BACHELOR OF ARCHITECTURE

OBJECTIVES, EXAMINATION SCHEME

AND

SYLLABUS

BACHELOR OF ARCHITECTURE

Approved by the Board of Studies

(w.e.f. the Academic Year 2024-2025)

HIMACHAL PRADESH TECHNICAL UNIVERSITY,

HAMIRPUR 177 001 (H.P.)

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Hamirpur - 177 001, HP

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BACHELOR OF ARCHITECTURE

Himachal Pradesh Technical University, Hamirpur (HP) - 177 001

OBJECTIVE OF B. ARCH. FIVE YEAR PROGRAM

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

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

An Architect supposed to act as a team leader and coordinator of the inputs of the various specific disciplines. The need to possess a sound knowledge of all aspects of modem building, technology, technological and engineering aspects have been remarkably incorporated in the curriculum to make the student able to keep pace with fast changing world of technology, where the meaning of a house has been changed from. The program aims at attaining a high level of excellence in Architectural Education. However, the program is intended to reinforce intellectual capabilities and develop proficiency in professional scheme to enable graduates to completely pursue alternative career with in the broad spectrum of Architecture.

COURSE STRUCTURE

The course consists of five years out of which 4 1/2 years will be of formal contact instructions 'and six months will be devoted to professional training in a recognized professional office/ industry. Basic course areas are scheduled as:

- Architectural Design
- Building Construction & Materials
- Building, Structures- Analysis & Designs

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

The weightage of credits is as under as per the COA Minimum Standards of Architectural Education Regulations 2020:

1. 01 Lecture hour shall have 1 credit.
2. 01 Labs/workshops/seminar hours shall have 1 credit.
3. 01 Design studio/construction studio/project/thesis period hour shall have 1 credit.
4. Credits for Architecture design thesis can vary from 15-18.
5. The Lecture(L)/Tutorial(T)/Studio(S)/Practical(P) is expressed in hours. Notes:

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Template for Internal Assessment
(Theory)

HIMACHAL PRADESH TECHNICAL UNIVERSITY

AWARD SHEET **THEORY** (INTERNAL ASSESSMENT)

NAME OF THE COLLEGE:		Based on Mid semester Examination		Teachers Assessment (Assignment/Quiz)	Attendance	Total Marks
PROGRAM:		1st Periodical Examination	2nd Periodical Examination			
SUBJECT:						
SUBJECT CODE:						
BRANCH: SEMESTER:						
SCHEME:						
MAX. MARKS: MIN. MARKS:						
		10	10	16	4	40
Sr. No	University Roll No					

Name of Internal Examiner:	Head School of Architecture	Head of the Institution
Signature.....	Signature.....	Signature.....
Date.....	Date.....	Date.....

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Template for Internal Assessment
Studio (Design /Construction /Drawing)

HIMACHAL PRADESH TECHNICAL UNIVERSITY

AWARD SHEET **Studio (Design/ Construction / Drawing)** (INTERNAL ASSESSMENT)

NAME OF THE COLLEGE:		DISTRIBUTION OF MARKS			Total Marks
PROGRAM:		Teacher Assessment	FINAL PORTFOLIO	ATTENDANCE	
SUBJECT:					
SUBJECT CODE:					
BRANCH: SEMESTER:					
SCHEME:					
MAX. MARKS: MIN. MARKS:					
		40	5	5	50
Sr. No	University Roll No				

Name of Internal Examiner:	Head School of Architecture	Head of the Institution
Signature.....	Signature.....	Signature.....
Date.....	Date.....	Date.....

Template for External Examiner Viva
Studio (Design /Construction /Drawing)

HIMACHAL PRADESH TECHNICAL UNIVERSITY

AWARD SHEET (EXTERNAL EXAMINER VIVA)

NAME OF THE COLLEGE:		MARKS DISTRIBUTION		Total Marks
PROGRAM:				
SUBJECT:				
SUBJECT CODE:				
BRANCH: SEMESTER:		External Examiner Assessment	Final Portfolio	
SCHEME:				
MAX. MARKS: MIN. MARKS:				
		15	5	20
Sr. No	University Roll No			

Name of Internal Examiner:	Name of External Examiner:	
Signature.....	Signature.....	
Date.....	Date.....	

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Template for Internal Assessment
(LAB)

HIMACHAL PRADESH TECHNICAL UNIVERSITY

AWARD SHEET **LAB** (INTERNAL ASSESSMENT)

NAME OF THE COLLEGE:		**DISTRIBUTION OF MARKS**			**Total Marks**
PROGRAM:					
SUBJECT:					
SUBJECT CODE:		File Work	Lab Performance	Attendance	
BRANCH: **SEMESTER:**					
SCHEME:					
MAX. MARKS: **MIN. MARKS:**					
		10	15	5	**30**
Sr. No	University Roll No				
Name of Internal Examiner:		Name of External Examiner:			
Signature……		Signature……			
Date……		Date……			

Template for External Examiner Viva
LAB

HIMACHAL PRADESH TECHNICAL UNIVERSITY

AWARD SHEET (EXTERNAL EXAMINER VIVA)

NAME OF THE COLLEGE:		**External Examiner Assessment**	**Total Marks**
PROGRAM:			
SUBJECT:			
SUBJECT CODE:			
BRANCH: **SEMESTER:**			
SCHEME:			
MAX. MARKS: **MIN. MARKS:**			
		20	**20**
Sr. No	University Roll No		
Name of Internal Examiner:		Name of External Examiner:	
Signature……		Signature……	
Date……		Date……	

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Template for External Examiner Viva
(INTERNSHIP/ PRACTICAL TRAINING)

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AWARD SHEET ESVE (INTERNSHIP/ PRACTICAL TRAINING)

NAME OF THE COLLEGE:		**MARKS DISTRIBUTION**		**Total Marks**
PROGRAM:				
SUBJECT:				
SUBJECT CODE:				
BRANCH: **SEMESTER:**		**External Examiner Assessment**	**Final Portfolio**	
SCHEME:				
MAX. MARKS: **MIN. MARKS:**				
		40	**10**	**50**
Sr. No	University Roll No			
Name of Internal Examiner:		Name of External Examiner:		
Signature……		Signature……		
Date……		Date……		

Template for External Examiner Viva
(ARCHITECTURAL DESIGN THESIS)

HIMACHAL PRADESH TECHNICAL UNIVERSITY

AWARD SHEET ESVE (ARCHITECTURAL DESIGN THESIS)

NAME OF THE COLLEGE:		**Teacher's Assessment**		**Total Marks**
PROGRAM:				
SUBJECT:				
SUBJECT CODE:				
BRANCH: **SEMESTER:**		**External Examiner Assessment**	**Final Portfolio**	
SCHEME:				
MAX. MARKS: **MIN. MARKS:**				
		40	**10**	**50**
Sr. No	University Roll No			
Name of Internal Examiner:		Name of External Examiner:		
Signature……		Signature……		
Date……		Date……		

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SEMESTER –I

S. N	Category	Paper Code	Subject	L	T	S/ P	Credits	Evaluation Scheme (Marks)		
								Internal Assessment (IA)	ESVE / ESE	TOTAL
Studio (Design/ Construction / Drawing)								**Internal Assessment**	**External Examiner Viva +End Semester Exam**	**Sub. Total**
1	PC	BAR-111	Architectural Design- I	0	0	6	6	50	20+30	100
2	BS/A E	BAR-112	Building Material & Construction- I	0	0	4	4	50	20+30	100
3	PC	BAR-113	Architectural Drawing- I	0	0	3	3	50	20+30	100
Theory/ Lecture:								**Internal Assessment**	**ESE**	**Sub. Total**
4	PC	BAR-114	History of Architecture-I	3	0	0	3	40	60	100
5	FC/B S/AE	BAR-115	Mathematics in Architecture	3	0	0	3	40	60	100
6	MC	UHV-111	Universal Human Values and Awareness about Himachal Pradesh	3	0	0	3	40	60	100
7	FC/S EC	HS-111	Communication Skills	3	0	0	3	40	60	100
Labs:								**Internal Assessment**	**External Examine r Viva**	**Sub. Total**
8	PC	BAR-116	Workshop Technology-I	0	0	3	3	30	20	50
9	PC	BAR-117	Art and Graphics- I	0	0	2	2	30	20	50
			Total	**12**	**0**	**18**	**30**			

Note: The 50% of Subject Total Assessment will be evaluated by subject teacher (Internal Assessment), 20 % by external examiner and 30% End Semester Exam by HPTU in respect of subject BAR-111, BAR-112, and BAR-113.

Site Visits/Tours may be conducted within the semester as per requirement of the subjects.

Legend:

L- Lecture	ESE - End Semester Examination	PC - Professional Core Course
T - Tutorial	ESVE - End Semester Exam/viva-voce Exam.	BS/AE- Building Sciences and Applied Engineering
P - Practical	TA- Teacher Assessment	EC- Elective Course
S- Studio	TP - Training performance	PE- Professional Elective
MC- Mandatory Course	LP - Lab performance	OE- Open Elective
FC- Foundation Course	FW - Documentation/ File work and presentation	PAEC- Professional Ability Enhancement Course
IA - Internal Assessment	CT - Class Test	SEC- Skill Enhancement Courses

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SEMESTER – II

S. N.	Category	Paper Code	Subject	L	T	S/P	Credits	Evaluation Scheme (Marks)		
								Internal Assessment	ESVE / ESE	TOTAL
Studio (Design/ Construction / Drawing)								**Internal Assessment**	**External Examiner Viva +End Semester Exam**	**Sub. Total**
1	PC	BAR-121	Architectural Design-II	0	0	6	6	50	20+30	100
2	BS/AE	BAR-122	Building Construction & Material-II	0	0	4	4	50	20+30	100
3	PC	BAR-123	Architectural Drawing -II	0	0	3	3	50	20+30	100
Theory/ Lecture								**Internal Assessment**	**ESE**	**Sub. Total**
4	PC	BAR-124	History of Architecture-II	3	0	0	3	40	60	100
5	BS/AE	BAR-125	Structural Design-I	3	0	0	3	40	60	100
6	BS/AE	BAR-126	Building Services-I	3	0	0	3	40	60	100
7	BS/AE	BAR-127	Climatology	3	0	0	3	40	60	100
Labs:								**Internal Assessment**	**External Examiner Viva***	**Sub. Total**
8	PC	BAR-128	Workshop Technology-II	0	0	3	3	30	20	50
9	PC	BAR-129	Art and Graphics-II	0	0	2	2	30	20	50
			Total	**12**	**0**	**18**	**30**			

Note: The 50% of Subject Total Assessment will be evaluated by subject teacher (Internal Assessment), 20 % by external examiner and 30% End Semester Exam by HPTU in respect of subject BAR-121, BAR-122 and BAR-123.

Site Visits/Tours may be conducted within the semester as per requirement of the subjects.

Legend:

L- Lecture	ESE - End Semester Examination	PC - Professional Core Course
T - Tutorial	ESVE - End Semester Exam/viva-voce Exam.	BS/AE- Building Sciences and Applied Engineering
P - Practical	TA- Teacher Assessment	EC- Elective Course
S- Studio	TP - Training performance	PE- Professional Elective
MC- Mandatory Course	LP - Lab performance	OE- Open Elective
FC- Foundation Course	FW - Documentation/ File work and presentation	PAEC- Professional Ability Enhancement Course
IA - Internal Assessment	CT - Class Test	SEC- Skill Enhancement Courses

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SEMESTER-III

S. N.	Category	Paper Code	Subject	L	T	S/P	Credits	Evaluation Scheme (Marks)		
								Internal Assessment	ESVE / ESE	TOTAL
Studio (Design/ Construction / Drawing)								**Internal Assessment**	**External Examiner Viva +End Semester Exam**	**Sub. Total**
1	PC	BAR-211	Architectural Design-III	0	0	8	8	50	20+30	100
2	BS/AE	BAR-212	Building Construction & Material-III	0	0	4	4	50	20+30	100
Theory/ Lecture								**Internal Assessment**	**ESE**	**Sub. Total**
3	PC	BAR-213	History of Architecture-III	3	0	0	3	40	60	100
4	BS/AE	BAR-214	Building Services-II	3	0	0	3	40	60	100
5	BS/AE	BAR-215	Structural Design-II	3	0	0	3	40	60	100
6	BS/AE	BAR-216	Surveying and leveling	3	0	0	3	40	60	100
7	MC	IKS-311	Indian Knowledge Systems	2	0	0	2	40	60	100
Labs:								**Internal Assessment**	**External Examiner Viva**	**Sub. Total**
8	BS/AE	BAR-217	Surveying and Leveling Lab	0	0	2	2	30	20	50
9	SEC	BAR-218	Computer Applications in Architecture-I	0	0	2	2	30	20	50
			Total	**14**	**0**	**16**	**30**			

Note: The 50% of Subject Total Assessment will be evaluated by subject teacher (Internal Assessment), 20 % by external examiner and 30% End Semester Exam by HPTU in respect of subject BAR-211 and BAR-212.

Site Visits/Tours may be conducted within the semester as per requirement of the subjects.

L- Lecture	ESE - End Semester Examination	PC - Professional Core Course
T - Tutorial	ESVE - End Semester Exam/viva-voce Exam.	BS/AE- Building Sciences and Applied Engineering
P - Practical	TA- Teacher Assessment	EC- Elective Course
S- Studio	TP - Training performance	PE- Professional Elective
MC- Mandatory Course	LP - Lab performance	OE- Open Elective
FC- Foundation Course	FW - Documentation/ File work and presentation	PAEC- Professional Ability Enhancement Course
IA - Internal Assessment	CT - Class Test	SEC- Skill Enhancement Courses

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SEMESTER-IV

S. N.	Category	Paper Code	Subject	L	T	S/P	Credits	Evaluation Scheme (Marks)		
								Internal Assessment	ESVE / ESE	TOTAL
Studio (Design/ Construction / Drawing)								**Internal Assessment**	**External Examiner Viva +End Semester Exam**	**Sub. Total**
1	PC	BAR-221	Architectural Design-IV	0	0	8	8	50	20+30	100
2	BS/AE	BAR-222	Building Construction & Material-IV	0	0	4	4	50	20+30	100
Theory/ Lecture								**Internal Assessment**	**ESE**	**Sub. Total**
3	PC	BAR-223	History of Architecture-IV	3	0	0	3	40	60	100
4	BS/AE	BAR-224	Building Services-III	3	0	0	3	40	60	100
5	BS/AE	BAR-225	Structural Design-III	3	0	0	3	40	60	100
6	PE	BAR-226	Hill Architecture	3	0	0	3	40	60	100
Labs:								**Internal Assessment**	**ESVE**	**Sub. Total**
7	SEC	BAR-227	Computer Applications in Architecture-II	0	0	3	3	30	20	50
			Total	**12**	**0**	**15**	**27**			

Note: The 50% of Subject Total Assessment will be evaluated by subject teacher (Internal Assessment), 20 % by external examiner and 30% End Semester Exam by HPTU in respect of subject BAR-221 and BAR-222.

Site Visits/Tours may be conducted within the semester as per requirement of the subjects.

Legend:

L- Lecture	ESE - End Semester Examination	PC - Professional Core Course
T - Tutorial	ESVE - End Semester Exam/viva-voce Exam.	BS/AE- Building Sciences and Applied Engineering
P - Practical	TA- Teacher Assessment	EC- Elective Course
S- Studio	TP - Training performance	PE- Professional Elective
MC- Mandatory Course	LP - Lab performance	OE- Open Elective
FC- Foundation Course	FW - Documentation/ File work and presentation	PAEC- Professional Ability Enhancement Course
IA - Internal Assessment	CT - Class Test	SEC- Skill Enhancement Courses

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SEMESTER – V

S. N.	Category	Paper Code	Subject	L	T	S/P	Credits	Evaluation Scheme (Marks)		
								Internal Assessment	ESVE / ESE	TOTAL
Studio (Design/ Construction / Drawing)								**Internal Assessment**	**External Examiner Viva +End Semester Exam**	**Sub. Total**
1	PC	BAR-311	Architectural Design-V	0	0	8	8	50	20+30	100
2	BS/AE	BAR-312	Building Construction & Material-V	0	0	4	4	50	20+30	100
Theory/ Lecture								**Internal Assessment**	**ESE**	**Sub. Total**
3	PC	BAR-313	Site Planning &Landscape Design	3	0	0	3	40	60	100
4	BS/AE	BAR-314	Building Services-IV	3	0	0	3	40	60	100
5	PC	BAR-315	Structural Design-IV	3	0	0	3	40	60	100
6	PE/ OE	BAR-316	Disaster Mitigation & Resilient Architecture	3	0	0	3	40	60	100
Labs:								**Internal Assessment**	**ESVE**	**Sub. Total**
7	SEC	BAR-317	Computer Applications in Architecture-III	0	0	3	3	30	20	50
			Total	**12**	**0**	**15**	**27**			

Note: The 50% of Subject Total Assessment will be evaluated by subject teacher (Internal Assessment), 20 % by external examiner and 30% End Semester Exam by HPTU examiner in respect of subject BAR-311 and BAR-312.

Site Visits/Tours may be conducted within the semester as per requirement of the subjects.

Legend:

L- Lecture	ESE - End Semester Examination	PC - Professional Core Course
T - Tutorial	ESVE - End Semester Exam/viva-voce Exam.	BS/AE- Building Sciences and Applied Engineering
P - Practical	TA--Teacher Assessment	EC- Elective Course
S- Studio	TP - Training performance	PE- Professional Elective
MC- Mandatory Course	LP - Lab performance	OE- Open Elective
FC- Foundation Course	FW - Documentation/ File work and presentation	PAEC- Professional Ability Enhancement Course
IA - Internal Assessment	CT - Class Test	SEC- Skill Enhancement Courses

SEMESTER – VI

S. N.	Category	Paper Code	Subject	L	T	S/P	Credits	Evaluation Scheme (Marks)		
								Internal Assessment	ESVE / ESE	TOTAL
Studio (Design/ Construction / Drawing)								**Internal Assessment**	**External Examiner Viva +End Semester Exam**	**Sub. Total**
1	PC	BAR-321	Architectural Design-VI	0	0	10	10	50	20+30	100
2	BS/AE	BAR-322	Building Construction & Material-VI	0	0	4	4	50	20+30	100
Theory/ Lecture								**Internal Assessment**	**ESE**	**Sub. Total**
3	PC	BAR-323	Human Settlement Planning	3	0	0	3	40	60	100
4	PC	BAR-324	Housing	3	0	0	3	40	60	100
5	BS/AE	BAR-325	Structural Design-V	3	0	0	3	40	60	100
6	PC	BAR-326	Building Estimation, Costing &Specification	3	0	0	3	40	60	100
7	PE	BAR-327	Professional Elective-1	3	0	0	3	40	60	100
Professional Elective-5: Only *One* to be selected by the students out of the choice given below								**Internal Assessment**	**ESE**	**Sub. Total**
	PE	BAR-327 A	Interior Design	3	0	0	3	40	60	100
	EC	BAR-327 B	Online Course-Swayam Portal	3	0	0	3	40	60	100
			Total	**15**	**0**	**14**	**29**			

Note: The 50% of Subject Total Assessment will be evaluated by subject teacher (Internal Assessment), 20 % by external examiner and 30% End Semester Exam by HPTU in respect of subject BAR-321 and BAR-322.

Site Visits/Tours may be conducted within the semester as per requirement of the subjects.

Legend:

L- Lecture	ESE - End Semester Examination	PC - Professional Core Course
T - Tutorial	ESVE - End Semester Exam/viva-voce Exam.	BS/AE- Building Sciences and Applied Engineering
P - Practical	TA- Teacher Assessment	EC- Elective Course
S- Studio	TP - Training performance	PE- Professional Elective
MC- Mandatory Course	LP - Lab performance	OE- Open Elective
FC- Foundation Course	FW - Documentation/ File work and presentation	PAEC- Professional Ability Enhancement Course
IA - Internal Assessment	CT - Class Test	SEC- Skill Enhancement Courses

SEMESTER – VII

S. N.	Category	Paper Code	Subject	L	T	S/P	Credits	Evaluation Scheme (Marks)		
								Internal Assessment	ESVE / ESE	TOTAL
Studio (Design/ Construction / Drawing)								**Internal Assessment**	**External Examiner Viva +End Semester Exam**	**Sub. Total**
1	PC	BAR-411	Architectural Design-VII	0	0	10	10	50	20+30	100
2	BS/AE	BAR-412	Building Construction & Material-VII	0	0	4	4	50	20+30	100
Theory/ Lecture								**Internal Assessment**	**ESE**	**Sub. Total**
3	PAEC	BAR-413	Project Management	3	0	0	3	40	60	100
4	PC	BAR-414	Urban Design	3	0	0	3	40	60	100
5	PE/ OE	BAR-415	Disaster Mitigation & Resilient Architecture	3	0	0	3	40	60	100
6	PE	BAR-416	Professional Elective-2	3	0	0	3	40	60	100
Labs:								**Internal Assessment**	**ESVE**	**Sub. Total**
7	SEC	BAR-417	Computer Applications in Architecture-IV	0	0	3	3	30	20	50
Professional Elective-2: Only *One* to be selected by the students out of the choice given below								**Internal Assessment**	**ESE**	**Sub. Total**
	PE	BAR-416 A	Architecture Journalism and Photography	3	0	0	3	40	60	100
	PE	BAR-416 B	Building Bye Laws & Regulations	3	0	0	3	40	60	100
			Total	**12**	**0**	**17**	**29**			

Note: The 50% of Subject Total Assessment will be evaluated by subject teacher (Internal Assessment), 20 % by external examiner and 30% End Semester Exam by HPTU in respect of subject BAR-411 and BAR-412. Site Visits/Tours may be conducted within the semester as per requirement of the subjects.

L- Lecture	ESE - End Semester Examination	PC - Professional Core Course
T - Tutorial	ESVE - End Semester Exam/viva-voce Exam.	BS/AE- Building Sciences and Applied Engineering
P - Practical	TA- Teacher Assessment	EC- Elective Course
S- Studio	TP - Training performance	PE- Professional Elective
MC- Mandatory Course	LP - Lab performance	OE- Open Elective
FC- Foundation Course	FW - Documentation/ File work and presentation	PAEC- Professional Ability Enhancement Course
IA - Internal Assessment	CT - Class Test	SEC- Skill Enhancement Courses

SEMESTER – VIII

S. N.	Category	Paper Code	Subject	L	T	S/P	Credits	Evaluation Scheme (Marks)		
								Internal Assessment	External Examiner Viva	TOTAL
Internship/ Practical Training										**Sub. Total**
1	PAEC	BAR-421	Internship/ Practical Training	-	-	-	13	50	50	100
			Total	-	-	-	**13**			

Note:-

- The internal assessment component will be evaluated by Training firm/organisation and ESVE/viva-voce will be conducted by the department at the end of internship. The student will undergo Office Training with COA Registered/Affiliated Architect.
- Training of one semester duration shall start after end of 7th semester examination.

Legend:

L- Lecture	ESE - End Semester Examination	PC - Professional Core Course
T - Tutorial	ESVE - End Semester Exam/viva-voce Exam.	BS/AE- Building Sciences and Applied Engineering
P - Practical	TA- Teacher Assessment	EC- Elective Course
S- Studio	TP - Training performance	PE- Professional Elective
MC- Mandatory Course	LP - Lab performance	OE- Open Elective
FC- Foundation Course	FW - Documentation/ File work and presentation	PAEC- Professional Ability Enhancement Course
IA - Internal Assessment	CT - Class Test	SEC- Skill Enhancement Courses

SEMESTER – IX

S. N.	Category	Paper Code	Subject	L	T	S/ P	Credits	Evaluation Scheme (Marks)		
								Internal Assessment	ESVE / ESE	TOTAL
Studio (Design/ Construction / Drawing)								**Internal Assessment**	**External Examiner Viva +End Semester Exam**	**Sub. Total**
1	PC	BAR-511	Architectural Design-VIII	0	0	12	12	50	20+30	100
Theory/ Lecture								**Internal Assessment**	**ESE**	**Sub. Total**
2	PAEC	BAR-512	Research Methodology	3	0	0	3	40	60	100
3	SEC	BAR-513	Architectural Conservation	3	0	0	3	40	60	100
4	PE	BAR-514	Intelligent Building Management System	3	0	0	3	40	60	100
5	EC	BAR-515	Sustainable Cities and Communities	3	0	0	3	40	60	100
6	PE	BAR-516	Energy Efficient Architecture	3	0	0	3	40	60	100
			Total	**15**	**0**	**12**	**27**			

Note: The 50% of Subject Total Assessment will be evaluated by subject teacher (Internal Assessment), 20 % by external examiner and 30% End Semester Exam by HPTU in respect of subject BAR-511.

Site Visits/Tours may be conducted within the semester as per requirement of the subjects.

Legend:

L- Lecture	ESE - End Semester Examination	PC - Professional Core Course
T - Tutorial	ESVE - End Semester Exam/viva-voce Exam.	BS/AE- Building Sciences and Applied Engineering
P - Practical	TA- Teacher Assessment	EC- Elective Course
S- Studio	TP - Training performance	PE- Professional Elective
MC- Mandatory Course	LP - Lab performance	OE- Open Elective
FC- Foundation Course	FW - Documentation/ File work and presentation	PAEC- Professional Ability Enhancement Course
IA - Internal Assessment	CT - Class Test	SEC- Skill Enhancement Courses

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SEMESTER – X

S. N.	Category	Paper Code	Subject	L	T	S/ P	Credits	Evaluation Scheme (Marks)		
								Internal Assessment	ESVE / ESE	TOTAL
Studio (Design/ Construction / Drawing)								**Internal Assessment**	**External Examiner Viva**	**Sub. Total**
1	PC	BAR-521	Architectural Design Thesis	0	0	18	18	50	50	100
Theory/ Lecture								**Internal Assessment**	**ESE**	**Sub. Total**
2	PAEC	BAR-522	Entrepreneurship skills in Architecture	3	0	0	3	40	60	100
3	PAEC	BAR-523	Professional Practice & Ethics	3	0	0	3	40	60	100
			Total	**6**	**0**	**18**	**24**			

Note: -

- Necessary Guidelines shared shall be followed every respective year.
- The 50% of the Internal Assessment (IA) component will be evaluated by Thesis Guide and remaining 50% to be collectively evaluated by the Thesis Coordinator and External Examiner during Stage-Wise scheduled Internal Viva in respect of subject BAR-521.

Legend:

L- Lecture	ESE - End Semester Examination	PC - Professional Core Course
T - Tutorial	ESVE - End Semester Exam/viva-voce Exam.	BS/AE- Building Sciences and Applied Engineering
P - Practical	TA- Teacher Assessment	EC- Elective Course
S- Studio	TP - Training performance	PE- Professional Elective
MC- Mandatory Course	LP - Lab performance	OE- Open Elective
FC- Foundation Course	FW - Documentation/ File work and presentation	PAEC- Professional Ability Enhancement Course
IA - Internal Assessment	CT - Class Test	SEC- Skill Enhancement Courses

BAR-111: ARCHITECTURAL DESIGN-I

Semester- I

Teaching Scheme			Credits	Evaluation Scheme (Marks)			Duration of End Semester Examination
L	T	S/P	C	Internal Assessment (IA)	External Examiner Viva (ESVE) + End Semester Exam (ESE)	Total	
0	0	6	6	50	20 + 30	100	6hrs

COURSE OBJECTIVE:

- *To introduce the architectural design language and design process.*
- *To understand the nature of the built environment and its determinants.*

Instructions to the question paper setter: The question paper will contain 01 Main Question (Design problem) with four subparts of 10 marks each, as per the project requirement of the syllabus.

COURSE CONTENT:

UNIT	CONTENT
I	**Introduction to the Concept of design** in everyday life, • **Objectives** of design, • **Elements of design** such as point- *Line- Form- Space- Texture- Colour etc.* • Detailed study of colour theory and its applications through geometric compositions. • **Principles of design** such as Scale- Balance- Proportion- Rhythm- Harmony- Contrast - etc. Application of the same through exercises in two- and three-dimensional compositions; using single and multiple types of design elements.
II	**Anthropometric Studies:** • Measurement and Graphical representation of Average Human body (for various age groups and gender), as well as their relative proportions. • Studying different working positions such as bending, standing, sleeping, sitting, etc.
III	**Space Study:** • Understanding habitable spaces and related exercises in creating and designing functional spaces, such as dining, sleeping, cooking, studying, and toilets etc in consideration with minimal standards of space requirements for furniture layout and circulation.

COURSE OUTCOME:

- Upon completion of the course, the student shall have achieved a comprehensive understanding of technical drawing techniques and architectural presentation.
- The course shall prepare students to gain an understanding into the fundamental issues in architectural design and develop skills to create architectural solutions for simple problems.

LEARNING RESOURCES / REFERENCES

1. "Design through Discovery", M.E. Bevlin, Holt, Rinehart, and Winston.
2. "Drawing and Perceiving", Douglas Cooper, John Wiley & Sons.
3. "Principles of Design in Architecture", K.W. Smithies, Van Nostrand Reinhold.
4. "Architectural Drawing Masterclass", Tom Porter, Charles Scribner's.
5. "Time-saver Standards for Architectural Design Data: The Reference of "Architectural Fundamentals", Donald Watson, McGraw-Hill.
6. "Time Saver Standards for Building Types", John Hancock Callender, Joseph De Chiara, McGraw-Hill, New York.
7. "Architectural Graphic Standards", Charles George Ramsey, Harold Reeve Sleeper, Bruce Bassler John Wiley & Sons.
8. "Form Space & Order", 4th Ed., Francis DK Ching, John Wiley & Sons, New Jersey
9. "Design in Architecture",Geoffrey Broadbent, John Wiley and Sons, 1973.
10. "Neuferts", Architect's Data

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BAR-112: BUILDING MATERIALS AND CONSTRUCTION I

Semester- I

Teaching Scheme			Credits	Evaluation Scheme (Marks)			Duration of End Semester Examination
L	T	S/P	C	Internal Assessment (IA)	External Examiner Viva (ESVE) + End Semester Exam (ESE)	Total	
0	0	4	4	50	20 + 30	100	4hrs

COURSE OBJECTIVE:

- *To Introduce the elementary building materials, their applications and construction methods in contemporary and vernacular/ traditional building practices.*
- *To familiarize the students with building elements of superstructure and foundations.*
- *To apply the construction techniques involved in masonry work with mud and stone.*

Instructions to the question paper setter: The question paper will contain 08 Questions **Question 1 to 8** shall be distributed under four Section I, II, III, IV and will have two questions each from the respective unit of the syllabus. Candidates are required to attempt one question from each unit which will be of 10 marks each. Each question may be further divided into minimum 2 questions and marks may be distributed in such a manner that total marks of all sub questions should be 10. Candidates are required to attempt four questions in all, selecting one question from each of the Section I, II, III, IV of the question paper.

COURSE CONTENT:

UNIT	CONTENT
I	**Basic components of a 'building' – in Contemporary and Rural context.** Introduction to primary building elements in • Structural system (Super and substructure), • Enclosure system, (Roofs, walls, door, windows) • Mechanical system (staircases, water supply, electrical, sewage disposal, heating, ventilating, firefighting etc)
II	**Understanding the building materials** • Lectures on historical evolution of building materials and construction methods. Understanding properties and behaviour of materials such as mud, stone, wood sand, lime, brick, cement, mortar, and PCC, RCC
III	**Type of construction systems** • To make students familiar with the basics of different types of construction systems. Load bearing structure system, Frame structures (RCC, Steel, Timber), Pre-engineered construction, temporary structures. • To introduce foundations as the foremost step to any construction and making students aware of foundations for load bearing and toe walls.
IV	**Types of Masonry** • To introduce different types of Masonry • Detail understanding of traditional Masonry made with materials like Mud and Stone • Mud: Adobe, Rammed earth, Wattle, and daub, Cob • Stone: Rubble Masonry and Ashlar Masonry.

COURSE OUTCOMES/ SUGGESTED PEDAGOGICAL APPROACH

- Students will develop an understanding of basic vocabulary of building construction, materials, and techniques.
- Students will learn the traditional buildings practices in the location.
- Site visits for exposure to site practices.
- Measured drawing of any above masonry type (may be integrated with Workshop Technology)

LEARNING RESOURCES / REFERENCES

1) Building Construction Illustrated by Francis D. K. Ching
2) Building Construction by W B Mackay (Volume 1 and Volume 2)
3) Building Construction by Rangwala
4) Engineering Materials by Rangwala
5) Building Construction by B C Punmia, Ashok K. Jain and Arun K. Jain
6) Building Materials by Gurcharan Singh
7) Building Construction Handbook by R. Chudley

BAR-113: ARCHITECTURAL DRAWING– I

Semester- I

Teaching Scheme			Credits	Evaluation Scheme (Marks)			Duration of End Semester Examination
L	T	S/P	C	Internal Assessment (IA)	External Examiner Viva (ESVE) + End Semester Exam (ESE)	Total	
0	0	3	3	50	20 + 30	100	4 hrs

COURSE OBJECTIVE: *To familiarize the student with basic knowledge of drawing, sketching, drafting, and lettering techniques and visualization of geometric forms.*

Instructions to the question paper setter: The question paper will contain 08 Questions **Question 1 to 8** shall be distributed under four Section I, II, III, IV and will have two questions each from the respective unit of the syllabus. Candidates are required to attempt one question from each unit which will be of 10 marks each. Each question may be further divided into minimum 2 questions and marks may be distributed in such a manner that total marks of all sub questions should be 10. Candidates are required to attempt four questions in all, selecting one question from each of the Section I, II, III, IV of the question paper.

COURSE CONTENT:

UNIT	CONTENT
I	**Introductory tools of Drawing in Architecture:** • Significance and Scope; Usage of Drawing Instruments, Sheet layout, Dimensions, Scales, Free hand Lettering; Introduction to pencils with different grades and representation of the different lines created by the different pencils by varying thick-ness and pressure; Line types such as Elevation lines - Construction lines – Section lines – Hidden lines – Centre lines; • Representation of various textures with thick, thin, and flat pencil strokes; Practice different line strokes, patterns, textures with pen and pencils of different thicknesses to understand the pressure variation and build a relationship with the media
II	**Understanding Typography and Lettering in Architecture:** • Exploring fonts as an important pillar of graphics and developing lettering styles to aim consistency in the design drawings; Understanding role of typography in architecture;
III	**Orthographic Projections:** • Introduction to Projections, Concept, Principle and Methods of Projections, Orthographic Projections of Point, Line and Plane, Projections of Solids in different positions, Application of Projection for preparing architectural drawings
IV	**Application of Sections in Architectural Drawings:** • To understand and draw the sections of solids and its application to building drawings, Introduction of section of solids with simple forms, Concept and methods of drawing section of solids, Application of sections for simple building drawings, Section of complex form or structures • Practice and understand the drawing of - plan, elevation and section using daily geometrical objects

COURSE OUTCOME:

- Students are able to apply different pencils in drawing. Students equipped with the skill of free-hand drawing as well as drawings using tools such as parallel bars and set squares. Students with honed (re)presentational techniques such as sectional elevations, cut-aways, methods of rendering, model making, abstraction, usage of colour in presentation
- Students enabled to apply various mediums for sketching; practice sketching indoors as well as outdoors to understand impact of light/shade, landscape, foreground/background, human figures

LEARNING RESOURCES / REFERENCES

1. "Drawing: A Creative Process", Francis D. K. Ching
2. Architectural Graphics, Francis D. K. Ching
3. Ways of Seeing, John Berger (Movie)
4. The Story of Art, E. H. Gombrich
5. M. C. Escher www.mcescher.com

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BAR-114: HISTORY OF ARCHITECTURE-I

Semester- I

Teaching Scheme			Credits	Evaluation Scheme (Marks)			Duration of End Semester Examination
L	T	S/P	C	Internal Assessment (IA)	End Semester Exam (ESE)	Total	
3	0	0	3	40	60	100	3 hrs

COURSE OBJECTIVE:

- *To appreciate the importance of the history of architecture and its relationship to the development of any region.*
- *To create awareness of the precious architectural past and how to interpret the future development based on that tradition, wisdom, and technical knowledge.*

Instructions to the question paper setter: The question paper will contain 01+08 Questions (total 9 questions).

Question 1 (20 marks) shall be compulsory and will consist of a single question with 08 subparts of short answer type which will cover the entire syllabus.

Question 2 to 9 shall be distributed under four Section I, II, III, IV and will have two questions each from the respective unit of the syllabus. Candidates are required to attempt one question from each unit which will be of 10 marks each. Each question may be further divided into minimum 2 questions and marks may be distributed in such a manner that total marks of all sub questions should be 10.

Candidates are required to attempt five questions in all selecting one question from each of the Section I, II, III, IV of the question paper and all the subparts of the Question-1.

COURSE CONTENT:

UNIT	CONTENT
I	Factors influencing the architectural character of any place; Geographic, Climatic, Socio-cultural, Religious, Economic, etc. **Prehistoric architecture of the West, Middle East and East:** General characteristics of the earliest Human Settlements: GobekliTepe, CatalHuyuk, Jericho, Jomon culture; Shoji walls, Pagoda, etc. **Early Settlements in India**: Mehrgarh, Early Harappan.
II	**Ancient Mesopotamia**: History, evolution, and characteristics. Example: Ziggurat (Sumerian), Palace of Sargon (Assyrian), Ishtar Gate (Babylonian). **Ancient Egypt**: History, evolution, and characteristics. Example: Mastabas, Pyramid of Giza and Temple of Amon at Karnak. **Indus Valley Civilisation**: City Planning. Domestic Architecture. Building materials and construction techniques. Example: Great Bath, Mohenjo- daro.
III	**Vedic Period**: Vedic Village. City Planning in the later Vedic period. Building materials and construction techniques. **Buddhist & Jain**: History, evolution, and characteristics. Major typologies; Stupa, Chaitya Hall, Vihara. Example: Lomas Rishi, The Great Stupa at Sanchi, Chaitya Hall at Karli,Viharas at Ajanta.
IV	**North Indian**: Evolution of architectural style, major influences on the development of form and other architectural elements. Gupta Period. Example: Tigawa Dasavatara Temples. **Central & South Indian**: Chalukya Pallava Architecture. Example: Ladkhan and Durga temples at Aihole (Chalukya), Ratha & Shore temple (Pallava). **Dravidian temple architecture:** Principles of Design and Construction

COURSE OUTCOME:

- Knowledge about the history of a culture, its building art and construction techniques helps an architecture student to develop designs that are rooted in the country.
- Upon completion of the course, the student will be able to develop a keen appreciation of our heritage buildings leading to the understanding that architecture is the product of a particular culture, time, and place.

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

LEARNING RESOURCES / REFERENCES

1. Percy Brown, 'Indian Architecture: Buddhist and Hindu Periods', D. B. Taraporevala,1965.
2. Satish Grover, 'The Architecture of India: Buddhist and Hindu', Vikas, 1980.
3. Christopher Tadgell , 'The History of Architecture in India', Phaidon, 1994.
4. Satish Chandra, 'History of Architecture and Ancient Building Materials in India', Tech Books International, 2003.
5. James C. Harle , 'The Art and Architecture of the Indian Subcontinent:' Second Edition, Yale University Press,1994.
6. Banister Fletcher, 'Dan Cruickshank Sir, Banister Fletcher's a history of architecture: A History of Architecture', Architectural Press, 1996.
7. Dora P. Crouch, June G. Johnson, 'Traditions in Architecture: Africa, America, Asia, and Oceania', Oxford University, 2000.
8. Michael Raeburn, 'Architecture of the Western World', Rizzoli, 1982.
9. Ilay Cooper, 'Barry Dawson, Traditional Buildings of India', Thames and Hudson, 1998.
10. Ching, Francis, Vikramadithya Prakash, Mark M Jarzombek, 'A Global History of Architecture', John Wiley & Sons, 2011
11. "Ancient Indian Architecture", Sanjeev Maheshwari and Rajeev Garg, CBS Publishers & Distributors, 2001.
12. The Hindu Temple", R. Champakalakshmi and Usha Kris, Roli Books, 2000.

BAR-115: MATHEMATICS IN ARCHITECTURE

Semester- I

Teaching Scheme			Credits	Evaluation Scheme (Marks)			Duration of End Semester Examination
L	T	S/P	C	Internal Assessment (IA)	End Semester Exam (ESE)	Total	
3	0	0	3	40	60	100	3 hrs

COURSE OBJECTIVE:

- *To develop basic Mathematical skills for Architecture students to understand structural concepts of complex/composed shapes and geometry.*
- *To acquire the skills of analysing/drawing surfaces through calculating parameters and coordinates.*
- *To inculcate understanding of the application of matrices, differential & integral calculus, analytical geometry, curved surfaces & solid intersections in the study of architecture.*

Instructions to the question paper setter: The question paper will contain 01+08 Questions (total 9 questions).

Question 1 (20 marks) shall be compulsory and will consist of a single question with 08 subparts of short answer type which will cover the entire syllabus.

Question 2 to 9 shall be distributed under four Section I, II, III, IV and will have two questions each from the respective unit of the syllabus. Candidates are required to attempt one question from each unit which will be of 10 marks each. Each question may be further divided into minimum 2 questions and marks may be distributed in such a manner that total marks of all sub questions should be 10. Candidates are required to attempt five questions in all selecting one question from each of the Section I, II, III, IV of the question paper and all the subparts of the Question-1.

COURSE CONTENTS:

UNIT	CONTENT
I	**Introduction to Linear Algebra:** Review of matrices,Rank of a matrix, Consistency using Linear system of equations; Linear & Orthogonal Transformations, Linearly Dependent & Independent vectors. **Vector Algebra:** Vectors & their operations, Direction cosines; Dot, Cross product of vectors & their physical applications. Scalar & Vector product of three vectors; Equations of a Plane, Equation of a Line, lines in a plane, Distance between two lines, Intersection of three planes.
II	**Differential Calculus:** **Functions of a Real Variable;** Differentials & Approximations, maximum & minimum values of Functions. Curvature; Radius of Curvature for Cartesian & polar curves. **Functions of Several Real Variables:** Partial Derivatives, Euler's Theorem on Homogeneous Functions, Jacobians.
III	**Solid Geometry:** Defining algebraic solids, their features, parameters and intersections (Sphere, Equation of the tangent plane, Cone & Cylinder); Practice in drawing algebraic surfaces (Ellipsoid, Hyperboloid, Cone, Elliptic & Hyperbolic Paraboloid & Cylinder); Surfaces of Revolution.
IV	**Integral Calculus: –** Shapes of Basic (Circle, Parabola, Hyperbola, Ellipse, Cardioid, cycloid, lemniscate, Catenary, Spiral) Curves (Cartesian, polar & parametric); their analytical description & Applications (Areas, Lengths) to Architecture. **Multiple Integral:** Double & triple Integration, Calculation of Area enclosed by plane curves & Volume of solids (cartesian & polar curves). Calculation of Mass, Centre of Gravity, Centre of Pressure. Moment of Inertia.

COURSE OUTCOME:

Upon completion of this course, students will be able to understand and apply the concepts of geometry, curves, solid surfaces, and calculus in drawing/building different models/structures in the areas of architecture.

LEARNING RESOURCES / REFERENCES

1. Grewal B.S., Higher Engineering Mathematics, Khanna Publisher.
2. Jain R.K., Iyengar S.R.K., Advanced Engineering Mathematics, 5/e Narosa Publisher.
3. George B. Thomas Jr., Finney R.L., Calculus & Analytical Geometry, Pearson Education.
4. Chandra Mohan and Varghese Philip, Engineering Mathematics I&II
5. Kreyszig E., Advanced Engineering Mathematics, 9/e, Wiley India,2013.

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UHV-111: UNIVERSAL HUMAN VALUES AND AWARENESS ABOUT HIMACHAL PRADESH Semester- I

Teaching Scheme			Credits	Evaluation Scheme (Marks)			Duration of End Semester Examination
L	T	S/P	C	Internal Assessment (IA)	End Semester Exam (ESE)	Total	
3	0	0	3	40	60	100	3 hrs

Instructions to the question paper setter: The question paper will contain 01+08 Questions (total 9 questions).

Question 1(20 marks) shall be compulsory and will consist of a single question with 08 subparts of short answer type which will cover the entire syllabus.

Question 2 to 9 shall be distributed under four Section I, II, III, IV and will have two questions each from the respective unit of the syllabus. Candidates are required to attempt one question from each unit which will be of 10 marks each. Each question may be further divided into minimum 2 questions and marks may be distributed in such a manner that total marks of all sub questions should be 10.

Candidates are required to attempt five questions in all selecting one question from each of the Section I, II, III, IV of the question paper and all the subparts of the Question-1. The questions in Section I, II, III, IV shall have the same course outcomes and level.

COURSE CONTENTS:

UNIT	CONTENT
I	**Introduction to Value Education**: Difference between moral and human values. Five core human values: Truth, Righteous conduct, Peace, Love and Non-violence. Classification of moral values, Value crisis in contemporary Indian society at different levels: Individual, family, Society, and culture. Values in Indian constitution: Justice, liberty, equality and fraternity, Fundamental Rights under Indian constitution: Fundamental duties of Indian citizens.
II	**Harmony with the self, family & society:** Understanding Human being as the Co-existence of the Self and the Body, Program to ensure the health of the body Distinguishing between the Needs of the Self and the Body, living in harmony with the self, family & society, steps to achieve self-discipline. Noble Eightfold Path: Right Understanding, Thought, Speech, Action, Livelihood, Effort, Mindfulness, and Concentration.
III	**Understanding Mental health & emotional well-being:** Characteristics of a mentally healthy person, causes of mental-health issues in contemporary society, possible solutions to improve mental health. Emotional intelligence: elements of emotional intelligence, Advantages of higher emotional intelligence & improving emotional intelligence, Maslow 's hierarchy of needs & self-actualization
IV	**Awareness about Himachal Pradesh:** General knowledge including the knowledge of different places of historic, national and cultural importance & tourist attraction, hydro power projects, industries, highways, educational and other institutions of the state, knowledge about the famous personalities from the state, currents affairs of Himachal Pradesh, history of Himachal- from medieval to present time, Geography-including the weather, borders, rivers, mountain-ranges , passes, peaks , knowledge of customs and culture of HP : including the costumes, customs, fairs and festivals etc.

TEXTBOOKS:

1. The Textbook A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P
2. Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1
3. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
4. The Wonderland Himachal Pradesh An Encyclopaedia, Jag Mohan Balokhra, H. G. Publications New Delhi

REFERENCE BOOKS:

1. Jeevan Vidya: EkParichaya, A Nagaraj, JeevanVidyaPrakashan, Amarkantak, 1999.
2. The Story of Stuff (Book).
3. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
4. Slow is Beautiful - Cecile Andrews
5. Economy of Permanence - J C Kumarappa
6. Bharat Mein Angreji Raj – Pandit Sunderlal
7. Rediscovering India - by Dharampal
8. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
9. India Wins Freedom - Maulana Abdul Kalam Azad
10. Vivekananda - Romain Rolland (English)

HS-111: COMMUNICATION SKILL

Semester- I

Teaching Scheme			Credits	Evaluation Scheme (Marks)			Duration of End Semester Examination
L	T	S/P	C	Internal Assessment (IA)	End Semester Exam (ESE)	Total	
3	0	0	3	40	60	100	3 hrs

COURSE OBJECTIVE:

- *The course intends to build the required communication skills of the students having limited communicative abilities, so that they may communicate effectively in real-life situations.*
- *This will help the students to equip themselves for better performance in all subjects that require verbal communication and written explanations.*

Instructions to the question paper setter: The question paper will contain 01+08 Questions (total 9 questions).

Question 1 (20 marks) shall be compulsory and will consist of a single question with 08 subparts of short answer type which will cover the entire syllabus.

Question 2 to 9 shall be distributed under four Section I, II, III, IV and will have two questions each from the respective unit of the syllabus. Candidates are required to attempt one question from each unit which will be of 10 marks each. Each question may be further divided into minimum 2 questions and marks may be distributed in such a manner that total marks of all sub questions should be 10.

Candidates are required to attempt five questions in all selecting one question from each of the Section I, II, III, IV of the question paper and all the subparts of the Question-1. The questions in Section I, II, III, IV shall have the same course outcomes and level.

COURSE CONTENTS:

Unit	Contents
I	**Understanding basics of Communication skills:** Need for effective communication, process of communication, The Seven Cs of Effective Communication - Completeness, Conciseness, Consideration, Concreteness, Clarity, Courtesy, Correctness; Barriers to communication - miscommunication, physical noise; Overcoming measures.
II	**Essentials of Grammar & Building Vocabulary:** Sentence structure; Sentence formation, Use of appropriate diction, Tenses, articles, and prepositions; English Phonetics: International phonetic alphabets - Production of sounds, Classification of consonant and vowel sounds.
III	**Writing Skills:** Letter writing - Formal, informal, and demi-official letters; Business letters - quotations, supply orders, complaints, sales, adjustment letters, etc.; Resume writing: Difference between bio-data, CV and resume, Cover letter, Application for job; Design Concept writing.
IV	**Soft skills:** Classification of soft skills, soft skills for personality development & career growth; Capturing audience, Tone, Behavior and telephone etiquette - good practice when making and receiving a call; Becoming a good leader and team-player, Personal SWOT analysis. Preparing for Vivas, external juries and presentations.

TEXT BOOKS:

1. Herta A. Murphy, et al., ***Effective Business Communication,*** Tata Mc-Graw Hill: New Delhi.
2. Krishna Mohan and Meenakshi Raman, ***Effective English Communication,*** TMH.
3. B. K. Mitra, Personality and Soft Skills, Oxford press.

LEARNING RESOURCES / REFERENCES:

1. R.W. Lesikar and John.D. Pettit, ***Business Communication: Theory and Application***, All India TravellerBookseller.
2. Francis Soundaraj, ***Speaking and Writing for Effective Business Communication***, Macmillan.
3. Ronald B. Adler and George Rodman, ***Understanding Human Communication***, Oxford University Press: New York.

BAR-116: WORKSHOP TECHNOLOGY-I

Semester- I

Teaching Scheme			Credits	Evaluation Scheme (Marks)			Duration of End Semester Examination
L	T	S/P	C	Internal Assessment (IA)	External Examiner Viva (ESVE)	Total	
0	0	0	3	30	20	50	-

COURSE OBJECTIVE:

To introduce the students with practical exposure of construction and traditional building material.

Following is the list of experiments/ jobs. Minimum 06 number of practicals are to be performed from the following list. The additional experiments may be performed by the respective institution depending on the infrastructure available.

COURSE CONTENT:

UNIT	CONTENT
I	• Develop a hands-on approach, skills of working with different materials and the ability to choose an appropriate material as and when required for presentation or design purposes. • Working with model making materials like thermocol, paper, wire etc.
II	• Workshop in brick making (adobe), • Workshop in traditional Masonry made with materials like Mud (Adobe, Rammed earth, Wattle, and daub, Cob) and different types of stone masonry

LEARNING RESOURCES / REFERENCES

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

BAR-117: ART & GRAPHICS – I

Semester- I

Teaching Scheme			Credits	Evaluation Scheme (Marks)			Duration of End Semester Examination
L	T	S/P	C	Internal Assessment (IA)	External Examiner Viva (ESVE)	Total	
0	0	2	2	30	20	50	-

COURSE OBJECTIVE: *To familiarize the student with basic knowledge of drawing, sketching, drafting, and lettering techniques and visualization of geometric forms.*

COURSE CONTENT:

UNIT	CONTENT
I	**Applications of Pencil/Pen in Architectural Drawing**: • Indoor and outdoor sketching: live drawing in various contexts to develop a professional level ability to draw existing objects, buildings, landscapes in pencil and pen;
II	**Architectural Presentation Techniques:** • Mediums of Hand-Rendering: pencil, pen, pencil colours, water colours; Understanding mixed media of presentation in Architecture: model-making, mass and void, photo-montages, and abstraction. • Poster making exercise based on rephrasing architectural photographs or sketches by using typographic materials

COURSE OUTCOME:

- Students are able to apply different pencils in drawing. Students equipped with the skill of free-hand drawing
- Students enabled to apply various mediums for sketching; practice sketching indoors as well as outdoors to understand impact of light/shade, landscape, foreground/background, human figures

LEARNING RESOURCES / REFERENCES

1. "Drawing: A Creative Process", Francis D. K. Ching
2. Architectural Graphics, Francis D. K. Ching
3. Ways of Seeing, John Berger (Movie)
4. The Story of Art, E. H. Gombrich
5. M. C. Escher www.mcescher.com
6. "Architectural Shades and Shadows", Henry McGoodwin, Nabu Press
7. "Rendering with Pen and Ink", Robert W. Gill, Thames & Hudson Ltd.
8. "Sketching the Concept", Harold Linton and Scott Sutton, Design Press.

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BAR-121: ARCHITECTURAL DESIGN-II

Semester-II

Teaching Scheme			Credits	Evaluation Scheme (Marks)			Duration of End Semester Examination
L	T	S/P	C	Internal Assessment (IA)	External Examiner Viva (ESVE) + End Semester Exam (ESE)	Total	
0	0	6	6	50	20 + 30	100	6hrs

COURSE OBJECTIVE:

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

Instructions to the question paper setter: The question paper will contain 01 Main Question (Design problem) with four subparts of 10 marks each, as per the project requirement of the syllabus.

COURSE CONTENT:

UNIT	CONTENT
I	Design of mono cellular structure like florist kiosk, gift/souvenir shop, pavilions, bus shelter, milk booth, Guard cabin, cycle stand, entrance gate, traffic police kiosk, ATM centre etc. with emphasis on form, function and integration of anthropometric studies.
II	Designing of space such as Crèche, Kindergarten, Aganwadi etc. for small groups and relative activities with reference to climate, site conditions, and user requirements. Understanding relationship between indoor and outdoor spaces and application of design principles.
III	Study of any architecturally important building of the local area. Site visits, documentation through text, photography, or sketches and measured drawings. Cohesion with Architectural Drawing- II BAR-123

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

LEARNING RESOURCES / REFERENCES

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

BAR-122: BUILDING MATERIALS & CONSTRUCTION – II

Semester II

Teaching Scheme			Credits	Evaluation Scheme (Marks)			Duration of End Semester Examination
L	T	S/P	C	Internal Assessment (IA)	External Examiner Viva (ESVE) + End Semester Exam (ESE)	Total	
0	0	4	4	50	20 + 30	100	4 hrs

COURSE OBJECTIVE:

- *The study in the semester increases in complexity from shallow and spread foundations to deep foundations and from introduction to building elements to a more detailed study of building elements like sills, copings, lintels, arches, and openings.*
- *The students will apply the construction techniques involved in masonry work with different materials like brick and composite materials in different locations like T- junctions, independent piers, and corner junctions.*
- *Students will also learn about waterproofing methods and techniques at all building levels*

Instructions to the question paper setter: The question paper will contain 08 Questions **Question 1 to 8** shall be distributed under four Section I, II, III, IV and will have two questions each from the respective unit of the syllabus. Candidates are required to attempt one question from each unit which will be of 10 marks each. Each question may be further divided into minimum 2 questions and marks may be distributed in such a manner that total marks of all sub questions should be 10. Candidates are required to attempt four questions in all, selecting one question from each of the Section I, II, III, IV of the question paper.

COURSE CONTENT:

UNIT	CONTENT
I	**Foundations: Introduction to Shallow & Deep foundations** • Concrete: Composition, properties of PCC and RCC, methods of concrete construction – various stages involved like – batching, mixing, transporting, compacting, curing, shuttering. • Shallow foundation: Strip footing, Isolated footing, Strap footing, combined and raft foundations, their construction techniques and usage. • Deep Foundation: Grillage foundations, Piles foundations, Caisson foundations.
II	**Introduction to RCC elements like Columns, Beams and Slabs** • Reinforcement detailing of RCC building elements like columns, beams and slabs through sketches and site visits. • RBC, Flat, Filler, waffle, coffer
III	**Types of Masonry walls: (Brick and Composite block)** • Different types of Bricks and Composite blocks. • Introduction to bonds, principle, and applications • Brick walls in different bonds, ends, corners and junctions. • Composition of brick earth and their properties, manufacturing process of bricks, classification of bricks, test for bricks, special type of bricks, substitutes for bricks, etc. • Introduction to sustainability and energy conservation using cavity walls, rattrap bonds etc.
IV	**Introducing different types of Openings in the wall** • To familiarise with terminology of openings as Sill, Lintel, Projections, Coping, Drip course, Parapet. • Classification of Arches based on geometrical shape, materials, construction techniques, viz. flat, segmental, semicircular, Tudor, circular, elliptical, semi-elliptical, venetian, Florentine arches, etc. Illustration of terminology for arches, construction detailing and methods of cantering. • Waterproofing details in different levels: details in simple foundations, walls, roofs, sills, lintels, and roofs in RCC, RB and steel, damp proof details of plinth, sill, lintel, and roof level.

LEARNING OUTCOMES / PEDAGOGICAL APPROACH

- The subject will act as direct aid for Design exercises which involves requirement of knowledge of architectural drawings for small projects in the current semester. Preparation of detailed working drawings demarcation plan and foundation plan.
- Construction Detail of External Brick wall section
- Students will understand the importance of various bonds through brick models and the assembling of these brick models in the form of courses and bonds.
- Workshop in brick laying, setting-out, etc. and Site visits for exposure to site practices.

LEARNING RESOURCES / REFERENCES:

1. Building Construction Illustrated by Francis D. K. Ching
2. Building Construction by W. B.Mckay
3. Building Construction by Sushil Kumar
4. Building Construction by Rangwala
5. Building Construction by B. C. Punmia
6. Building Construction Handbook, R. Chudely

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BAR-123: ARCHITECTURAL DRAWING II

Semester II

Teaching Scheme			Credits	Evaluation Scheme (Marks)			Duration of End Semester Examination
L	T	S/P	C	Internal Assessment (IA)	External Examiner Viva (ESVE) + End Semester Exam (ESE)	Total	
0	0	3	3	50	20 + 30	100	4 hrs

COURSE OBJECTIVE: *To enable the students to have a better visualization/understanding of a three-dimensional entity through Drawings: Sections of Solids and Sciography*

Instructions to the question paper setter: The question paper will contain 08 Questions **Question 1 to 8** shall be distributed under four Section I, II, III, IV and will have two questions each from the respective unit of the syllabus. Candidates are required to attempt one question from each unit which will be of 10 marks each. Each question may be further divided into minimum 2 questions and marks may be distributed in such a manner that total marks of all sub questions should be 10.Candidates are required to attempt four questions in all selecting one question from each of the Section I, II, III, IV of the question paper.

COURSE CONTENT:

UNIT	CONTENT
I	**Basics of perspective drawings** • Anatomy of perspective: Station point, Eye level, Cone of vision, Picture plane, Horizon line, Ground line, Vanishing points • Types of perspectives : One point, Two point, Three point
II	**Metric Drawing - Architectural Drawing Techniques** • Types used & advantage • Isometric, Axonometric & Oblique view • Metric drawings, projections and their dimensions • Difference between perspective and metric projections
III	**Development of Surfaces of Solids** • Introduction to solids bounded by plane surfaces such as prisms / pyramids and solids of revolution such as cylinders / cones • Projection of solids having axis perpendicular to one of the reference planes / axis parallel to either of the reference plane and incline to other reference plane / axis inclined to both the reference planes • Introduction to Development of Surfaces • Drawing developments for solids such as pyramid, prism, cylinder, cone • Drawing developments for truncated solids with sectional top views, sectional side views and true shape of the section • Model-making exercises to understand development of surface
IV	**Sciography** : Introduction and Importance, Sciography of points, lines and planes. **Documentation Exercise in collaboration with BAR-121 employing application of presentation mediums studied**

COURSE OUTCOME:

- Students are able to decode the development of solids such as pyramids, prism, cylinder, cone, etc.
- Students equipped with the skill of drawing views to enable them to represent two-dimensional entities
- Students with a developed understanding of different solids and their projections
- Students enabled to draw sciography of point, lines, etc. to initiate the sensitivity towards light and shadow

LEARNING RESOURCES / REFERENCES:

1. "A Textbook of Engineering Drawing", Prof. P.J. Shah, S. Chand Publishing.
2. "Engineering Drawing", Dhananjay A. Jolhe,Tata McGraw Hill, .
3. "Architectural Drawing", Tom Porter, Hamlyn.
4. Engineering Drawing , A. Yarwood
5. Basic Technical Drawing, Henry Cecil Spencer

BAR-124: HISTORY OF ARCHITECTURE-II

Semester II

Teaching Scheme			Credits	Evaluation Scheme (Marks)			Duration of End Semester Examination
L	T	S/P	C	Internal Assessment (IA)	End Semester Exam (ESE)	Total	
3	0	0	3	40	60	100	3 hrs

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

Instructions to the question paper setter: The question paper will contain 01+08 Questions (total 9 questions).

Question 1 (20 marks) shall be compulsory and will consist of a single question with 08 subparts of short answer type which will cover the entire syllabus.

Question 2 to 9 shall be distributed under four Section I, II, III, IV and will have two questions each from the respective unit of the syllabus. Candidates are required to attempt one question from each unit which will be of 10 marks each. Each question may be further divided into minimum 2 questions and marks may be distributed in a such a manner that total marks of all sub question should be 10.Candidates are required to attempt five questions in all selecting one question from each of the Section I, II, III, IV of the question paper and all the subparts of the Question-1.

COURSE CONTENT:

UNIT	CONTENT
I	**Ancient Greece:** History, evolution, and characteristics. Example: Classical Orders, Optical corrections, Parthenon, Acropolis, Agora, Theatre.
II	**Ancient Rome:** History, evolution, and characteristics. Example: Roman engineering skills- Pantheon, Colosseum, Basilica.
III	**Islamic Architecture** The Rise and development of Islamic architecture in the west. The advent of Islam into India.
IV	Influences of Islamic ideas on secular and religious architecture in India and the 1.Rise of Islam 2. Islamic Invasions, political and social conditions in the country 3. Study of the Islamic Architecture, regions, and style wise under local influence regarding – • **Delhi or Imperial Style:** Slave, Khilji, Tughlaq, Sayyed, Lodhi • **Provincial Style:** Bengal, Jaunpur, Deccan, Malwa, Bijapur, Malwa or Mandu style. Different styles at Deccan – a) Gulbarga, b) Bidar, c) Golkonda, • **Mughal Architecture** in North India under : Humayun, Jehangir, Akbar, Shahjehan

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

LEARNING RESOURCES / REFERENCES:

1. ***The World of Architecture***", Paul Holberton, Chancellor Press.
2. "***A History of Architecture***", Sir Banister Fletcher, CBS Publisher.
3. "***A History of Architecture***", Spiro Kostof, Oxford University Press.
4. "***Encyclopedia of World Architecture",*** James Ferguson.
5. "***A Global History of Architecture***", Mark M. Jarzombek, Vikramaditya Prakash and Francis D. K. Ching, John Wiley & Sons; 2nd Edition.
6. "Islamic Architecture in India", Satish Grover, Galgotia Publishing Company, 1996

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BAR-125: STRUCTURAL DESIGN – I

Semester II

Teaching Scheme			Credits	Evaluation Scheme (Marks)			Duration of End Semester Examination
L	T	S/P	C	Internal Assessment (IA)	End Semester Exam (ESE)	Total	
3	0	0	3	40	60	100	3 hrs

Course Objective: ***To understand the basic principles of structural mechanics that would be pertinent to simple design elements. To understand the structural behaviour of building elements.***

Instructions to the question paper setter: The question paper will contain 01+08 Questions (total 9 questions).

Question 1 (20 marks) shall be compulsory and will consist of a single question with 08 subparts of short answer type which will cover the entire syllabus.

Question 2 to 9 shall be distributed under four Section I, II, III, IV and will have two questions each from the respective unit of the syllabus. Candidates are required to attempt one question from each unit which will be of 10 marks each. Each question may be further divided into minimum 2 questions and marks may be distributed in such a manner that total marks of all sub questions should be 10. Candidates are required to attempt five questions in all selecting one question from each of the Section I, II, III, IV of the question paper and all the subparts of the Question-1.

COURSE CONTENT:

UNIT	CONTENT
I	**Introduction to the subject and theory of structure:** • Aims, objectives and scope of study of theory of structure for architects. • Technical names and function of various structural components from foundation to roof. • Fundamentals and mechanics, S.I. system and units. • Understanding structure: why things don't fall down?
II	**Structural systems-** • ways to create inner space • understanding loads of various types.
III	**Force and its units,** • Laws of forces, Resultant of a Force System, Law of Inertia, Law of action and reaction, Free body diagram, Static equilibrium & conditions of equilibrium, conditions of statically determinacy, Degree of Indeterminacy. Types of supports and support reactions, Determination of support reactions for statically determinate structures, Analysis of forces, moments and couples in structures. • Stress, strain, Hooke's Law, stress-strain curve, stressed streams in simple and composite sections, temperature stresses, Poisson's ratio, state of simple shear, shear strain.
IV	• Introduction to types of loads and supports. • Study of Structural system design such as Fundamental characteristics, Strength, Stability, Ability, Rigidity, Economy and Aesthetics. Determination of Centre of gravity, Moment of Inertia of square, rectangle, and I shaped cross-sections.

COURSE OUTCOME:

Upon completion of the course, the student shall have developed the necessary skills to analyse and solve basic problems involving graphics and spatial manipulations for architectural applications.

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

LEARNING RESOURCES / REFERENCES:

1. Tayal, "Engineering Mechanics", UmeshPublications , 13/e, 2006.
2. Bansal R. K., "Engineering Mechanics", Lakshmi Publications Pvt Ltd, 3/e,1996.
3. Vazarani, "Mechanics of structures'', 16/e, 1995
4. Chakraborthi M., "Strength of Materials", SK Kataria& Sons, New Delhi, 2010.
5. Abdul Mubeen, "Mechanics of Solids", Dorling Kindersley (India) Pvt Ltd, 2/e, 2011.
6. Kumar D.S., Textbook of Engineering Mechanics, S K Kataria& Sons, 3/e, 2009.
7. Rajput R.K., Textbook of Engineering Mechanics, Danpat Rai & Sons, New Delhi, 2002
8. Prasad I.B., Textbook of Applied Mechanics, Khanna Publications, 12/e, 1998.

BAR-126: BUILDING SERVICES-I

Semester II

Teaching Scheme			Credits	Evaluation Scheme (Marks)			Duration of End Semester Examination
L	T	S/P	C	Internal Assessment (IA)	End Semester Exam (ESE)	Total	
3	0	0	3	40	60	100	3 hrs

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

Instructions to the question paper setter: The question paper will contain 01+08 Questions (total 9 questions).

Question 1 (20 marks) shall be compulsory and will consist of a single question with 08 subparts of short answer type which will cover the entire syllabus.

Question 2 to 9 shall be distributed under four Section I, II, III, IV and will have two questions each from the respective unit of the syllabus. Candidates are required to attempt one question from each unit which will be of 10 marks each. Each question may be further divided into minimum 2 questions and marks may be distributed in such a manner that total marks of all sub questions should be 10. Candidates are required to attempt five questions in all selecting one question from each of the Section I, II, III, IV of the question paper and all the subparts of the Question-1.

Course Content:

UNIT	CONTENT
I	**Water Supply and Sewage system.** Introduction to Sources of Water Supply: • Municipal Level: Understanding types of Water Demand, Treatment of Water (in brief only); Storage & its conveyance: Methods of Distribution: Gravity, Pumping and Dual System; Intermittent and Continuous System of Supply. Layout of Distribution: Dead-End/ Tree, GridIron, Ring, Radial System. Joints and Pipes; • Building Level: Water demand & calculations, Storage and Conveyance; Services Connection; Introduction to Types of Waste : Refuse, and its types; Sewer, Sewage and Sewerage; Stormwater.Conveyance: Methods of carrying refuse; Systems of Sewerage: Combined and Separate System
II	**Plumbing and Drainage** • Plumbing: Water Supply Systems: Direct and In-Direct; Hot and Cold water supply layouts of wet areas in a building (Site Visit of ongoing plumbing works). Various types of PlumbingFittings, Fixtures and Wares (with Market Survey). • Introduction to water supply in a multi-storeyed building. • Drainage: Principles of House Drainage; One Pipe System and Two Pipe System • Fixtures and Fittings:Various drainage & sanitary fixtures & fittings, traps - role of water seal, sizes, materials and their space requirements, Water efficient and waterless fixtures(with Market Survey). Types of pipes and drains in different materials and their usage, diameter of pipes, slope standards. Inspection and Intercepting chambers, manholes etc. and understanding Siphonic Action, Anti-siphonage pipe, Vent Pipes etc.
III	**Waste Water and Solid Waste Management** • Waste Management Techniques: Segregation of waste at source; Treatments: Sewage and Effluent treatment- Innovative and cost effective sanitation concepts e.g. EcoSAN; Wastewater recycling methods e.g. DEWATS etc. Introduction to STP's & ETP's, Design calculations of septic tank & soak pit • Stormwater design calculations for roof top & for surface drains, Rainwater Harvesting & Groundwater Recharge
IV	**Design of Domestic Water Supply and Sewage Network** • To design a domestic water supply, drainage, sewage and storm water network for a small residential building. • Design of Underground & Overhead water tanks,

Course Outcomes: Students will understand the importance of services as an integral part of building design

LEARNING RESOURCES / REFERENCES:

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

BAR-127: CLIMATOLOGY

Semester II

Teaching Scheme			Credits	Evaluation Scheme (Marks)			Duration of End Semester Examination
L	T	S/P	C	Internal Assessment (IA)	End Semester Exam (ESE)	Total	
3	0	0	3	40	60	100	3 hrs

COURSE OBJECTIVE: ***The course intends to obtain knowledge required for understanding the influence of climate on architecture. To familiarize students with the design and settings for buildings for daylight and factors that influence temperature. The students are exposed to the various design strategies for building in different types of climatic zones, factors of thermal comfort, solar geometry, natural ventilation and climate responsive building design and site planning.***

Instructions to the question paper setter: The question paper will contain 01+08 Questions (total 9 questions).

Question 1 (20 marks) shall be compulsory and will consist of a single question with 08 subparts of short answer type which will cover the entire syllabus.

Question 2 to 9 shall be distributed under four Section I, II, III, IV and will have two questions each from the respective unit of the syllabus. Candidates are required to attempt one question from each unit which will be of 10 marks each. Each question may be further divided into minimum 2 questions and marks may be distributed in such a manner that total marks of all sub questions should be 10. Candidates are required to attempt five questions in all selecting one question from each of the Section I, II, III, IV of the question paper and all the subparts of the Question-1.

COURSE CONTENT:

UNIT	CONTENT
I	**Introduction:** Climate and Weather, Elements of Climate, Classification of climates, Climate balanced Architecture **Bioclimatic Approach:** Human Comfort- definitions and concepts, Thermal Comfort Factors, Bioclimatic Requirements, Relation of climatic elements to comfort, The Bio-Climatic Chart.
II	**Environment and Building Forms:** Impact of External forces on Building, Reading of Psychometric chart and its applicability, Building configuration and climate response. **Site & Building Design:** Site Selection, Site Planning, Building Orientation and Placement, Effect of Landscaping
III	**Sun & Building Design** Basic Principles of Heat Transfer, calculations based on heat transfer in buildings, Day lighting & Solar Control, Thermal Insulation strategies **Wind & Building Design** Wind effect and Air Flow Pattern, Ventilation Techniques, Air movement around the buildings, Stack Effect and Thermally induced air currents
IV	**Architectural Application** • Shelter for warm-humid climates • Shelter for hot-dry climates • Shelter for composite climate • Shelter for cold –cloudy and cold- sunny climates. • Application of software in climate responsive design

LEARNING RESOURCES / REFERENCES:

1. Manual of Tropical Housing and Building: Climate Design", O.H. Koenigsberger et.al., Madras: Orient Longman, 1984.
2. "Energy-efficient Buildings in India", Mili Majumdar, TERI Press,
3. "Sustainable Building-Design Manual- Volume I&II", TERI Press,
4. "Thermal control in passive solar buildings", S.C. Kaushik, G.N. Tiwari and J.K. Nayak, IBT Publishers & Distributors, 1988.
5. Givoni, B., Man Climate and Architecture
6. Krishan, A., Climate Responsive Architecture.

BAR-128: WORKSHOP TECHNOLOGY-II

Semester II

Teaching Scheme			Credits	Evaluation Scheme (Marks)			Duration of End Semester Examination
L	T	S/P	C	Internal Assessment (IA)	External Examiner Viva (ESVE)	Total	
0	0	3	3	30	20	50	-

COURSE OBJECTIVE:

To introduce the students to basic structural processes with practical exposure and workability of material, Joinery.

Following is the list of experiments/ jobs. Minimum 06 number of practicals are to be performed from the following list. The additional experiments may be performed by the respective institution depending on the infrastructure available.

COURSE CONTENT:

UNIT	CONTENT
I	**CEMENT & BRICKS:** • Workshop in exploring cement as a material, different ratio of concrete mixtures, cube test. • Understanding of Reinforcement arrangements for slabs, beams and columns through site visit. Hands-on various Shell structure arrangements using Ferrocement techniques. • Hands-on different brick masonry, Brick jali, piers Type of arches
II	**WOOD or METAL:** • Basic workshop techniques for carpentry and joinery, to prepare half-lap corner joints, mortise & tenon joints. • To make a job involving fitting work -drilling, tapping or dieing • To prepare a simple butt and Lap welded joints.

Reference Books:

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

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BAR-129: ART & GRAPHICS – II

Semester II

Teaching Scheme			Credits	Evaluation Scheme (Marks)			Duration of End Semester Examination
L	T	S/P	C	Internal Assessment (IA)	External Examiner Viva (ESVE)	Total	
0	0	2	2	30	20	50	-

COURSE OBJECTIVE: ***To enable the students to have a better visualization/understanding of a three-dimensional entity through free hand drawings and Rendering techniques.***

COURSE CONTENT:

UNIT	CONTENT
I	**Freehand Perspective Drawing and Sketching:** • Introduction to types of freehand perspective; • Outdoor sketching implementing theory of perspective, light and shadow study; • Indoor Sketching implementing theory of perspective; • Sketching Compositions of various objects; with shade and shadows
II	**Manual techniques for Rendering painting/colouring of Architectural Drawings** • Introduction to represent different textures and finishes in plan and elevation of interior and exterior spaces. • Graphical representation of furniture, automobiles, human figures, etc. in plans and elevations and 3- dimensions. • Techniques Colouring of architectural presentation drawings in various medium • Monochromatic shades, Shades and shadows in multi-coloured drawings

COURSE OUTCOME:

- Sketch using freehand techniques
- Draw views demonstrating the play of light and shadows.
- Demonstrate use of various presentation mediums

LEARNING RESOURCES / REFERENCES:

1. Architectural Graphics, 4th Edition by Francis D.K. Ching
2. Design Drawing by Francis D.K. Ching

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