Interest and Compound Interest. Types of Mortgage, Lease Arrangements

9. Allied C - Introduction to Archaeology

Course contents:

Units	Contents of The Course
1	Introduction to the field and background, significance to the field of Archaeology.
2	Fundamentals of archaeological methods and multidisciplinary approaches. Exploration methods- surface, subsurface and aerial survey etc. Methods of excavation- horizontal and Quadrant excavation methods etc.
3	Methodologies and challenges inherent in archaeology. Dating, documenting and Post-excavation analysis
4	Contributions of Important Indian archaeologists and Important Archaeological Sites in India
5	Major sub-disciplines of Archaeology and Its relations with other disciplines

1. Audit Course : DISASTER MANAGEMENT

Course contents:

Objective of the Course	
<ol style="list-style-type: none"> 1. To provide basic conceptual understanding of disasters. 2. To understand approaches of Disaster Management 3. To build skills to respond to disaster 	
Units	Contents of the Course
1	Introduction to Disaster and its types <ul style="list-style-type: none"> ● Definition and types of disaster Hazards and Disasters, Risk and Vulnerability in Disasters.
2	Disaster Classification <ul style="list-style-type: none"> ● Natural disasters: Earthquakes, floods, drought, landside, land subsidence, cyclones, volcanoes, tsunami, avalanches, and global climate extremes. etc. ● Man-made disasters: Terrorism, gas and radiations leaks, toxic waste disposal, oil spills, forest fires. ● Social Economics and Environmental impact of disasters.
3	Response ,mitigation Measures and Management <ul style="list-style-type: none"> ● Mitigation and Management techniques of Disaster Basic principles of disasters management, Disaster Management cycle, Disaster management policy, National and State Bodies for Disaster Management, Early Warning Systems, Building design and construction in highly seismic zones, retrofitting of buildings ● Awareness program and project on disaster management Training and drills for disaster preparedness, ● A brief Report on Workshop or Live demonstration conducted by local planning authority is desirable

NOTE	The evaluation of the audit course of 'Disaster Management' will be done by internal examiners based on the report submitted by the students.
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Learning Resources:

1	Disaster Management Guidelines, GOI-UND Disaster Risk Program (2009-2012)
2	Damon, P. Copola, (2006) Introduction to International Disaster Management, Butterworth Heineman.
3	Gupta A.K., Niar S.S and Chatterjee S. (2013) Disaster management and Risk Reduction, Role of Environmental Knowledge, Narosa Publishing House, Delhi.
4	Murthy D.B.N. (2012) Disaster Management, Deep and Deep Publication PVT. Ltd. New Delhi.
5	Modh S. (2010) Managing Natural Disasters, Mac Millan publishers India LTD
6	Disaster Management in India <u>Rajendra Kumar Pandey</u> - Faculty at Chaudhary Charan Singh University, Meerut