COMPETENCY BASED CURRICULUM

DIPLOMA
IN
ARCHITECTURAL ASSISTANTSHIP

(Duration 03 Years)
NSQF Level – 5

Under
Haryana State Board of Technical Education

Developed By

Curriculum Development Center

National Institute of Technical Teachers Training & Research

(Ministry of Education, Government of India)

Sector - 26, Chandigarh, UT, India

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PREFACE

Learning and learning experience are the foundation of any education system. Appropriateness of education and its useful implications stand on the platform of knowledge and skill. But the knowledge and skill cannot be quantified qualitatively without ensuring learning experience. Curriculum is the pathway to select and organise learning experience. It helps the teachers to provide tangible resources, goals and objectives to learners. Curriculum acts as a catalyst to stimulate creativity, innovation, ethics, values, responsibility and many human factors. Curriculum embodies rigour and high standards and creates coherence to empower learner to meet the industrial and societal needs. Curriculum is a central guide for a teacher to plan a standard based sequence for the instructional delivery.

The industrial revolution 4.0 has forced the technical education system to reinvent the curriculum to meet the human resource requirement of the industry. The data driven systems relying on the subjects like machine-learning, Artificial Intelligence, Data Science etc. are literally forcing the technical education system to offer different subjects differently to address the emerging challenges. The non-linear way of learning now facilitates students to choose path of knowledge to skill or vice-versa. The bi-directional process requires innovative curriculum design and revision. Diploma Programme is now more challenging than ever. The level of skill and knowledge demanded by industry from diploma holders are highly interdisciplinary at the same time address special need. Hence, there is a need to align the curriculum to National Skill Qualification Framework (NSQF).

National Education Policy, NEP-2020 has now opened up diversities for the education system to explore and exploit to make the education relevant. The policy emphasises to inculcate value, ethics, respect to culture and society etc along with industry ready knowledge and skill among the students. The interdisciplinary nature of curriculum, academic bank of credits and integration of technology in teaching- learning envisaged in NEP-2020 make it more challenging for curriculum development. NITTTR, Chandigarh has developed the art of curriculum development over 54 years of its existence. The expertise and experience available in the institute follow time-tested and acclaimed scientific methods to design/revise curriculum. The experienced faculty members entrusted with the curriculum development or revision activities are well-versed with NSQF, NEP and Outcome based education. I am happy to note that **Haryana State Board of Technical Education, Panchkula, Haryana** reposed their confidence on this expertise to develop **AICTE/NSQF/NEP 2020** aligned curriculum for the state. This documented curriculum is an outcome of meticulous planning and discussions among renowned experts of the subject through series of workshops. The effective implementation of this curriculum supported with quality instructional resources will go a long way in infusing the learning experience among learners to make them industry ready.

Director
National Institute of Technical Teachers Training &Research, Chandigarh

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Professor & Head
Curriculum Development Center
National Institute of Technical Teachers Training &Research, Chandigarh

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1. SALIENT FEATURES

1.	Name	:	**Diploma in Architectural Assistantship**
2.	Duration	:	**03Years**
3.	Hours per week	:	**35**
4.	Entry Qualification	:	**10thPass**
5.	Student Intake	:	**As per sanctioned strength**
6.	Pattern	:	**Semester**
7.	Scheme	:	**Multi Pont Entry and Exit**
8.	NSQF Level	:	**5**
9.	Theory Practical Ratio	:	**37 :63**
10.	Project Work	:	**Minor and Major Project**
11.	In-house/Industrial Training	:	**Mandatory after First and Second Year**

2. NSQF GUIDELINES

National Skill Qualification Framework has defined total Ten Levels. Each level of the NSQF is associated with a set of descriptors made up of five outcome statements, which describe in general terms, the minimum knowledge, skills and attributes that a learner needs to acquire in order to be certified for that level.

Fig1: NSQF Domains

NSQF LEVEL - 3 COMPLIANCE

The NSQF level - 3 descriptor is as follows:

Process	• Person may carry out a job which may require limited range of activities routine and predictable.
Professional Knowledge	• Basic facts, process and principle applied in trade of employment.
Professional Skill	• Recall and demonstrate practical skill, routine and repetitive in narrow range of application.
Core Skill	• Communication written and oral, with minimum required clarity, skill of basic arithmetic and algebraic principles, personal banking, basic understanding of social and natural environment.
Responsibility	• Under close supervision. Some responsibility for own work within defined limit.

Fig 2: NSQF Level – 3 Descriptor

Work requiring knowledge, skills and aptitudes at level 3 will be routine and predictable. Job holders will be responsible for carrying out a limited range of jobs under close supervision. Their work may require the completion of a number of related tasks. People carrying out these job roles may be described as "Semi skilled workers". Individuals in jobs which require level 3 qualifications will normally be expected to be able to communicate clearly in speech and writing and may be required to use arithmetic and algebraic processes. They will be expected to have previous knowledge and skills in the occupation and should know the basic facts, processes and principles applied in the trade for which they are qualified and be able to apply the basic skills of the trade to a limited range of straightforward jobs in the occupation.

They will be expected to understand what constitutes quality in their job role and more widely in the sector or sub-sector and to distinguish between good and bad quality in the context of the jobs they are given. Job holders at this level will be expected to carry out the jobs they are given safely and securely. They will work hygienically and in ways which show an understanding of environmental issues. This means that they will be expected to take responsibility for their own health and safety and that of fellow workers and, where appropriate, customers and/or clients. In working with others, they will be expected to conduct themselves in ways which show a basic understanding of the social environment. They should be able to make a good contribution to team work.

NSQF LEVEL - 4 COMPLIANCE

The NSQF level-4 descriptor is given below:

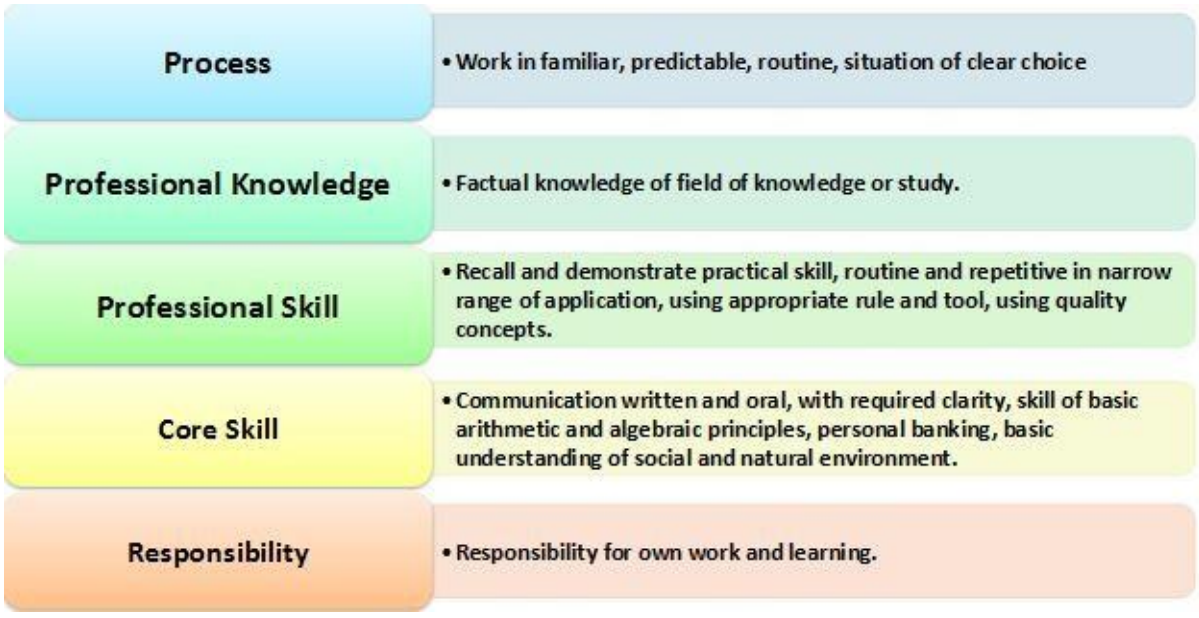

Fig 3: NSQF Level – 4 Descriptor

Work requiring knowledge, skills and aptitudes at level 4 will be carried out in familiar, predictable and routine situations. Job holders will be responsible for carrying out a range of jobs, some of which will require them to make choices about the approaches they adopt. They will be expected to learn and improve their practice on the job. People carrying out these jobs may be described as "skilled workers". Individuals in jobs which require level 4 qualifications should be able to communicate clearly in speech and writing and may be required to use arithmetic and algebraic processes. They will be expected to have previous knowledge and skills in the occupation in which they are employed, to appreciate the nature of the occupation and to understand and apply the rules which govern good practice. They will be able to make choices about the best way to carry out routine jobs where the choices are clear.

They will be expected to understand what constitutes quality in the occupation and will distinguish between good and bad quality in the context of their job roles. Job holders at this level will be expected to carry out their work safely and securely and take full account of the health and safety on colleagues and customers. They will work hygienically and in ways which show an understanding of environmental issues. In working with others, they will be expected to conduct themselves in ways which show a basic understanding of the social and political environment. They should be able to guide or lead teams on work within their capability.

NSQF LEVEL - 5 COMPLIANCE

The NSQF level-5 description is given below:

Process	• Job that requires well developed skill, with clear choice of procedures in familiar context.
Professional Knowledge	• Knowledge of facts, principles, processes and general concepts, in a field of work or study.
Professional Skill	• A range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials and information.
Core Skill	• Desired mathematical skill; understanding of social, political; and some skill of collecting and organising information, communication.
Responsibility	• Responsibility for own work and learning and some responsibility for others' works and learning

Fig 4: NSQF Level – 5 Descriptor

Work requiring knowledge, skills and aptitudes at level 5 will also be carried out in familiar situations, but also ones where problems may arise. Job holders will be able to make choices about the best procedures to adopt to address problems where the choices are clear. Individuals in jobs which require level 5 qualifications will normally be responsible for the completion of their own work and expected to learn and improve their performance on the job. They will require well developed practical and cognitive skills to complete their work. They may also have some responsibility for others' work and learning. People carrying out these jobs may be described as "fully skilled workers" or "supervisors".

Individuals employed to carry out these jobs will be expected to be able to communicate clearly in speech and writing and may be required to apply mathematical processes. They should also be able to collect and organize information to communicate about the work. They will solve problems by selecting and applying methods, tools, materials and information. They will be expected to have previous knowledge and skills in the occupation, and to know and apply facts, principles, processes and general concepts in the occupation. They will be expected to understand what constitutes quality in the occupation and will distinguish between good and bad quality in the context of their work. They will be expected to operate hygienically and in ways which show an understanding of environmental issues. They will take account of health and safety issues as they affect the work they carry out or supervise.

In working with others, they will be expected to conduct themselves in ways which show an understanding of the social and political environment.

3. NATIONAL EDUCATION POLICY (NEP) -2020

NEP 2020 aims at a comprehensive holistic education to develop all capacities of human beings - intellectual, aesthetic, social, physical, emotional, and moral - in an integrated manner. A holistic arts education will help develop well-rounded individuals that possess: critical 21st century capacities in fields across the arts, humanities, languages, sciences, social sciences, and professional, technical, and vocational fields; an ethic of social engagement; soft skills, such as communication, discussion and debate; and rigorous specialization in a chosen field or fields. Such a holistic education shall be, in the long term, the approach of all undergraduate programmes, including those in professional, technical, and vocational disciplines.

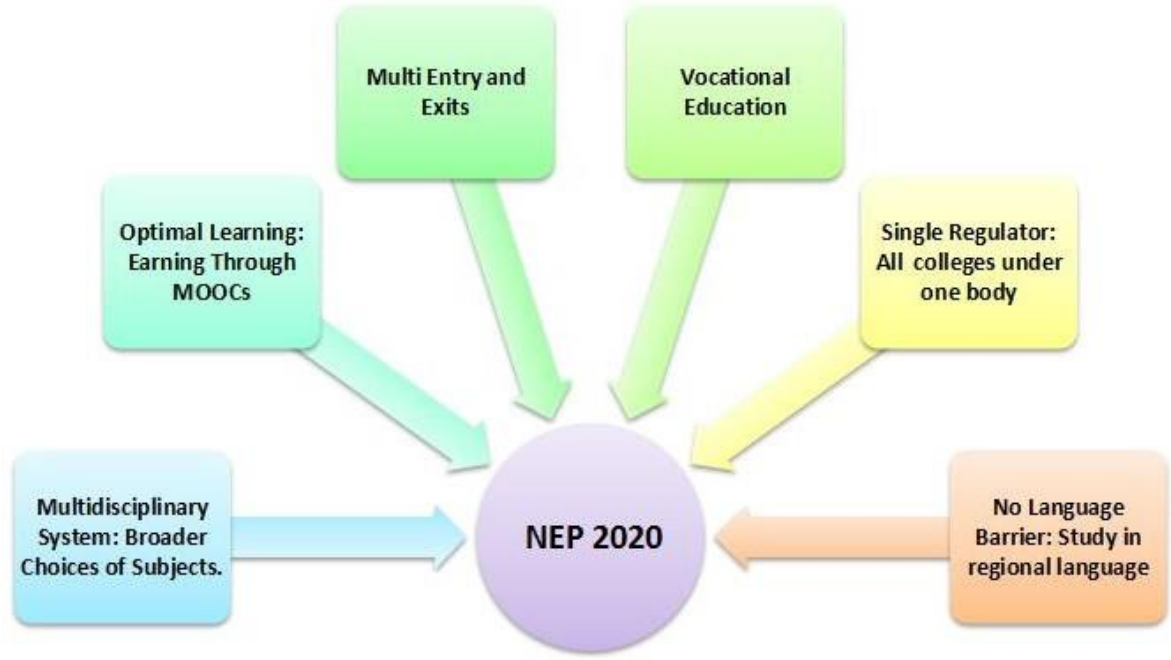

Fig 5: NEP 2020

Flexibility in curriculum and novel and engaging course options will be on offer to students, in addition to rigorous specialization in a subject or subjects. Pedagogy for courses will strive for significantly less rote learning and an increased emphasis on communication, discussion, debate, research, and opportunities for cross-disciplinary and interdisciplinary thinking. The flexible and innovative curriculum shall emphasize on offering credit-based courses and projects in the areas of community engagement and service, environmental education and value-based education. as part of a holistic education, students will be provided with opportunities for internships with local industry, businesses, artists, crafts persons, villages and local communities etc. as well as research

internships with faculty and researchers at their own or other HEIs or research institutions, so that students may actively engage with the practical side of their learning and, as a by-product, further improve their employability.

Effective learning requires relevant curriculum, engaging pedagogy, continuous formative assessment and adequate student support. The curriculum must be updated regularly aligning with the latest knowledge requirements and shall meet specified learning outcomes. High-quality pedagogy is then necessary to successfully impart the curricular material to students; pedagogical practices determine the learning experiences that are provided to students - thus directly influencing learning outcomes. The assessment methods have to be scientific and test the application of knowledge. Higher Education Institutes should move to a criterion-based grading system that assesses student achievement based on the learning goals for each programme, making the system fairer and outcomes more comparable. HEIs should also move away from high-stakes examinations towards more continuous and comprehensive evaluation.

4. DIPLOMA PROGRAMME OUTCOMES

The program outcomes are derived from five domains of NSQF Level namely Process, Professional Knowledge, Professional Skill, Core Skill, Responsibility. After completing this programme, the student will be able to:

PO1: Perform tasks in limited range of activities, familiar situation with clear choice of procedures.

PO2: Acquire knowledge of principles and processes in the field of Architectural Assistantship.

PO3: Develop skills to accomplish quality tasks and solve problems using methods, tools, materials and information**.**

PO4: Demonstrate skill of communication, basic mathematics, collecting and organizing information along with knowledge of social, political and natural environment.

PO5: Take the responsibility of own works and supervises others work.

PO6: Select multidisciplinary open elective subjects of own interest and perform Self Learning through Massive Open Online Courses (MOOCs).

5. DERIVING CURRICULUM SUBJECT AREAS FROM DIPLOMA PROGRAMME OUTCOMES

The following curriculum areas have been derived from Diploma Programme Outcomes:

Sr. No.	Programme Outcomes	Curriculum Subjects / Areas
1.	Perform tasks in limited range of activities, familiar situation with clear choice of procedures.	• Applied Physics • Applied Chemistry • Architectural Drawing-I • Sketching & Model Making • Basic Design and Visual Arts • Building Materials & Construction -II • History of Architecture -I • Climatology • Architectural Drawing - III • Building Services • Building Byelaws • Building Materials & Construction – III • History of Architecture-II • Building Materials & Construction -IV • Structure Systems-I • Quantity Surveying & Costing • Programme Elective-I • Interior Design • Structure Systems-II • Programme Elective -II
2.	Acquire knowledge of principles and processes in Architectural Assistantship related field.	• Applied Physics • Applied Chemistry • Architectural Drawing-I • Sketching & Model Making • Theory of Design • Architectural Drawing-II • Basic Design and Visual Arts • Building Materials & Construction -II • History of Architecture -I • Climatology • Architectural Drawing - III

		• Building Services • Building Byelaws • Building Materials & Construction – III • History of Architecture-II • Building Materials & Construction -IV • Structure Systems-I • Quantity Surveying & Costing • Programme Elective-I • Interior Design • Structure Systems-II • Programme Elective -II
3.	Develop skills to accomplish quality tasks and solve problems using methods, tools, materials and information**.**	• Architectural Drawing-I • Sketching & Model Making • Theory of Design • Architectural Drawing-II • Surveying • Building Materials & Construction- I • Industrial/In-House Training-I • Basic Design and Visual Arts • Architectural Drawing - III • Working Drawing and Detailing • Computer Applications in Architecture-I • Architectural Design • Computer Applications in Architecture-II • Computer Applications in Architecture-III
4.	Demonstrate skill of communication, basic mathematics, collecting and organizing information along with knowledge of social, political and natural environment.	• English and Communication Skills -I • Applied Mathematics • Fundamentals of IT • Environmental Studies &Disaster Management • English & Communication Skills – II • Entrepreneurship Development and Management • Major Project/ Industrial Training
5.	Take the responsibility of own works and supervises others work.	• Industrial/In-House Training • Architectural Drawing-II • Minor Project

		• Industrial Training-II • Major Project/ Industrial Training
6.	Select multidisciplinary and open subjects of own interest and perform self learning through Massive Open Online Courses.	• Multidisciplinary Elective • Open Elective

FIRST YEAR

NSQF LEVEL - 3

6. DIPLOMA PROGRAMME STUDY AND EVALUATION SCHEME

FIRST SEMESTER

Sr. No.	SUBJECTS	STUDY SCHEME Periods/Week		Credits (C) L+P=C	MARKS IN EVALUATION SCHEME						Total Marks of Internal & External
					INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT			
		L	P/S***		Th	Pr	Total	Th	Pr	Total	
1.1	* English & Communication Skill-I	2	2	2+1=3	40	40	80	60	60	120	200
1.2	**Applied Mathematics	4	-	4+0=4	40	-	40	60	-	60	100
1.3	**Applied Physics	2	2	2+1=3	40	40	80	60	60	120	200
1.4	* Applied Chemistry	3	2	3+1=4	40	40	80	60	60	120	200
1.5	Architectural Drawing-I	-	8	0+4=4	-	40	40	-	60	60	100
1.6	Sketching &Model Making	-	8	0+4=4	-	40	40	-	60	60	100
	#Student Centered Activities	-	2	-	-	-	-	-	-	-	-
Total		**11**	**24**	**22**	**160**	**200**	**360**	**240**	**300**	**540**	**900**

* Common with other diploma programmes.

** Same as Applied Mathematics-I and Apply Physics-I and common with other diploma programmes.

*** P/S is studio for architectural subjects & practical for other subjects.

Student Centered Activities will comprise of co-curricular activities like extension lectures on Constitution of India, Games, Yoga, Human Ethics, Knowledge of Indian System, Hobby clubs e.g. Photography etc., Seminars, Declamation contests, Educational field visits, N.C.C., NSS, Cultural Activities and self study etc.

SECOND SEMESTER

Sr. No.	SUBJECTS	STUDY SCHEME Periods/Week		Credits (C) L+P=C	MARKS IN EVALUATION SCHEME						Total Marks of Internal & External
					INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT			
		L	P/S***		Th	Pr	Total	Th	Pr	Total	
2.1	Surveying	3	4	3+2=5	40	40	80	60	60	120	200
2.2	*Environmental Studies and Disaster Management	2	-	2+0=2	40	-	40	60	-	60	100
2.3	Building Materials & Construction- I	3	4	3+2=5	40	40	80	60	60	120	200
2.4	*Fundamentals of IT	2	4	2+2=4	40	40	80	60	60	120	200
2.5	Architectural Drawing- II	-	6	0+3=3	-	40	40	-	60	60	100
2.6	Theory of Design	4	-	4+0=4	40	-	40	60	-	60	100
#Student Centered Activities		-	3	-	-	-	-	-	-	-	
Total		**14**	**21**	**23**	**200**	**160**	**360**	**300**	**240**	**540**	**900**

* Common with other diploma programmes.

*** P/S is studio for architectural subjects & practical for other subjects.

Student Centered Activities will comprise of co-curricular activities like extension lectures on Constitution of India, Games, Yoga, Human Ethics, Knowledge of Indian System, Hobby clubs e.g. Photography etc., Seminars, Declamation contests, Educational field visits, N.C.C., NSS, Cultural Activities and self study etc.

Summer Internship/In-house Training: After 2nd semester, students shall undergo Summer Internship of 4 Weeks.

7. HORIZONTAL AND VERTICAL ORGANISATION OF SUBJECTS

Sr. No.	Subjects/Areas	Hours Per Week	
		First Semester	Second Semester
1.	English & Communication Skill-I	4	-
2.	Applied Mathematics	4	-
3.	Applied Physics	4	-
4.	Applied Chemistry	5	-
5.	Architectural Drawing-I	8	-
6.	Sketching & Model Making	8	-
7.	Surveying	-	7
8.	Environmental Studies and Disaster Management	-	2
9.	Building Materials & Construction- I	-	7
10.	Fundamentals of IT	-	6
11.	Architectural Drawing- II	-	6
12.	Theory of Design	-	4
14.	Student Centered Activities	2	3
	Total	**35**	**35**

8. COMPETENCY PROFILE AND EMPLOYMENT OPPORTUNITIES

In government and private sectors related to Architectural Assistantship, "Semi Skilled workers" are required to carry out a limited range of predictable tasks under close supervision. They are normally expected to communicate clearly in speech and along with knowledge of arithmetic and algebraic processes. They should know the basic facts, processes and principles applied in limited area of Architectural Assistantship.

Architectural Assistantship NSQF Level – 3 pass out students are expected to recall and demonstrate practical routine and repetitive skills, in narrow range of related applications. They should have the basic knowledge of principles of Architectural Assistantship. They should demonstrate general manual and machining skills along with awareness of dignity of labour, safety at work place, team working and right attitude. They should have good knowledge of physical principles and analysis in various technical fields. They are expected to handle wide variety of Architectural Assistantship instruments while testing, trouble shooting, calibration etc. along with the knowledge of working principles and operation of different instruments.

From the feedback received from polytechnics and field organizations, they find employment in service sector in the following organizations:

- The private enterprises consisting of firms of Architects or engineers
- Builders, contractors, interior designers, web-page designers and survey companies

Government departments namely:

a) State Department of Architecture
b) State Department of Town and Country Planning
c) Central Public Works Department
d) State Housing Boards and Corporations
e) State Urban Development Agency
f) Railways
g) Military Engineering Services
h) Local Bodies
i) Survey of India
j) State Electricity Department/Boards
k) Telecommunication Department

Self-Employment

- Private Practice with local bodies
- Own unit/enterprise for

a) Model Making
b) Perspective making
c) Landscaping
d) Drawings and CAD
- Service to Private Architects
- Sub Contracts of Construction, renovation, repair and interior design
- Site Supervision
- Site Surveying
- Estimation and Billing
- Site/marketing of building components
- Liaison work

9. PROGRAMME OUTCOMES

The program outcomes are derived from five domains of NSQF Level – 3 namely Process, Professional Knowledge, Professional Skill, Core Skill, Responsibility. After completing this level, the student will be able to:

PO1: Carry out a task which may require limited range of predictable activities.

PO2: Acquire knowledge of Basic facts, process and principles related to Architectural Assistantship for employment.

PO3: Demonstrate practical skill in narrow range of Architectural Assistantship

PO4: Demonstrate skill of communication, basic mathematics, collecting and organizing information along with knowledge of social, political and natural environment.

PO5: Perform task under close supervision with some responsibility for own work within defined limit.

10. ASSESSMENT OF PROGRAMME AND COURSE OUTCOMES

Programme Outcomes to be assessed	Assessment criteria for the Course Outcomes
PO1: Carry out a task which may require limited range of predictable activities.	• Identify physical quantities, select their units and make measurements with accuracy. • Represent physical quantities as scalar and vector and identify type of motions, various forms of energy, their conversion and applications. • Elaborate scientific work, energy and power, forms of friction and solve problems related to them. • Comprehend properties of matter and effect of temperature on various matter and phenomenon. • Demonstrate the use of physical principles and analysis in various technical fields. • Classify the elements into metals, non-metals and metalloids. • Explain the extraction of metals from ores, their mechanical properties and modification of properties by alloy formation. • Classify fuels and lubricants and apply them in different engineering applications. • Identify the polymeric materials, assess their properties and design suitable polymeric materials for current and future applications. • Apply effective methods for corrosion prevention • State the basic concepts of geometric construction of various polygons its sub division, projection of plane figure • Explain development of solids its cross sections and their true shapes • Differentiate between isometrics, econometrics & perspective drawings • Draw perspectives drawings of simple objects

PO2: Acquire knowledge of Basic facts, process and principles related to Architectural Assistantship for employment.	• Identify physical quantities, select their units and make measurements with accuracy. • Represent physical quantities as scalar and vector and identify type of motions, various forms of energy, their conversion and applications. • Describe the various facets of art and architecture and the formal vocabulary of design. • State the basic form, space and elements of architecture design. • Explain the basic anthropometrics-average measurements of human body (adult and children) in different postures-its proportion and graphic representation. • Discuss the basic human functions and their implications for spatial planning. • Develop space and visualization of form with expressional skills. • Explain about the common building stones and their properties • Describe about the various types of bricks, their bonding and their properties • Discuss different types of foundation for basements and normal super structure • State the basics of lintels, arches and brick jallies and use of it in buildings. • Determine the requirements of damp proof course • Explain basic elements in 2-D and 3-D in design and their utilities in mural and other 3-D compositions.
PO3: Demonstrate practical skill in narrow range of Architectural Assistantship applications.	• State the basic concepts of geometric construction of various polygons its sub division, projection of plane figure • Explain development of solids its cross sections and their true shapes • Differentiate between isometrics, econometrics & perspective drawings • Draw perspectives drawings of simple objects • Draw free hand sketching of various three

	dimensional geometrical objects and various simple buildings, trees, human figures, furnitures, vehicles in different medium and techniques. • Draw the various lettering ratios of height & width. • Draw free hand lettering and with the help of stencils.
PO4: Demonstrate skill of communication, basic mathematics, collecting and organizing information along with knowledge of social, political and natural environment.	• Identify the nuances of Communication, both Oral and Written. • Acquire knowledge of the meaning of communication, communication process and speaking skills. • Acquire enhanced vocabulary and in-depth understanding of Grammatical Structures and their usage in the communication. • Communicate effectively with an increased confidence to read, write and speak in English language fluently. • Understand the geometric shapes used in engineering problems by Co-ordinate Geometry and Trigonometry. • Formulate engineering problems into mathematical formats with the use matrices, co-ordinate geometry and trigonometry • Calculate the approximate value of roots of certain expressions in engineering problems by application of binomial theorem. • Explore the idea of location, graph, and linear relationships between two variables. • Learn about basic fundamentals about MATLAB/ Sci Lab and mathematical calculation with MATLAB/ Sci Lab software. • Explain the basic components of Computers, Internet and issues of abuses/attacks on information and computers. • Handle the Computer/Laptop/Mobiles/Internet

	Utilities and Install/Configures. • Assemble a PC and connect it to external devices. • Manage and Use Office practiced Automation Tools. • Develop worksheets and Prepare presentations. • Comprehend the importance of sustainable ecosystem • Demonstrate inter disciplinary nature of environmental issues • Implement corrective measures for the abatement of pollution. • Identify the role of non-conventional energy resources in environmental protection. • Manage various types of disasters.
PO5: Perform task under close supervision with some responsibility for own work within defined limit.	• Measure a long line with tape. • Prepare maps for closed traverse and open traverse with survey instruments • Perform leveling with digital level • Find difference of level between two points with dumpy level, auto level and digital level.

11. SUBJECTS & DETAILED CONTENTS

FIRST SEMESTER

1.1 ENGLISH & COMMUNICATION SKILLS – I

L	P
2	2

RATIONALE

Language as the most commonly used medium of self-expression remains indispensable in all spheres of human life –personal, social and professional. This course is intended to break fresh ground in teaching of Communicative English as per the requirements of National Skill Quality Framework. This course is designed to help students to acquire the concept of communication and develop an ability or skills to use them effectively to communicate with the individuals and community.

COURSE OUTCOMES

After undergoing this course, the students will be able to:

CO1: Identify the nuances of Communication, both Oral and Written.

CO2: Acquire knowledge of the meaning of communication, communication process and Speaking skills.

CO3: Acquire enhanced vocabulary and in-depth understanding of Grammatical Structures and their usage in the communication.

CO4: Communicate effectively with an increased confidence to read, write and speak in English language fluently.

DETAILED CONTENTS

UNIT I

Reading

1.1 Techniques of reading: Skimming and Scanning

1.2 Extensive and Intensive Reading: Textual Study

1.3 Homecoming – R.N. Tagore

1.4 Life Sketch of Sir MokshagundamVisvesvarayya

1.5 Life Sketch of Dr. Abdul Kalam

1.6 Narayan Murthy’s speech at LBSNA, Dehradun

UNIT II

Fundamentals of Communication

2.1 Concept and Process of Communication,

2.2 Types of Communication (Verbal Communication)

2.3 Barriers to Communication

2.4 Speaking Skill: Significance and essentials of Spoken Communication

2.5 Listening Skill: Significance and essentials of Listening

UNIT III

Grammar and Usage

3.1 Nouns

3.2 Pronouns

3.3 Articles

3.4 Verbs(Main and Auxiliary)

3.5 Tenses

UNIT IV

Writing Skills

4.1 Significance, essentials and effectiveness of Written Communication

4.2 Notice Writing

4.3 Official Letters and E-mails.

4.4 Frequently-used Abbreviations used in Letter-Writing

4.5 Paragraph Writing

4.6 Netiquettes

PRACTICAL EXERCISES

1 Reading

Reading Practice of lessons in the Lab Activity classes.

i. Comprehension exercises of unseen passages along with the lessons prescribed.

ii. Vocabulary enrichment and grammar exercises based on the selected readings.

iii. Reading aloud Newspaper headlines and important articles.

2 Fundamentals of Communication

i. Introducing oneself, others and leave- taking(talking about yourself)

ii. Just a minute (JAM) sessions: Speaking extempore for one minute on given topics

iii. Situational Conversation: Offering-Responding to offers; Congratulating; Apologising and Forgiving; Complaining; Talking about likes and dislikes, Self-introduction Mock Interviews.

3 Grammar and Usage

i. Written and Oral Drills will be undertaken in the class to facilitate holistic linguistic competency among learners.

ii. Exercises on the prescribed grammar topics.

4 Writing Skills

i. Students should be given Written Practice in groups so as to inculcate team-spirit and collaborative learning .

ii. Group exercises on writing paragraphs on given topics.

iii. Opening an e-mail account, receiving and sending emails

RECOMMENDED BOOKS

1. Alvinder Dhillon and Parmod Kumar Singla, "Text Book of English and Communication Skills Vol – 2", M/S Abhishek Publications, Chandigarh.
2. V Sasikumar & PV Dhamija, "Spoken English", Tata MC Graw Hills, New Delhi, Second Edition.
3. JK Gangal, "A Practical Course in Spoken English", PHI Learning Pvt. Ltd., New Delhi.
4. NK Aggarwal and FT Wood, "English Grammar, Composition and Usage", Macmillan Publishers India Ltd., New Delhi.
5. RC Sharma and Krishna Mohan, "Business Correspondence & Report writing", Tata MC Graw Hills, New Delhi, Fourth Edition.
6. Kavita Tyagi & Padma Misra, "Professional Communication", PHI Learning Pvt. Ltd., New Delhi.
7. Nira Konar, "Communication Skills for professionals", PHI Learning Pvt. Ltd., New Delhi.
8. Krishna Mohan & Meera Banerji, "Developing Communication Skills", Macmillan Publishers India Ltd., New Delhi, Second Edition
9. M. Ashraf Rizwi, "Effective Technical Communication", Tata MC Graw Hills, New Delhi.
10. Andrea J Rutherfoord, "Basic Communication Skills for Technology", Pearson Education, New Delhi.

INSTRUCTIONAL STRATEGY

This is practice based subject and topics taught in the class should be practiced in the Lab regularly for development of required communication skills in the students. This subject contains four units of equal weight age.

1.2 APPLIED MATHEMATICS

L	P
4	-

RATIONALE

Contents of this course provide fundamental base for understanding engineering problems and their solution algorithms. Contents of this course will enable students to use basic tools like logarithm, binomial theorem, matrices, t-ratios and co-ordinates for solving complex engineering problems with exact solutions in a way which involve less computational task. By understanding the logarithm, they will be able to make long calculations in short time and it is also a pre-requisite for understanding Calculus.

COURSE OUTCOMES

After undergoing this course, the students will be able to:

CO1: Understand the geometric shapes used in engineering problems by Co-ordinate Geometry and Trigonometry.

CO2: Formulate engineering problems into mathematical formats with the use matrices, co-ordinate geometry and trigonometry

CO3: Calculate the approximate value of roots of certain expressions in engineering problems by application of binomial theorem.

CO4: Explore the idea of location, graph, and linear relationships between two variables.

CO5: Learn about basic fundamentals about MATLAB/ SciLab and mathematical calculation with MATLAB/ SciLab software.

DETAILED CONTENTS

UNIT I

Algebra

1.1 Complex Numbers: definition of complex number, real and imaginary parts of a complex number, Polar and Cartesian Form and their inter conversion, Conjugate of a complex number, modulus and amplitude, addition subtraction, multiplication and division of complex numb

1.2 Logarithms and its basic properties

UNIT II

Binomial Theorem, Determinants and Matrices

2.1 Meaning of ${}^{n}p_{r}$ & ${}^{n}c_{r}$ (mathematical expression). Binomial theorem (without proof) for positive integral index (expansion and general form); binomial theorem for any index (expansion up to 3 terms - without proof), first binomial approximation with application to engineering problems.

2.2 Determinants and Matrices – Evaluation of determinants (upto 2^{nd}order), solution of equations (upto 2 unknowns) by Crammer's rule, definition of Matrices and its types, addition, subtraction and multiplication of matrices (upto 2^{nd} order).

UNIT III

Trigonometry

3.1 Concept of angle, measurement of angle in degrees, grades, radians and their conversions.

3.2 T-Ratios of Allied angles (without proof), Sum, Difference formulae and their applications (without proof). Product formulae (Transformation of product to sum, difference and vice versa

3.3 Applications of Trigonometric terms in engineering problems such as to find an angle of elevation, height, distance etc.

UNIT IV

Co-ordinate Geometry

4.1 Cartesian and Polar co-ordinates (two dimensional), Distance between two points, mid-point, centroid of vertices of a triangle.

4.2 Slope of a line, equation of straight line in various standards forms (without proof); (slope intercept form, intercept form, one-point form, two-point form, symmetric form, normal form, general form), intersection of two straight lines, concurrency of lines, angle between straight lines, parallel and perpendicular lines, perpendicular distance formula, conversion of general form of equation to the various forms.

UNIT V

Geometry of Circle and Software

Circle

5.1 General equation of a circle and its characteristics. To find the equation of a circle, given:

i. Centre and radius

ii. Three points lying on it

iii. Coordinates of end points of a diameter

Software

5.2 **MATLAB Or SciLab software –** Theoretical Introduction, MATLAB or Scilabas Simple Calculator (Addition and subtraction of values –Trigonometric and Inverse Trigonometric functions) – General Practice

RECOMMENDED BOOKS

1. R. D. Sharma, "Applied Mathematics – I & II for Diploma Courses", Dhanpat Rai Publications.
2. "Mathematics for Class XI", NCERT Publication, New Delhi.
3. "Mathematics for Class XII", NCERT Publication, New Delhi.
4. H. K Dass, "Applied Mathematics for Polytechnics", CBS Publishers & Distributers.
5. A Ganesh and G Balasubramanian, "Textbook of Engineering Mathematics – I", CBS Publisher, New Delhi.
6. A Ganesh and G Balasubramanian, "Textbook of Engineering Mathematics –II", CBS Publisher, New Delhi.
7. G. B. Thomas, R. L. Finney, "Calculus and Analytic Geometry", Addison Wesley, Ninth Edition.
8. B S Grewal, "Elementary Engineering Mathematics", Khanna Publishers, Delhi, Thirty-fifth edition.
9. R.K. Jain and S.R.K. Iyengar, "Advanced Engineering Mathematics", Narosa Publishing House, New Delhi, Second Edition, 2003.
10. SS Sabharwal & Dr Sunita Jain, "Applied Mathematics Vol. I & II", Eagle Parkashan, Jalandhar.
11. S Kohli, "Engineering Mathematics Vol. I & II", IPH, Jalandhar.
12. Reena Garg & Chandrika Prasad, "Advanced Engineering Mathematics", Khanna Publishing House, New Delhi
13. R. Pratap, "Getting Started with MATLAB 7", Oxford University Press, Seventh Edition.
14. E-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

SUGGESTED WEBSITES

1. http://swayam.gov.in
2. https://www.scilab.org

INSTRUCTIONAL STATREGY

This is theoretical subject and contains five units of equal weightage. Basic elements of algebra, trigonometry and co-ordinate geometry can be taught in the light of their applications in the field of engineering and technology. By laying more emphasis on applied part, teacher can also help in providing a good continuing education base to the students. Students need to be taught the skills needed to use software tools built by experts through multiple problem solving based on the topics related to Algebra, Trigonometry and Coordinate Geometry that the industry requires. Examples to be used should be related to engineering. Useful software MATLAB or open source software Sci Lab can be taught theoretically by books/online literatures and basic operations can be shown practically with practical software laboratory or small mobile apps of these software or authentic Trial version of MATLAB/ Sci Lab software. Students should be able to relate to the actual use of these examples and the way mathematical calculations will help them in doing their job.

1.3 APPLIED PHYSICS

L	P
2	2

RATIONALE

Applied physics includes the study of a large number of diverse topics all related to things that go on in the world around us. It aims to give an understanding of this world both by observation and by prediction of the way in which objects will behave. Concrete use of physical principles and analysis in various technical fields are given prominence in the course content.

COURSE OUTCOMES

After completing this course, student should be able to:

CO1: Identify physical quantities, select their units and make measurements with accuracy.

CO2: Represent physical quantities as scalar and vector and identify type of motions, various forms of energy, their conversion and applications.

CO3: Elaborate scientific work, energy and power, forms of friction and solve problems related to them.

CO4: Comprehend properties of matter and effect of temperature on various matter and phenomenon.

CO5: Demonstrate the use of physical principles and analysis in various technical fields.

DETAILED CONTENTS

UNIT I

Unit and Dimensions

1.1 Definition of Physics, physical quantities- fundamental and derived

1.2 Units: fundamental and derived

1.3 System of units: CGS, FPS, MKS, SI

1.4 Dimension, dimensional formulae and SI units of physical quantities-distance, displacement, area, volume, density, velocity, acceleration, linear momentum, force, impulse, work, power, energy, pressure, surface tension, stress, strain)

1.5 Dimensional equations, principle of homogeneity of dimensional equation

1.6 Application of dimensional analysis: checking the correctness of physical equation,

conversion of system of unit (force, work, acceleration)

UNIT II

Force and Motion

2.1 Scalar and vector quantities– definition and examples, representation of vector, types of vector (unit vector, position vector, co-initial vector, collinear vector, co-planar vector)

2.2 Vector algebra- addition of vectors, Triangle &Parallelogram law (statement and formula only),

2.3 Scalar and vector product (statement and formula only)

2.4 Force and its units, resolution of force (statement and formula only)

2.5 Newton's laws of motion (statement and examples)

2.6 Linear momentum, Law of conservation of linear momentum (statement and examples), Impulse

2.7 Circular motion: definition of angular displacement, angular velocity, angular acceleration, frequency, time period; Relation between linear and angular velocity, centripetal and centrifugal forces (definition and formula only), application of centripetal force in banking of road

2.8 Rotational motion: definition with examples

2.9 Definition of torque, angular momentum, moment of inertia and its physical significance

UNIT III

Work, Power and Energy

3.1 Work- definition, symbol, formula and SI unit, types of work (zero work, positive work and negative work) with example

3.2 Friction– definition and its simple daily life applications

3.3 Power- definition, formula and units

3.4 Energy- definition and its SI unit, examples of transformation of energy.

3.5 Kinetic energy- definition, examples, formula and its derivation

3.6 Potential energy- definition, examples, formula and its derivation

3.7 Law of conservation of mechanical energy for freely falling bodies (with derivation)

3.8 Simple numerical problems based on formula of Power and Energy

UNIT IV

Properties of Matter

4.1 Elasticity and plasticity- definition, deforming force, restoring force, example of elastic and plastic body

4.2 Definition of stress and strain, Hooke's law, modulus of elasticity

4.3 Pressure- definition, atmospheric pressure, gauge pressure, absolute pressure, Pascal's law

4.4 Surface tension- definition, SI unit, applications of surface tension, effect of temperature on surface tension

4.5 Viscosity: definition, unit, examples, effect of temperature on viscosity

UNIT V

Heat and Temperature

5.1 Definition of heat and temperature (on the basis of kinetic theory)

5.2 Difference between heat and temperature

5.3 Principle and working of mercury thermometer

5.4 Modes of transfer of heat- conduction, convection and radiation with examples.

5.5 Properties of heat radiation

5.6 Different scales of temperature and their relationship

PRACTICAL EXCERCISES

1. Familiarization of measurement instruments and their parts (for example –Verniercaliper, screw gauge, sphere meter, travelling microscope etc.), and taking a reading. (compulsory to all students)
2. To find diameter of solid cylinder using a Vernier caliper
3. To find internal diameter and depth of a beaker using a Vernier caliper and hence find its volume.
4. To find the diameter of wire using screw gauge
5. To find thickness of paper using screw gauge.
6. To determine the thickness of glass strip using aspherometer
7. To determine radius of curvature of a given spherical surface by a spherometer.
8. To verify parallelgram law of force
9. To determine the atmospheric pressure at a place using Fortin's Barometer
10. To determine force constant of spring using Hooke's law
11. Measuring room temperature with the help of thermometer and its conversion in different scale.

RECOMMENDED BOOKS

1. "Text Book of Physics for Class XI (Part-I, Part-II)", N.C.E.R.T., Delhi.
2. Dr. HH Lal, "Applied Physics, Vol.I and Vol.II",TTTI Publications, Tata McGraw Hill, Delhi.
3. AS Vasudeva, "Applied Physics – I", Modern Publishers, Jalandhar.
4. R A Banwait, "Applied Physics – I", Eagle Prakashan, Jalandhar.
5. E-books/e-tools/relevant software to be used as recommended by AICTE/ HSBTE/ NITTTR.
6. C. L. Arora, "Practical Physics", S Chand Publication.

SUGGESTED WEBSITES

1. http://swayam.gov.in
2. The Physics Classroom
3. https://www.khanacademy.org/science/physics

INSTRUCTIONAL STATREGY

This is hands-on practice based subject and topics taught in the class should be practiced in the Lab regularly for development of required skills in the students. This subject contains five units of equal weightage.

Teacher may use various teaching aids like models, charts, graphs and experimental kits etc. for imparting effective instructions in the subject. Students need to be exposed to use of different sets of units and conversion from one unit type to another. Software may be used to solve problems involving conversion of units. The teacher should explain about field applications before teaching the basics of mechanics, work, power and energy, rotational motion, properties of matter etc. to develop proper understanding of the physical phenomenon. Use of demonstration can make the subject interesting and develop scientific temper in the students. Teachers should give examples of engineering/technology applications of various concepts and principles in each topic so that students are able to appreciate learning of these concepts and principles. In all contents, SI units should be followed. Working in different sets of units can be taught through relevant software.

1.4 APPLIED CHEMISTRY

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3	2

RATIONALE

The regular use of a variety of chemistry based materials and processes in diverse technical and engineering fields have repeatedly proven the importance of Applied Chemistry and its role in current and future technological advancements. Ever increasing use of chemical materials in the emerging engineering applications demands engineers and technocrats to acquire an in-depth knowledge of Applied Chemistry to be able to choose the best suited materials to meet their needs while maintaining the environment sustainability. An understanding of the principles of Applied Chemistry will develop scientific attitude in the budding engineers to understand the physical and chemical properties of the available materials for engineering applications as well as an ability to design new and effective materials.

COURSE OUTCOMES

After studying this course, students will be able to:

CO1: Classify the elements into metals, non-metals and metalloids.

CO2: Explain the extraction of metals from ores, their mechanical properties and modification of properties by alloy formation.

CO3: Classify fuels and lubricants and apply them in different engineering applications.

CO4: Identify the polymeric materials, assess their properties and design suitable polymeric materials for current and future applications.

CO5: Apply effective methods for corrosion prevention

DETAILED CONTENTS

UNIT 1

Atomic Structure, Periodic Table and Chemical Bonding.

1.1 Bohr's model of atom (qualitative treatment only), dual character of matter: derivation of de-Broglie's equation, Heisenberg's Principle of Uncertainty, modern concept of atomic structure: definition of orbitals, shapes of s, p and d-orbitals, quantum numbers and their

significance. Electronic configuration: Aufbau and Pauli's exclusion principles and Hund's rule, electronic configuration of elements up to atomic number 30.

1.2 Modern Periodic law and Periodic table, classification of elements into s, p, d and f-blocks, metals, non-metals and metalloids (periodicity in properties excluded).

1.3 Chemical bonding: cause of bonding, ionic bond, covalent bond, and metallic bond (electron sea or gas model), Physical properties of ionic, covalent and metallic substances.

UNIT II

Metals and Alloys

2.1 Metals: mechanical properties of metals such as conductivity, elasticity, strength and stiffness, luster, hardness, toughness, ductility, malleability, brittleness, and impact resistance and their uses.

2.2 Definition of a mineral, ore, gangue, flux and slag. Metallurgy of iron from haematite using a blast furnace. Commercial varieties of iron.

2.3 Alloys: definition, necessity of making alloys, composition, properties and uses of duralumin and steel. Heat treatment of steel- normalizing, annealing, quenching, tempering.

UNIT III

Water, Solutions, Acids and Bases

3.1 Solutions: definition, expression of the concentration of a solution in percentage (w/w, w/v and v/v), normality, molarity and molality and ppm. Simple problems on solution preparation.

3.2 Arrhenius concept of acids and bases, strong and weak acids and bases, pH value of a solution and its significance, pH scale. Simple numerical problems on pH of acids and bases.

3.4 Hard and soft water, causes of hardness of water, types of hardness – temporary and permanent hardness, expression of hardness of water, ppm unit of hardness; disadvantages of hard water; removal of hardness: removal of temporary hardness by boiling and Clark's method; removal of permanent hardness of water by Ion-Exchange method; boiler problems caused by hard water: scale and sludge formation, priming and foaming, caustic embrittlement; water sterilization by chlorine, UV radiation and RO.

UNIT IV

Fuels and Lubricants

4.1 Fuels: definition and classification of higher and lower calorific values, units of calorific value, characteristics of an ideal fuel. Petroleum: composition and refining of petroleum;

gaseous fuels: composition, properties and uses of CNG, PNG, LNG, LPG; relative advantages of liquid and gaseous fuels over solid fuels. Scope of hydrogen as future fuel.

4.2 Lubricants- Functions and qualities of a good lubricant, classification of lubricants with examples; lubrication mechanism (brief idea only); physical properties (brief idea only) of a lubricant: oiliness, viscosity, viscosity index, flash and fire point, ignition temperature, pour point.

UNIT V

Polymers and Electrochemistry

5.1 Polymers and Plastics: definition of polymer, classification, addition and condensation polymerization; preparation properties and uses of polythene, PVC, Nylon-66, Bakelite; definition of plastic, thermoplastics and thermosetting polymers; natural rubber and neoprene, other synthetic rubbers (names only).

5.2 Corrosion: definition, dry and wet corrosion, factors affecting rate of corrosion, methods of prevention of corrosion—hot dipping, metal cladding, cementation, quenching, cathodic protection methods

5.3 Introduction and application of nanotechnology: nano-materials and their classification, applications of nanotechnology in various engineering applications (brief).

PRACTICAL EXERCISES

1. To prepare standard solution of oxalic acid.
2. To dilute the given $KMnO_4$ solution
3. To find out the strength in grams per litre of an unknown solution of sodium hydroxide using a standard (N/10) oxalic acid solution.
4. To find out the total alkalinity in parts per million (ppm) of a water sample with the help of a standard sulphuric acid solution.
5. To determine the total hardness of given water sample by EDTA method
6. To determine the amount of total dissolved solids(TDS) in ppm in a given sample of water gravimetrically
7. To determine the pH of different solutions using a digital pH meter.
8. To determine the calorific value of a solid/liquid fuel using a Bomb calorimeter.
9. To determine the viscosity of a lubricating oil using a Redwood viscometer
10. To prepare a sample of Phenol-formaldehyde resin (Bakelite)/Nylon-66 in the lab.

RECOMMENDED BOOKS

1. Textbook of Chemistry for class XI and XII (part I & II) NCERT, Delhi, 2017-18.
2. C.N. R. Rao, Understanding Chemistry, Universities Press (India) Pvt. Ltd, 2011.
3. Jain & Jain, Engineering Chemistry, Dhanpat Rai and Sons; New Delhi, 2015.
4. Dr. G. H. Hugar& Prof A. N. Pathak, Applied Chemistry Laboratory Practices, Vol. I and Vol. II, NITTTR, Chandigarh, Publications, 2013-14.
5. Agnihotri, Rajesh, Chemistry for Engineers, Wiley India Pvt. Ltd, 2014.
6. Applied Chemistry by Usha Raju.

SUGGESTED WEBSITES

1.www.chemguide.co.uk/atommenu.html (Atomic structure and chemical bonding) 2.www.visionlearning.com (Atomic structure and chemical bonding)
3. www.cheml.com (Atomic structure and chemical bonding)
4. https://www.wastewaterelearning.com/elearning/ (Water treatment)
5. www.capital-refractories.com (Metals, Alloys, Cement, and Refractory Materials) 6.www.em-ea.org/guide%20books/book-2/2.1%20fuels%20and%20combustion.pdf (Fuel and combustion)

INSTRUCTIONAL STRATEGY

Teachers may take help of various models and charts while imparting instructions to make the concept clear. More emphasis should be laid on discussing and explaining practical applications of various chemical process and reactions. In addition, students should be encouraged or motivated to study those processes in more details, which may find practical application in their future professional career. This subject contains five units of equal weightage.

1.5 ARCHITECTURAL DRAWING-I

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RATIONALE

Architectural Drawing forms a core subject for preparing scale drawings, three dimensional views, furniture drawings and layouts. Teachers are expected to lay considerable stress on practical work so that students attain sufficient skills in lettering, printing and desired competencies for preparing good quality architectural drawings. Teachers are also expected to stress upon appropriate line work, dimensioning and lettering.

COURSE OUTCOMES

After undergoing the subject, students will be able to:

CO1: State the basic concepts of geometric construction of various polygons its sub division, projection of plane figure

CO2: Explain development of solids its cross sections and their true shapes

CO3: Differentiate between isometrics, exonometrics & perspective drawings

CO4: Draw perspectives drawings of simple objects

DETAILED CONTENTS-CUM-PRACTICAL EXERCISES

Introduction and relevance (need and importance)of the architectural drawing

UNIT I

Introduction to the Studio Environment

i) Basics of drafting instruments, starting off

ii) Basics of stationery (Pencils, sharpening, types of sheets, erasers, cutter etc.)

iii) Demonstration by the teacher on holding pencils, fixing parallel bar and handling other tools and equipment used in Architectural Drawing(Demonstration sheet to be put up for better understanding)

UNIT II

Line Work

1. Basic line work, with different pencil thickness & intensities H, HB, 2B, 4B, 6B

i) Horizontallines
ii) Vertical lines
iii) Grid
iv) Diagonal lines
v) Composition, pattern making in line work
(Using different grades of pencils to understand the tonal variation)

2. Lettering using different pencils & pens ,stencils(4 sheets) Different styles, heights &intensities
3. Introduction to Scale (1sheet)

Use of the modular scale - both metric system and FPS

UNIT III

4. Geometric Shapes (Plan, elevation etc.) (2sheets)

i) Simple geometric (cubes, cylinder, cones etc.)
ii) Complex(fusion of the basic shapes (Incorporating he use of scale both feet &metric)

5. Dimensioning (2 Sheets)

i) Elements of dimensioning
ii) Methods of dimensioning
iii) Arrangements of dimensions
iv) Symbols for shape indication

UNIT IV

6. Orthographic Projections (Introduction to Planes) (2sheets)

i) Protection of points
ii) Projections of lines
iii) Projection of solids

7. Section of Solids (4sheets)

Simple geometrical shapes e.g. cube: Elementary building sections highlighting line intensities for sectional and elevation components. (Example: parapet, chajj as in section and elevation behind)

8. Development of surface (1sheet)

Development with an aim to calculate areas if required

UNIT V

9. Isometric Views (3sheets)

Conversion of 2D geometrical shapes into 3D isometric views (30to realize the potential of each

from simple to complex solid to basic building forms

10. Axonometric Views (5sheets)

Conversion of 2D geometrical shapes into 3D axonometric views at different angles (45^{o} – 45^{o}) to realize the potential of each from simple to complex solid to basic building forms. Isometric/axonometric use of any building form, from a given base plan – to be developed as per the student's imagination of the exterior/interior components (with roads, landscape elements) ^{o}–30^{o}, 30^{o}–60^{o})

INSTRUCTIONAL STRATEGY

This is one of the most important practical oriented subjects for diploma in architectural assistantship. While imparting instruction, special visits may be arranged to demonstrate and explain important architectural features of different types of residential, commercial and public buildings. Teacher may present one of the already completed design works of practicing architects to the students and explain the important features and elements. Audio- visual material available in this field may be procured and presented to the students from time to time. Students should be encouraged to visit relevant web-sites and teachers should develop the design problems/assignments which can be taken up by the students using relevant and appropriate software. Students should be given group and independent design/drawing assignments and they should also maintain sketch book/portfolio of all the assignments given to them throughout the session. Teachers may conduct viva-voce on completion of each assignment. Students may present seminars towards the end of the session. Teachers should also motivate students to maintain sketch book/portfolio of all the assignments given to the students. This subject contains five units of equal weightage.

1.6 SKETCHING & MODEL MAKING

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RATIONALE

Free hand sketching plays very important role to inculcate interest among the students in the field of drawing. It also helps in developing the skills required for preparing various types of drawings and design. Considerable emphasis on outdoor sketching should be given to attain the required skills in the subject. Students of Architectural Assistantship at diploma level are expected to assist in the preparation of architectural models of various kinds in their professional career. This skill can also form a basis of self-employment. Architecture models as three-dimensional representations are made in different mediums. The students should be acquainted with all of these mediums/materials.

COURSE OUTCOMES

After undergoing the subject, students will be able to:

CO1: Draw free hand sketching of various three dimensional geometrical objects and various simple buildings, trees, human figures, furnitures, vehicles in different medium and techniques.

CO2: Draw the various lettering ratios of height & width.

CO3: Draw free hand lettering and with the help of stencils.

CO4: Explain basic elements in 2-D and 3-D in design and their utilities in mural and other 3-D compositions

PRACTICAL EXERCISES

Free Hand Sketching Exercises in pencil only

1. Free-hand line exercises of different types of lines (horizontal, vertical, diagonal grid (1 Sheets)
2. Free hand sketching of two-dimensional geometrical figures. (Square, circle, Triangles and Ellipses etc.) (2 Sheets)
3. Free hand sketching of three – dimensional geometrical objects.

(Cube, Cones, Prisms, Pyramids, Spheres Cylinders etc.). (2 Sheets)

4. Introduction & study of anthropometrics (2 sheets)
5. Free hand sketching of human figures, trees furniture and vehicles etc.
   One in-door & one out-doors exercise. (2 Sheets)
6. Free hand sketching of small buildings with shade and shadow sheets. (2 Sheets)
7. Free-hand sketching of buildings with trees, human figures, sky, clouds and birds and other land-scape elements, using various mediums like pencil, ink and colours (water colours and pencil colours etc.)
8. Free-hand sketches of various scenes such as railway-station, parking places, bus stand, market scene, village scene etc.
9. Introduction and Demonstration of model making materials and techniques.
10. Block models of basic geometrical shapes like prisms, pyramids, cubes, cylinders etc., using the following materials:
    10.1 Handmade and ivory sheet (1 Exercise)
    10.2 Thermo coal (1 Exercise)
    10.3 Mount Board/Sun Board/Balsa Wood strips (1 Exercise)
11. Composition of various geometrical shapes in different materials. (2Exercises)
12. Sculpture Making (2 Exercises in all)

12.1 Thermocol (Styropor)

12.2 Mount Board/ sun board/Balsa wood strips

12.3 Clay modelling

12.4 Miscellaneous materials such as copper broken ceramics, leather etc.

13. Brick Masonary Laying of bricks in different bonds (1 Exercise)
14. Painting and Polishing (1 Exercise)

Introduction regarding painting tools and equipments used for preparation of different colours surfaces

Total Number of Exercises: 10

Note: Students are also required to maintain sketchbooks for outdoor sketch

PRACTICAL STUDIO EXERCISES

1. Rendering Exercises
2. Colouring & Colour Making Exercises
3. Free Hand Sketching techniques
4. Abstract composition exercises (2D & 3D)
5. Mural making
6. Lettering Exercises (free hand single line, with stencils and various typographic techniques)

7. Block modeling with ivory sheets, Mount Board, Thermo coal

RECOMMENDED BOOKS

1. Time Saver Standard for landscape architecture: Design and construction by Charles W.Harris Published by Mc Graw-Hills Publishers, New Delhi
2. Time Saver Standards for Building Types by Joseph De Chiara and John Callendera Published by Mc Graw Hill, New Delhi
3. Rendering with Pencil and Ink by Gill Robert W., Published by Thomos and Hudson, New Delhi
4. Architects Data by Neufert, Published by Oxford BSP Professional Books, New Delhi

INSTRUCTIONAL STRATEGY

This is one of the most important practical oriented subjects for diploma in architectural assistantship. While imparting instruction, special visits may be arranged to demonstrate and explain important architectural features of different types of residential, commercial and public buildings. Teacher may present one of the already completed design works of practicing architects to the students and explain the important features and elements. Audio- visual material available in this field may be procured and presented to the students from time to time. Students should be encouraged to visit relevant web-sites and teachers should develop the design problems/assignments which can be taken up by the students using relevant and appropriate software. Students should be given group and independent design/drawing assignments and they should also maintain sketch book/portfolio of all the assignments given to them throughout the session. Teachers may conduct viva-voce on completion of each assignment. Students may present seminars towards the end of the session. Teachers should also motivate students to maintain sketch book/portfolio of all the assignments given to the students. This subject contains five units of equal weightage.

SECOND SEMESTER

2.1 SURVEYING

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RATIONALE

The important functions of a diploma holder in architectural assistantship includes the jobs of detailed surveying, plotting of survey data, preparation of survey maps and setting out works. While framing the curriculum for the subject of surveying, stress has been given to the development of the skill in each type of survey like compass surveying, leveling, that the diploma holder will normally be called upon to perform.

COURSE OUTCOMES

After undergoing the subject, the student will be able to:

CO1: Measure a long line with tape.
CO2: Prepare maps for closed traverse and open traverse with survey instruments
CO3: Perform leveling with digital level
CO4: Find difference of level between two points with dumpy level, auto level and digital level

DETAILED CONTENTS

UNIT 1

1. **Introduction**

1.1 Basic principles of surveying

1.2 Concept and purpose of surveying, measurements-linear and angular, units of measurements

1.3 Instruments used for taking these measurements, classification based on surveying instruments

UNIT II

2. Compass surveying

2.1 Purpose of compass surveying. Use of prismatic compass: Setting and taking of observations

2.2 Concept of following with simple numerical problems:

a) Meridian - Magnetic and true

b) Bearing - Magnetic, True and Arbitrary
c) Whole circle bearing and reduced bearing
d) Fore and back bearing
e) Magnetic dip and declination

2.3 Local attraction - causes, detection, errors and corrections, problems on local attraction, magnetic declination and calculation of included angles in a compass traverse

UNIT III

3. Levelling

3.1 Purpose of levelling, concept of a level surface, horizontal surface, vertical surface, datum, reduced level and bench marks

3.2 Identification of various parts of Dumpy level and use of Dumpy level, Engineer' level, Auto level: advantages and disadvantages, use of auto level.

3.3 Concepts of line of collimation, axis of the bubble tube, axis of the telescope and vertical axis

3.4 Levelling staff: single piece, folding, invar precision staff, telescopic

3.5 Temporary adjustment and permanent adjustment of dumpy level by two peg method.

3.6 Concept of back sight, foresight, intermediate sight, change point, to determine reduce levels

3.7 Level book and reduction of levels by

4.7.1 Height of collimation method and

4.7.2 Rise and fall method

UNIT IV

4. Plane Table Surveying

4.1 Purpose of plane table surveying, equipment used in plane table survey:

4.2 Setting of a plane table:

(a) Centering

(b) Levelling

(c) Orientation

4.3 Methods of plane table surveying

(a) Radiation,

(b) Intersection

(c) Traversing

(d) Resection

UNIT V

5. Introduction to Digital instruments (Auto level, Theodolite, Total Station, EDM instruments etc.), GPS and GI Systems

PRACTICAL EXERCISES

I. Compass Surveying:

i) a) Study of prismatic compass
   b) Setting the compass and taking observations
   c) Measuring angles between the lines meeting at a point

II. Levelling:

i) a) Study of dumpy level and levelling staff
   b) Temporary adjustments of various levels
   c) Taking staff readings on different stations from the single setting and finding differences of level between them

ii) a) To find out difference of level between two distant points by shifting the instrument

III. Plane Table Surveying:

   i) a) Study of the plane table survey equipment
      b) Setting the plane table
      c) Marking the North direction
      d) Plotting a few points by radiation method
   ii) a) Orientation by
      - Trough compass
      - Back sighting
      b) Plotting few points by intersection, radiation and resection method
   iii) Traversing an area with a plane table (at least five lines)

RECOMMENDED BOOKS

1. Hussain, SK and Nagraj, MS; "Text Book of Surveying"; New Delhi, S Chand and Co Ltd.
2. Deshpande, RS; "A Text Book Surveying and Levelling"; Poona, United Book Corporation
3. Kochar, CL; "A Text Book of Surveying"; Ludhiana, Katson Publishing House
4. Kanetkar,TP and Kulkarni, SV., "Surveying and Leveling", Poona, AVG Parkashan
5. Mahajan, Sanjay “Surveying -I”, Tech. Publication, Delhi
6. Punmia, BC; “Surveying and Leveling", Delhi Standard Publishers Distributors.
7. Shahai, PB; "A Text Book of Surveying", Oxford and IBH Publishing Co.

INSTRUCTIONAL STRATEGY

This is highly practice-oriented course. While imparting theoretical instructions, teachers are expected to demonstrate the use of various instruments in surveying; stress should be laid on correct use of various instruments so as to avoid/minimize errors during surveying. It is further recommended that more emphasis should be laid in conducting practical work by individual students. This subject contains five units of equal weightage.

2.2ENVIRONMENTAL STUDIES AND DISASTER MANAGEMENT

LP
2-

RATIONALE

A diploma holder must have knowledge of different types of pollution caused due to industrial and constructionactivitiesthat he/she may help in balancing the ecosystem and controlling pollution by various control measures. The course is intended to provide a general concept in the dimensions of environmental pollution and disasters caused by nature beyond the human control as well as the disasters and environmental hazards induced by human activities with emphasis on disaster preparedness, response and recovery.

COURSE OUTCOMES

After undergoing the subject, the student will be able to:

CO1: Comprehend the importance of sustainable ecosystem
CO2: Demonstrate interdisciplinary nature of environmental issues
CO3: Implement corrective measures for the abatement of pollution.
CO4: Identify the role of non-conventional energy resources in environmental protection.
CO5: Manage various types of disasters

DETAILED CONTENTS

UNIT I

1. Introduction

1.1 Basics of ecology, eco system- concept, and sustainable development, Sources, advantages, disadvantages of renewable and nonrenewable energy.
1.2 Rain water harvesting
1.3 Deforestation – its effects & control measures

UNIT II

2. Air and Noise Pollution

2.1 Air Pollution: Source of air pollution. Effect of air pollution on human health, economy, Air pollution control methods.

2.2 Noise Pollution: Source of noise pollution, Unit of noise, Effect of noise pollution, Acceptable noise level, Different method of minimizing noise pollution.

UNIT III

3. Water and Soil Pollution

3.1 Water Pollution: Impurities in water, Cause of water pollution, Source of water pollution. Effect of water pollution on human health, Concept of DO, BOD, COD. Prevention of water pollution- Water treatment processes, Sewage treatment. Water quality standard.

3.2 Soil Pollution :Sources of soil pollution, Effects and Control of soil pollution, Types of Solid waste- House hold, Industrial, Agricultural, Biomedical, Disposal of solid waste, Solid waste management E-waste, E – waste management

UNIT IV

4. Impact of Energy Usage on Environment

Global Warming, Green House Effect, Depletion of Ozone Layer, Acid Rain. Eco-friendly Material, Recycling of Material, Concept of Green Buildings, Concept of Carbon Credit & Carbon footprint.

UNIT V

5. Disaster Management

A. Different Types of Disaster:

Natural Disaster: such as Flood, Cyclone, Earthquakes and Landslides etc.

Man-made Disaster: such as Fire, Industrial Pollution, Nuclear Disaster, Biological Disasters, Accidents (Air, Sea Rail & Road), Structural failures(Building and Bridge), War & Terrorism etc.

B.Disaster Preparedness:

Disaster Preparedness Plan

Prediction, Early Warnings and Safety Measures of Disaster

Psychological response and Management (Trauma, Stress, Rumour and Panic)

RECOMMENDED BOOKS

1. Environmental Studies by S.C. Sharma & M.P. Poonia, Khanna Publishing House, New Delhi
2. Environmental and Pollution Awareness by Sharma BR; SatyaPrakashan, New Delhi.
3. Environmental Pollution by Dr. RK Khitoliya; S Chand Publishing, New Delhi

4. Environmental Studies by ErachBharucha; University Press (India) Private Ltd., Hyderabad.
5. Environmental Engineering and Management by Suresh K Dhamija; S K KatariaandSons, New Delhi.
6. E-books/e-tools/relevant software to be used as recommended by AICTE/BTE/NITTTR, Chandigarh.
7. Disaster Management by Dr. Mrinalini Pandey, Wiley India Pvt. Ltd.
8. Disaster Science and Management by Tushar Bhattacharya, McGraw Hill Education (India) Pvt. Ltd.

INSTRUCTIONAL STRATEGY

In addition to theoretical instructions, different activities pertaining to Environmental Studies and Disaster Management like expert lectures, seminars, visits etc. may also be organized. This subject contains five units of equal weightage.

2.3 BUILDING MATERIALS AND CONTRUCTION TECHNOLOGY –I

L	P/S
3	4

RATIONALE

Students are supposed to prepare working drawings of buildings and detailed drawings of various components of buildings. Knowledge of building materials and construction is very essential from the point of construction materials as well as providing detailed specifications in the detailed drawings. Therefore, the course in building construction and materials includes imparting basic knowledge in the properties and use of important materials like stones, bricks etc. Faculty is expected to show the samples of different materials, discuss their properties with particular reference to their use and appearance in particular situations depending upon climate and environmental conditions of the site where the materials are to be used. Students should be encouraged to collect samples of various materials and efforts should be made to maintain a good building materials museum. Also faculty is expected to show various components of buildings under construction, make use of models or other audio-visual media to clarify the concepts.

COURSE OUTCOMES

After undergoing this course, the learners will be able to:

CO1: Explain about the common building stones and their properties
CO2: Describe about the various types of bricks, their bonding and their properties
CO3 Discuss different types of foundation for basements and normal super structure
CO4: State the basics of lintels, arches and brick jallies and useof it in buildings.
CO5: Determine the requirements of damp proof course

DETAILED CONTENTS

UNIT I

1. Building Stones

1.1 Classification of rocks
1.2 Characteristics and utility of good building stones
1.3 Testing -- Water absorption, Compressive strength and Durability test

1.4 Natural bed of stones, its effective and correct placement in building
1.5 Common building stones
1.5.1 Granite, Basalt and Trap, Sandstone, Lime stone, Slate, Marble
1.5.2 Their composition, Properties, uses and their origin –
1.5.3 Their transportation and storage Techniques
1.5.4 Selection of stones for different building works
1.6 Characteristics and classification of stone masonry
1.7 Advantages and Disadvantages of different types of stones and their suitability to different elements of building

UNIT II

2. Bricks

2.1 Sizes, classification and Composition of bricks
2.2 Properties and uses of first class and second class bricks, clay and burnt bricks
2.3 Characteristics of a good brick including size and weight of a standard brick
2.4. Test for burnt clay bricks -- Compressive strength, Water absorption & efflorescence
2.5 Fire bricks, its properties, uses and availability.
2.6 Stretcher and header courses in various wall thickness,
2.7 T-junctions and Cross-junction in ½, 1 and 1 ½ thick brick wall
2.8 Different types of bonds - English, Flemish and Rat Trap Bond in different wall width
2.9 Advantages and Disadvantages of different Bonds
2.10 Advantages and Disadvantages of different types of bricks and their suitability to different elements of building

UNIT III

3. Foundation

3.1 Different types of foundations (normal and eccentric)
3.2 Their advantage of one over other.
3.3 Brief knowledge of different types of foundations in basements
3.4 Foundations for columns and verandah steps

UNIT IV

4. Openings in Walls

4.1 Classification of arches and lintels as per finish, shape and material.
4.2 Brick jallies and reinforcement.
4.3 Brick jallies in ½ and 1 thick brick wall in English and Flemish Bond

UNIT V

5. Damp Proof Course

5.1 Explanation of DPC and reasons for its use.

5.2 Sources and effects of dampness.

5.3 Classification as per hardness of material.

5.4 BIS stipulations of damp proofing

5.5 Treatment of Building component for effective damp proofing.

PRACTICAL EXERCISES

1. Drawing of various types of stone masonry
2. Sketches of different type of stone facing
3. Drawing of different shapes and sizes of bricks
4. Drawings of different bonds in different wall thickness, T-junctions, cross junction
5. Reinforced brick work and jallies
6. Drawings of lintels and arches of various materials and various wall thickness
7. Demonstration Showing of Damp proof course in a horizontal and vertical brick wall.
8. Drawing of spread foundation, toe wall and verandah steps foundation
9. Application of DPC on spread foundation and basements.
10. Foundation detail for brick pier and column foundation

RECOMMENDEDBOOKS

1. W.B. Mc Kay, Building Construction
2. R. Barry, Building Construction
3. Francis ChingD.K., Building construction illustrated
4. V.B.Sikka, Civil Engineering Drawing
5. Sushil Kumar, Building Construction
6. Sharma, SK; and Mathur, GC; "Engineering Materials;" Delhi-Jalandhar, S. Chand and Co.
7. Surendra Singh; "Engineering Materials;" New Delhi, Vikas Publishing House Pvt. Ltd.
8. Choudhary, N; "Engineering Materials;" Calcutta, Technical Publishers of India.

SUGGESTED WEBSITES

1. www.youtube.com

2. https://www.youtube.com/watch?v=IpzkAwWMkkY(For Brick)
3. Slideshare.net
4. https://www.youtube.com/watch?v=EIDXE28_8eQ&list=PL8BA090E69BF01BC2(building material and construction)
5. https://www.youtube.com/watch?v=R2dNp5tLni0 (Building material and construction)
6. https://www.youtube.com/watch?v=raeXjtLPS7k(various(levels in building)
7. https://www.youtube.com/watch?v=5zOOm2fhhwA(For stones)
8. https://www.youtube.com/watch?v=oWYSLxVJAR8 (DPC)
9. https://www.youtube.com/watch?v=vN8smpxhL9c (FOOTING)
10. https://www.youtube.com/watch?v=oXtUtANZqWQ (Foundation)
11. https://www.youtube.com/watch?v=Z_jieunkTtw&list=RDCMUCNCaoN3_OYmMC-rXeoCt4YA&index=3(bonds)
12. https://www.youtube.com/watch?v=CD2QOsa1RMc&list=RDCMUCNCaoN3_OYmMC-rXeoCt4YA&index=1(arches and lintels)

INSTRUCTIONALSTRATEGY

This is one of the fundamental subject covering basic building materials and construction and finishing materials. Teachers should demonstrate samples of various materials while imparting classroom instruction. Teachers may also arrange some field visits to manufacturing/ production units and retailer shops like cement, kilns, timber saw mills and seasoning plants, hardware shops, glass houses etc. Students should be encouraged to collect samples of various materials and catalogues of manufacturer. The students may maintain a scrapbook for this purpose. A museum of building construction, materials may be developed where samples of latest materials their specifications, characteristics, rates, manufacturer (supplier and relevant codes may be kept) to enhance the level of understanding of the students.

2.4 FUNDAMENTALS OF IT

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RATIONALE

Information technology has great influence on all aspects of life. Almost all work places and living environment are being computerized. In order to prepare diploma holders to work in these environments, it is essential that they are exposed to various aspects of information technology such as understanding the concepts of information technology and its scope, operating a computer: use of various office management tools, using internet and mobile applications etc. This course is intended to make new students comfortable with computing environment - Learning basic computer skills, learning basic application software tools, Understanding Computer Hardware, Cyber security awareness.

COURSE OUTCOMES

At the end of the course, student will be able to

CO1: Explain the basic components of Computers, Internet and issues of abuses/attacks on information and computers

CO2: Handle the computer/laptop/mobiles/Internet Utilities and Install/Configure OS

CO3: Assemble a PC and connect it to external devices

CO4: Manage and Use Office practiced Automation Tools

CO5: Develop worksheets and Prepare presentations

DETAILED CONTENTS

UNIT I

Basics of Computer

Brief history of development of computers, Definition of Computer, Block diagram of a Computer, Hardware, Software, Booting: Cold and Hot Booting, Interaction between the CPU and Memory with Input/output devices, Function of CPU and major functional parts of CPU.

Memory, Bit, Nibble, Byte, KB, MB, GB, TB, PB, Functions of memory, Use of storage devices in a Computer, List types of memory used in a Computer, Importance of cache memory, CPU speed and CPU word length

UNIT II

Basic Internet Skills

Understanding browser, Introduction to WWW, efficient use of search engines, awareness about Digital India portals (state and national portals) and college portals. Advantages of Email, Various email service providers, Creation of email id, sending and receiving emails, attaching documents with email and drive.

Effective use of Gmail, G-Drive, Google Calendar, Google Sites, Google Sheets, Online mode of communication using Google Meet & WebEx.

UNIT III

Basic Logic building

Introduction to Programming, Steps involved in problem solving, Definition of Algorithm, Definition of Flowchart, Steps involved in algorithm development, differentiate algorithm and flowchart, symbols used in flowcharts, algorithms for simple problems, flowcharts for simple problems, Practice logic building using flowchart/algorithms

UNIT IV

Office Tools

Office Tools like Libre Office/Open Office/MSOffice.

Open Office Writer – Typesetting Text and Basic Formatting, Inserting Images, Hyperlinks, Bookmarks, Tables and Table Properties in Writer

Introducing Libre Office/Open Office *Calc*, Working with Cells, Sheets, data, tables, using formulae and functions, using charts and graphics.

Open Office Impress – Creating and Viewing Presentations, Inserting Pictures and Tables, Slide Master and Slide Design, Custom Animation.

UNIT V

Use of Social Media

Introduction to Digital Marketing – Why Digital Marketing, Characteristics of Digital Marketing, Tools for Digital Marketing, , Effective use of Social Media like LinkedIn, Google+, Facebook, Twitter, etc.: Features of Social media, Advantages and Disadvantages of Social Media.

PRACTICAL EXERCISES

1. Browser features, browsing, using various search engines, writing search queries

2. Visit various e-governance/Digital India portals, understand their features, services offered
3. Read Wikipedia pages on computer hardware components, look at those components in lab, identify them, recognize various ports/interfaces and related cables, etc.
4. Using Administrative Tools/Control Panel Settings of Operating Systems
5. Connect various peripherals (printer, scanner, etc.) to computer, explore various features of peripheral and their device driver software.
6. Explore features of Open Office tools and MS-Office, create documents, create presentation, create spread sheet, using these features, do it multiple times
7. Working with Conversion Software like pdf to Word, Word to PPT, etc.
8. Working with Mobile Applications – Searching for Authentic Mobile app, Installation and Settings, Govt. of India Mobile Applications
9. Creating email id, sending and receiving mails with attachments.
10. Using Google drive, Google calendar
11. Create Flow chart and Algorithm for the following

a. Addition of n numbers and display result
b. To convert temperature from Celsius to Fahrenheit
c. To find Area and Perimeter of Square
d. Swap Two Numbers
e. find the smallest of two numbers
f. Find whether given number is Even or Odd
g. To print first n even Numbers
h. find sum of series 1+2+3+…..+N
i. print multiplication Table of a number
j. generate first n Fibonacci terms 0,1,1,2,3,5…n (n>2)
k. sum and average of given series of numbers
l. Factorial of number n (n!=1x2x3x…n)
m. Armstrong Number
n. Find whether given number is Prime or not

RECOMMENDED BOOKS

1. R.S. Salaria, “Computer Fundamentals” Khanna Publishing House
2. Ramesh Bangia, “PC Software Made Easy – The PC Course Kit” Khanna Publishing House
3. Online Resources, Linux man pages, Wikipedia
4. Mastering Linux Shell Scripting: A practical guide to Linux command-line, Bash scripting, and Shell programming, by MokhtarEbrahim, Andrew Mallett

5. Vikas Gupta, “Comdex Hardware and Networking Course Kit” Dream Tech press, New Delhi, 2008
6. SumitabhaDas,“UNIX concepts and applications” Tata McGraw Hill, New Delhi, 4th Edition, 2008

SUGGESTED WEBSITES

1. https://nptel.ac.in/courses/106/106/106106222/ - NPTEL Course on Modern Application Development
2. https://onlinecourses.swayam2.ac.in/aic19_de01/preview -
3. https://spoken-tutorial.org/ - Tutorials on Introduction to Computers, HTML, Libre Office Tools, etc.
4. NOTEPAD++
5. https://tms-outsource.com/blog/posts/web-development-ide/

INSTRUCTIONAL STRATEGY

This is a skill based subject and topics taught in the class should be practiced in the Lab regularly for development of required skills in the students. This subject contains five units of equal weightage.

2.5 ARCHITECTURAL DRAWING-II

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RATIONALE

Architectural Drawing forms a core subject for preparing scale drawings, three dimensional views, furniture drawings and layouts. Teachers are expected to lay considerable stress on practical work so that students attain sufficient skills for preparing good quality architectural drawing. Teachers are also expected to stress upon appropriate line work, properties, dimensioning and lettering

COURSE OUTCOMES

After undergoing the subject, students will be able to:

CO1: State the use of colour, shades and shadows and indication of various elements used in architecture.

CO2: Draw free hand sketching of various three dimensional geometrical objects and various simple buildings in different medium and techniques.

CO3: Explain basic elements of design and understand their utilities and use them in mosaics, mural and other 3-D compositions.

PRACTICAL EXERCISES

UNIT 1

1 Reviewing orthographic projections (plans, line projections, solids) (1sheet)

UNIT II

2 Section of Solids (4sheets)

Simple geometrical shapes e.g. cube: Elementary building sections highlighting line intensities for sectional and elevation components. (Example: parapet, chajjas in section and elevation behind)

UNIT III

3 Development of surface (1sheet)

Development with an aim to calculate areas if required

UNIT IV

4 Isometric Views (3sheets)

Conversion of 2D geometrical shapes into 3D isometric views(30 to realize the potential of each from simple to complex solid to basic building forms)

UNIT V

5 Axonometric Views (5sheets)

Conversion of 2D geometrical shapes into 3D axonometric views at different angles (45^{o} – 45^{o}) to realize the potential of each from simple to complex solid to basic building forms. Isometric/axonometric use of any building form, from a given base plan – to be developed as per the student's imagination of the exterior/interior components (with roads, landscape elements)

INSTRUCTIONALSTRATEGY

This is one of the most important practical oriented subjects for diploma in architectural assistantship. Teacher may present one of the already completed design works of practicing architects to the students and explain the important features and elements. Audio- visual material available in this field may be procured and presented to the students from time to time. Students should be encouraged to visit relevant web-sites and teachers should develop the design problems/assignments which can be taken up by the students using relevant and appropriate software. Students should be given group and independent design/drawing assignments and they should also maintain sketch book/portfolio of all the assignments given to them throughout the session. Teachers may conduct viva-voce on completion of each assignment. Students may present seminars towards the end of the session. Teachers should also motivate students to maintain sketch book/portfolio of all the assignments given to the students. This subject contains five units of equal weightage.

2.6 THEORY OF DESIGN

L	P
4	-

RATIONALE

Understanding the fundamental concepts of design, including primary elements, design elements, and principles of design, is crucial for students pursuing a diploma in architecture. These concepts serve as the building blocks for creating aesthetically pleasing and functional architectural designs. Additionally, exploring the relationship between form and function, as well as the interplay between aesthetics and utility, equips students with the knowledge needed to design spaces that not only look good but also serve their intended purpose effectively. Moreover, studying color theory and its application in architecture enables students to create environments that evoke specific emotions and responses, enhancing the overall user experience.

COURSE OUTCOMES

At the end of the course, student will be able to
CO1: Identify and apply principles of design in architectural projects.
CO2: Analyze the relationship between form and function in architectural structures.
CO3: Evaluate the interplay between aesthetics and utility in architectural design.
CO4: Demonstrate proficiency in color theory and its application in architectural projects.
CO5: Explain psychological effects of colors and their implications for architectural design.

DETAILED CONTENTS

UNIT-I

1. Primary Elements of Design
   Definition, examples and applications of the following:
   a) Point
   b) Line
   c) Figure
   d) Plane
   e) Volume

UNIT-II

2. Design Elements

Definition, examples and applications of the following:

a) Line
b) Form
c) Space
d) Colour
e) Mass

UNIT-III

3. Principles of Design

Definition, examples and applications of the following:

a) Harmony
b) Balance
c) Rhythm
d) Texture
e) Contrast
f) Monotony
g) Unity
h) Scale
i) Proportion

UNIT-IV

4. Relationship of form and functions
5. Relationship of Aesthetics and utility

UNIT-V

6. Colours
   a) Colour chart showing primary, secondary and tertiary colours
   b) Warm and cool colours
   c) Receding and Advancing colours
   d) Psychological effects of colours
   e) Effects of colours on building (interior and exterior)

RECOMMENDED BOOKS:

- Time Saver Standards for Building Types by Joseph De Chiara and John Callendera
- Architects Data by Neufert
- Space, Time and Order by DK Ching
- Elements of Design by S. G. Patil
- Design Fundamentals: Theory and Practice by Ritu Aggarwal
- Principles of Design in Architecture by Achyut Kanvinde
- Form and Function: A Guide to Architectural Design by Charles Correa
- Colors in Architecture: Theory and Practice by M. N. Sharma

SUGGESTED WEBSITES:

1. https://elementor.com/blog/color-theory-web-design/
2. https://www.nobledesktop.com/learn/design-theory/what-is-design-theory
3. https://ibrandstudio.com/articles/building-website-design-theory-principles
4. https://www.interaction-design.org/literature/topics/gestalt-principles
5. https://www.youtube.com/c/DesignTheoryDigest
6. https://youtu.be/jvcJgw-Z93s?si=9iu28gEs0OockHqQ

INSTRUCTIONAL STRATEGY

Through a multifaceted approach, students will engage in lectures, hands-on activities, and workshops to develop a comprehensive understanding of architectural design principles. Guest lectures and industry visits will provide real-world insights, while group discussions and critiques will foster collaborative learning. Research assignments and field trips will encourage independent exploration and exposure to diverse design influences. Additionally, integration of design software will enhance technical skills. By immersing students in a dynamic learning environment, they will emerge equipped with the knowledge and skills necessary for success in architectural practice. This subject contains five units of equal weightage.

SECOND YEAR

NSQF LEVEL - 4

12. STUDY AND EVALUATION SCHEME

THIRD SEMESTER

Sr. No.	SUBJECTS	STUDY SCHEME Periods/Week		Credits (C) L+P = C	MARKS IN EVALUATION SCHEME						Total Marks of Internal & External
					INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT			
		L	P/S		Th	Pr	Tot	Th	Pr	Tot	
3.1	Industrial/In-House Training - I	-	2	0+1=1	-	40	40	-	60	60	100
3.2	Basic Design and Visual Arts	-	8	0+4=4	-	40	40	-	60	60	100
3.3	Building Materials & Construction -II	2	4	2+2=4	40	40	80	60	60	120	200
3.4	History of Architecture -I	4	-	4+0=4	40	-	40	60	-	60	100
3.5	Climatology	3	-	3+0=3	40	-	40	60	-	60	100
3.6	Architectural Drawing - III	-	4	0+2=2	-	40	40	-	60	60	100
3.7	Building Services	3	-	3+0=3	40	-	40	60	-	60	100
3.8	Multidisciplinary Elective (MOOCs^{+}/Offline)	2	-	2+0=2	40	-	40	60	-	60	100
# Student Centered Activities(SCA)		-	3	-	-	-	-	-	-	-	-
	Total	**14**	**21**	**23**	**200**	**160**	**360**	**300**	**240**	**540**	**900**

\+ **Assessment of Multidisciplinary Elective through MOOCs shall be based on assignments out of 100 marks.**

\# Student Centered Activities will comprise of co-curricular activities like extension lectures on Constitution of India, Electoral Literacy, Motor Vehicles (Driving) Regulations 2017 etc., games, hobby clubs e.g. photography etc., seminars, declamation contests, educational field visits, N.C.C., NSS, Cultural Activities and self-study etc.

*** P/S is studio for architectural subjects & practical for other subjects.

FOURTH SEMESTER

Sr. No.	SUBJECTS	STUDY SCHEME Periods/Week		Credits (C) L+P = C	MARKS IN EVALUATION SCHEME						Total Marks of Internal & External
					INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT			
		L	P/S		Th	Pr	Tot	Th	Pr	Tot	
4.1	*English & Communication Skills – II	2	2	2+1=3	40	40	80	60	60	120	200
4.2	Building Byelaws	3	-	3+0=3	40	-	40	60	-	60	100
4.3	Building Materials & Construction - III	2	4	2+2=4	40	40	80	60	60	120	200
4.4	Working Drawing and Detailing	-	4	0+2=2	-	40	40	-	60	60	100
4.5	Computer Applications in Architecture-I	-	4	0+2=2	-	40	40	-	60	60	100
4.6	History of Architecture-II	4	-	4+0=4	40	-	40	60	-	60	100
4.7	Open Elective (MOOCs^{+}/Offline)	2	-	2+0=2	40	-	40	60	-	60	100
4.8	Minor Project	-	6	0+3=3	-	40	40	-	60	60	100
# Student Centered Activities(SCA)		-	2	-	-	-	-	-	-	-	-
	Total	**13**	**22**	**23**	**200**	**200**	**400**	**300**	**300**	**600**	**1000**

*** P/S is studio for architectural subjects & practical for other subjects.

* Common with other Diploma Courses

\+ Assessment of Open Elective through MOOCs shall be based on assignments out of 100 marks.

\# Student Centered Activities will comprise of co-curricular activities like extension lectures on Constitution of India, Electoral Literacy, Motor Vehicles (Driving) Regulations 2017 etc., games, hobby clubs e.g. photography etc., seminars, declamation contests, educational field visits, N.C.C., NSS, Cultural Activities and self-study etc.

Industrial Training: After 4th Semester, students shall undergo Industrial Training of 4 Weeks.

13. HORIZONTAL AND VERTICAL SUBJECTS ORGANISATION

Sr. No.	Subjects/Areas	Hours Per Week	
		Third Semester	Fourth Semester
1.	Industrial/In-House Training - I	2	-
2.	Basic Design and Visual Arts	8	-
3.	Building Materials & Construction -II	6	-
4.	History of Architecture -I	4	-
5.	Climatology	3	-
6.	Architectural Drawing - III	4	-
7.	Building Services	3	-
8.	Multidisciplinary Elective (MOOCs/Offline)	2	-
9.	English & Communication Skills – II	-	4
10.	Building Byelaws & Municipal Drawings	-	3
11.	Building Materials & Construction - III	-	6
12.	Working Drawing and Detailing	-	4
13.	Computer Applications in Architecture-I	-	4
14.	History of Architecture-II	-	4
15.	Open Elective (MOOCs/Offline)	-	2
16	Minor Project	-	6
	Student Centered Activities(SCA)	3	2
	Total	**35**	**35**

14. COMPETENCY PROFILE & EMPLOYMENT OPPORTUNITIES

Government and private sectors related to architectural assistantship require skilled workers to work in familiar, predictable, routine situations of clear choice. They are expected to have factual knowledge of automation and robotics field. They shall be able to write and speak with required clarity. Students after passing level 4 shall have understanding of basic arithmetic, algebraic principles along with basic understanding of social and natural environment. They are expected to recall and demonstrate quality skill in narrow range of applications using appropriate rules and tools.

Skilled workers will be responsible for carrying out a range of jobs, some of which will require them to make choices about the approaches they adopt. They will be expected to learn and improve their practice on the job. They should know what constitutes quality in the occupation and should distinguish between good and bad quality in the context of their job roles. Skilled worker at this level will be expected to carry out their work safely and securely and take full account of the health and safety on colleagues and customers. They should work hygienically and in ways which show an understanding of environmental issues. In working with others, they will be expected to conduct themselves in ways which show a basic understanding of the social and political environment. They might find work with various architectural organizations.

From the feedback received from polytechnics and field organizations, they find employment in service sector in the following organizations:

- The private enterprises consisting of firms of Architects or engineers
- Builders, contractors, interior designers, web-page designers and survey companies Government departments namely:
    a) State Department of Architecture
    b) State Department of Town and Country Planning
    c) Central Public Works Department
    d) State Housing Boards and Corporations
    e) State Urban Development Agency
    f) Railways
    g) Military Engineering Services
    h) Local Bodies
    i) Survey of India
    j) State Electricity Department/Boards
    k) Telecommunication Department

Self-Employment

- Private Practice with local bodies
- Own unit/enterprise for
  a) Model Making
  b) Perspective making
  c) Landscaping
  d) Drawings and CAD
- Service to Private Architects
- Sub Contracts of Construction, renovation, repair and interior design
- Site Supervision
- Site Surveying
- Estimation and Billing
- Site/marketing of building components
- Liaison work

15. PROGRAMME OUTCOMES

The program outcomes are derived from five domains of NSQF Level – 4 namely Process, Professional Knowledge, Professional Skill, Core Skill, Responsibility. After completing this level, the student will be able to:

PO1: Work in familiar, predictable, routine situation of clear choice.

PO2: Acquire factual knowledge in the field of architectural assistantship for employment.

PO3: Recall and demonstrate quality skills in routine and repetitive in narrow range of applications using appropriate rules and tools.

PO4: Write and speak with required clarity and show basic understanding of social and natural environment.

PO5: Perform tasks with responsibility for own work and learning.

PO6: Select multidisciplinary and open elective of own interest to develop self-learning through MOOCs.

16. ASSESSMENT OF PROGRAMME AND COURSE OUTCOMES

Programme Outcomes to be Assessed	Assessment Criteria for the Course Outcomes
PO1: Work in familiar, predictable, routine situation of clear choice.	• Explain about the Lime, Cement and their properties. • Discuss about the aggregates and mortar their bonding and their properties. • Discuss characteristics of timber, defects and its preservation • Describe the basics of door & window frames, hardware, types and uses of glasses in buildings • State the role and importance of climate as one of the major determinant of built form • Describe the human thermal comfort as an essential function of a building, its analysis & use in Architecture. • Explain natural sources of heating and cooling, such as sun and breezes, and to reduce demand on energy production. • Select building material appropriate for the climate so as to create necessary internal comfort. • Discuss building's site, climate, and materials to minimize energy use and design strategies for different climatic regions • State need and importance of building bye laws and their applications
PO2: Acquire factual knowledge in the field of architectural assistantship for employment	• Describe the various facets of art and architecture and the formal vocabulary of design. • Explain the basic form, space and elements of architecture design.

	• Discuss the basic anthropometrics-average measurements of human body (adult and children) in different postures-its proportion and graphic representation. • Describe the basic human functions and their implications for spatial planning. • Develop space and visualization of form with expressional skills. • State early shelter and determinants of built form. • Describe architectural characteristics of various Western Civilizations. • Explain Indian Civilization, building typology and role of key buildings. • Discuss Buddhist architecture in India and its building typology. • Describe main architectural characteristics of Hindu Temple in India. • Develop creativity and sensitize the students from the science stream to various design aspects and aesthetic line of thinking. • State the concept of Form, Space and Structure through creative thinking. • Discuss the elements and principles of basic design as the building blocks of creative design and visual composition. • Appreciate the process of design and the complexities involved in architectural design • Describe the basic human functions and their implications for spatial planning. • Develop space and visualization of form with expressional skills. • Explain water supply and drainage systems in a building

	• Describe basics of Heating, Ventilation and Air conditioning • Explain the basics of Fire-fighting Services • Explain the vertical transportation system in a building • Explain the basic form, space and elements of architecture design. • Discuss the basic anthropometrics-average measurements of human body (adult and children) in different postures-its proportion and graphic representation.
PO3: Recall and demonstrate quality skills in routine and repetitive in narrow range of applications using appropriate rules and tools	• Understand the working environment of industries. • Take necessary safety precautions and measures. • Work in team for solving industrial problems. • Develop competencies and skills required by relevant industries • Explain the various laws for regulation of building operations and urban development. • Describe various codes of practices /acts related to building construction. • Conduct various tests on • State features of various architectural periods in Europe. • Explain development of architecture in Europe in the form of various architectural styles. • Discuss various architectural periods and styles of Mughal Architecture in India.

	• Describe Modern Movement, and philosophies of Master Architects in Modern Architecture in Europe and America. • Explain architectural styles by Contemporary Architects and incorporate them in building design
PO4: Write and speak with required clarity and show basic understanding of social and natural environment.	• Develop writing, speaking and presentations skills • Communicate effectively with an increased confidence; read, write and speak in English language fluently. • Comprehend special features of format and style of formal communication through various modes. • Write a Report, Resume, make a Presentation, Participate in GDs and Face Interviews • Illustrate use of communication to build a positive self-image through self-expression and develop more productive interpersonalrelationships. • Create writing and communication skills. • Develop Presentation skills.
PO5: Perform tasks with responsibility for own work and learning.	• Draw various geometrical shapes in 3D form • Use the 3D of basic building blocks. • Draw & Visualise 3D views from different angles and viewpoints • Rendering of different drawings in Pen and Ink/colour mediums. • Convert 2D drawings in to 3D drawings. • Draw 3D Rendering in drawing • Develop 3D modeling of different shape. • Set 3D drawings for printing.

PO6: Select multidisciplinary and open elective of own interest to develop self-learning through MOOCs	• State the basic concepts and principles of multidisciplinary and open elective subject. • Perform in a better way in the professional world. • Learn the subject related to own interest. • Explore latest developments in the multidisciplinary and open elective field. • Develop the habit of self-learning. • Display analytical and research abilities. • Integrate multiple knowledge domains. • Enhance the scope and depth of learning.

17. SUBJECTS & CONTENTS

(SECOND YEAR)

THIRD SEMESTER

3.1 INDUSTRIAL / IN–HOUSE TRAINING-I

L	P
-	2

RATIONALE

Industrial training / In – house training will help the students to understand the working environment of relevant industries. The student will learn to work in team to solve the industrial problems. It will also give exposure about the present and future requirements of the relevant industries. This training is very important for development of required competencies and skills for employment and start– ups.

COURSE OUTCOMES

After undergoing the training, the students will be able to:

CO1: Understand the working environment of industries
CO2: Take necessary safety precautions and measures.
CO3: Learn about present and future requirement of industries.
CO4: Work in team for solving industrial problems
CO5: Develop competencies and skills required by relevant industries.
CO6: Develop writing, speaking and presentations skills.

PRACTICAL EXERCISES

1. Report writing based on industrial training.
2. Preparation of Power Point Slides based on industrial training and presentation by the candidate.
3. Internal Evaluation based on quality of Report, PPT preparation, PPT presentation and answer to queries.
4. External Evaluation based on quality of Report, PPT preparation, PPT presentation and answer to queries.

GUIDELINES

Students will be evaluated based on Industrial training / In – house training report and their presentation using Power Point about the knowledge and skills gained during the training. The Head of the Department will depute faculty coordinators by assigning a group of students to each. The coordinators will mentor and guide the students in preparing the PPTs for final presentation.

The following performance parameters are to be considered for assessment of the students out of 100 marks:

	Parameter	**Weightage**
i	Industrial / In-house assessment of the candidate by the trainer	40%
ii	Report Writing	20%
iii	Power Point Presentation	20%
iv	Viva-voce	20%

3.2 BASIC DESIGN AND VISUAL ARTS

L	P/S
-	8

RATIONALE

Students of diploma in Architecture Assistantship are supposed to have the knowledge about the basic elements and the principles of design and other related elements to develop skills for designing the various types of buildings. Teachers while imparting instructions/giving assignments are expected to teach various elements of design like form function, balance, shape, plane, volume, line, rhythm, proportions, textures and other such related elements. Teachers are also expected to show various types of design of small buildings for the better application of the subject.

Teachers should also motivate students to maintain sketch book/portfolio of all the assignments given to the students.

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

CO1: Describe the various facets of art and architecture and the formal vocabulary of design.

CO2: Explain the basic form, space and elements of architecture design.

CO3: Discuss the basic anthropometrics-average measurements of human body (adult and children) in different postures-its proportion and graphic representation.

CO4: Describe the basic human functions and their implications for spatial planning.

CO5: Develop space and visualization of form with expressional skills.

PRACTICAL EXERCISES

UNIT I

1. Basic elements of Anthropometrics with respect to average measurements of human body (adult and children) in different postures-its proportion and graphic representation.

(1 sheet)

(a) i) Human body (Anthropometrics)
ii) Various activities of human body

(b) Proportion of Components of Human Body (2 sheet)
The proportions of the different components of the human body;
Examples from Le Corbusier Modular Man, Vastu Pursha Mandala

UNIT II

2. a) **Human Activities** (2 sheets)
Basic human functions and their implications for spatial planning. Minimum and optimum areas for various functions. Activity space analysis related to form, function and expression of individual spaces like Bed room, Drawing room, Kitchen, Bath room etc.

b) **Furniture Standards** (2 sheets)
Furniture standards (sizes of domestic and public furniture); Toilet and Kitchen equipment - sizes and standards; Doors and windows - sizes, standards and locations.

UNIT III

3. **Vehicles, Street Furniture and Plants** (4 sheets)

- Standard Parking layouts showing turning radii for two-wheelers, cars, buses, etc. Parking layouts at various angles (parallel, 45 degrees, 90 degrees), Standard road width.
- Standards for drinking fountains, waiting queues at bus stops, garden seats, waste bins, telephone booths, street lights, foot paths, public walkways, railing etc.
- Graphic Representation of plant material (ground cover, foliage, shrubs, trees human figures and vehicles).

UNIT IV

4. **Introduction to AutoCAD**

- Input devices, Graphics, Starting AutoCAD, Inside the drawing editor, Commands in the menus (Tool bars), Accessing Commands, Entity selection, Entering coordinates, Folders for organizing drawings and files Creating and Saving a new Drawing, Commands and options to create new drawings, Units, Limits, Snap, Grid, Ortho, Layer, Application of layers, Open a new, existing drawing, Save, save as, quit, close, exit, Customization of tool bars (2 sheets)

UNIT V

5.1. **Draw Commands**

- Line, Poly line/Multi line., Arc, Ellipse, Polygon, Rectangle, SP line, Circle, Sketch., Hatch, Donuts

5.2 Modifying an Existing Drawing Commands

- Undo Redo/Oops, Trim, Move, Offset, Rotate, Array, Stretch, Divide, Champher, Erase, Break, Copy, multiple copy, Mirror (Mirror test), Change (change properties), Extend, Explode, Blip mode, Scale, Fillet, Design Center (3 sheets)

Note: Minimum of 16 sheets should be made. Teachers are required to supplement the teaching process through demonstration of the existing buildings.

RECOMMENDED BOOKS

1. Joseph De Chiara and John Callendera, "Time Saver Standards for Building Types".
2. Neufert, "Architects Data".
3. DK Ching, "Space, Time and Order".
4. Sangeet Sharma, "Architectural Aesthetics", Abhishek Publication, 57-59,Sector 17, Chandigarh.

SUGGESTED WEBSITES

1. https://youtu.be/uQk29ehVzNo (For drawing trees foliage)
2. https://youtu.be/1csAYcu0_u8 (For drawing trees)
3. https://youtu.be/jgeE5l2cRAk (For Drawing Furniture)
4. https://youtu.be/_jiQNGc50LU (For lamp posts)
5. https://youtu.be/uJdo4AiM_dg (For dustbin)
6. Slideshare.net
7. www.wikipedia.org
8. www.archdaily.com
9. www.Scholar/google.in
10. www.youtube.com

INSTRUCTIONAL STRATEGY

This is one of the most important practical oriented subject for diploma in architectural assistantship. While imparting instruction, special visits may be arranged to demonstrate and explain important architectural features of different types of residential, commercial and public buildings. Teacher may present some of the already completed design works of practicing architects to the students and explain the important features and elements. Audio- visual material available in this field may be procured and presented to the students from time to time. Students should be encouraged to visit relevant web-sites and teachers should develop the design problems/assignments which can be taken up by the students using relevant and appropriate software. Students should be given group and independent design/drawing assignments and they should also maintain sketch book/portfolio of all the assignments given to them throughout the session. Teachers may conduct viva-voce on completion of each assignment. Students may present seminars towards the end of the session.

3.3 BUILDING MATERIALS & CONSTRUCTION – II

L	P/S
2	4

RATIONALE

Students are supposed to prepare working drawings of buildings and detailed drawings of various components of buildings. Knowledge of building materials and construction is very essential from the point of construction materials as well as providing detailed specifications in the detailed drawings. Therefore, the course in building construction and materials includes imparting basic knowledge in the properties and use of important materials like stones, bricks etc. Faculty is expected to show the samples of different materials, discuss their properties with particular reference to their use and appearance in particular situations depending upon climate and environmental conditions of the site where the materials are to be used. Students should be encouraged to collect samples of various materials and efforts should be made to maintain a good building materials museum. Also faculty is expected to show various components of buildings under construction, make use of models or other audio-visual media to clarify the concepts.

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

CO1: Explain about the Lime, Cement and their properties.

CO2: Discuss about the aggregates and mortar their bonding and their properties.

CO3: Discuss characteristics of timber, defects and its preservation

CO4: Describe the basics of door & window frames, hardware, types and uses of glasses in buildings.

DETAILED CONTENTS

UNIT I

Lime & Cement

1.1 Uses and classification of lime

1.2 Setting action of fat lime and hydraulic lime and Storing of lime

1.3 Types of cement, their properties and uses
1.4 Composition of portland cement
1.5 Setting and hardening of cement and storage of cement

UNIT II

Aggregates & Mortar

2.1 Types and uses of Coarse Aggregates and Fine Aggregates
2.2 Different types of sand and other Puzzolona material
2.3 Functions, uses of Mortar and its proportion for different building works
2.4 Preparation of cement mortar, lime mortar, lime cement mortar and their uses.

UNIT III

Concrete

3.1 Definition of concrete, workability of concrete, Water - Cement Ratio
3.2 Compaction and Curing of concrete
3.3 Properties & necessity of Reinforced cement concrete (RCC), M15, and M20

UNIT IV

Timber

4.1 Characteristics and uses of common Indian timbers i.e. Sal, Deodar, Kali, Tali, Chir, and Teak etc.
4.2 Characteristics of hard wood and soft wood.
4.3 Characteristics of good timber and Defects in timber.
4.4 Different methods of seasoning and preservation / preservative materials of timber.
4.5 Types of doors
4.6 Types of windows

UNIT V

Glass

5.1 Types, thickness, uses, Availability and sizes of:

- Sheet glass
- Wired glass
- Laminated safety glass
- Plate glass
- Insulating glass

- Tinted glass
- Heat absorbing glass
- Glass blocks
- Toughened glass
- Structural glazing
- Etched glass
- Stained glass
- Mirrors

PRACTICAL EXERCISES

1. Joinery (2 sheets)
   - Doors and windows frames – their fixing
2. Panel Door, Flush Door (2 sheets)
3. Casement & Pivot Windows (2 sheets)
4. Building hardware (sizes, applications) (1sheet)
   - Tower bolts
   - Hinges including concealed hinges
   - Door Handles
   - Door springs
   - Latches
   - Floor door stopper/floor springs and magnetic types stoppers
   - Fan light pivots
   - Mortice lock
   - Door closer – including hydraulic types
   - Ventilator chains
   - Wire gauze
   - Magnetic cupboard closers
5. Plastering and pointing (1 Sheet)
6. False Ceiling, Paneling and Fibrous Board Finishes (2 Sheets)
7. Market survey/collection of catalogues for study purpose.

RECOMMENDED BOOKS

1 W.B. Mc Kay, “Building Construction”.
2 R. Barry, “Building Construction”.
3 Francis Ching D.K., “Building Construction Illustrated”.
4 V.B.Sikka, “Civil Engineering Drawing”.
5 Sushil Kumar, “Building Construction”
6 SK Sharma, and GC Mathur, "Engineering Materials;” S. Chand and Co., Delhi-Jalandhar.
7 Surendra Singh, "Engineering Materials;" Vikas Publishing House Pvt. Ltd., New Delhi.
8 N Choudhary, "Engineering Materials;" Calcutta, Technical Publishers of India.

SUGGESTED WEBSITES

1. www.youtube.com
2. https://www.youtube.com/watch?v=IpzkAwWMkkY(For Brick)
3. Slideshare.net
4. https://www.youtube.com/watch?v=EIDXE28_8eQ&list=PL8BA090E69BF01BC2(building material and construction)
5. https://www.youtube.com/watch?v=R2dNp5tLni0 (Building material and construction)
6. https://www.youtube.com/watch?v=raeXjtLPS7k(various(levels in building)
7. https://www.youtube.com/watch?v=5zOOm2fhhwA(For stones)
8. https://www.youtube.com/watch?v=oWYSLxVJAR8 (DPC)
9. https://www.youtube.com/watch?v=vN8smpxhL9c (FOOTING)
10. https://www.youtube.com/watch?v=oXtUtANZqWQ (Foundation)
11. https://www.youtube.com/watch?v=Z_jieunkTtw&list=RDCMUCNCaoN3_OYmMC-rXeoCt4YA&index=3(bonds)
12. https://www.youtube.com/watch?v=CD2QOsa1RMc&list=RDCMUCNCaoN3_OYmMC-rXeoCt4YA&index=1(arches and lintels)

INSTRUCTIONAL STRATEGY

This is one of the fundamental subject covering basic building materials and construction and finishing materials. Teachers should demonstrate samples of various materials while imparting classroom instruction. Teachers may also arrange some field visits to manufacturing/ production

units and retailer shops like cement, kilns, timber saw mills and seasoning plants, hardware shops, glass houses etc. Students should be encouraged to collect samples of various materials and catalogues of manufacturer. The students may maintain a scrapbook for this purpose. A museum of building construction, materials may be developed where samples of latest materials their specifications, characteristics, rates, manufacturer (supplier and relevant codes may be kept) to enhance the level of understanding of the students. This subject contains five units of equal weightage.

3.4 HISTORY OF ARCHITECTURE – I

L	P/S
4	-

RATIONALE

The course on History of Architecture develops appreciation regarding past and current trends in the field of architecture. The knowledge of this course will help the students to understand how political, physical, social, economic and technological change affects the architecture, materials and construction techniques. The course covers broad topics like: pre-historic architecture, important civilizations, (Indian, Egyptian, Greek and Roman), medieval architecture in Europe, and temple architecture and Buddhist architecture in India.

The teacher should try to create interest among the students for this course by organizing site visits to the local old monuments. Audio-visual aids should also be used to explain various architectural developments. While imparting instructions, teacher should stress upon the context of form and space, construction methods structural systems and materials. The teacher should motivate the students to take general reference for form, drawings structural solutions and materials from the history, while designing their project.

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

CO1: State early shelter and determinants of built form.
CO2: Describe architectural characteristics of various Western Civilizations.
CO3: Explain Indian Civilization, building typology and role of key buildings.
CO4: Discuss Buddhist architecture in India and its building typology.
CO5: Describe main architectural characteristics of Hindu Temple in India.

DETAILED CONTENTS

UNIT I

Pre Historical Architecture and Introduction to History of Architecture

1.1 Importance of history to understand the Architecture.

1.2 Examples of Early shelters, Stone Age, Tumuli, etc. as expression of man's physical and spiritual needs.

1.3 Determinants of built form – geo physical, societal, technological etc. (Earlycaves, timber huts, stone houses etc).

UNIT II

Western Civilization

2.1 Egyptian Civilization Concept of the Royal Necropolis, locational context and architectural characteristics of public buildings, e.g. Mastabas (master of sakara) and pyramids (rock – cut and structural) – one example of each type to be chosen.

2.2 Mesopotamian Civilization the urban context and architecture of public buildings (Ziggurats) - one example.

UNIT III

Greek and Roman Civilizations

3.1 Greek Civilization

3.1.1 Location and characteristics of typical civic spaces such as Agora, Acropolis,Stoa.

3.1.2 Significant characteristics of Greek Architecture such as Materials, construction systems, system of proportioning, Greek orders, architecture of Greek temples – Parthenon, Athens.

3.2 Roman Civilization

3.2.1 Significant characteristics of Roman Architecture. Concept of monumentality, materials and construction systems, Roman orders.

3.2.2 Colosseum, Pantheon, Rome, their form, and constructional/structural systems.

UNIT IV

Indian Civilization and Buddhist Architecture in India

4.1 Indus Valley Civilization: Form of the Harappan city, location and role of public buildings.

4.2 Architecture of the typical (Harappan dwelling) Great Granary and Great Bath.

4.3 The Vedic Village, building typology and construction.

4.4 Buddhist Architecture in India

Building typology – stupas, Chaitya Hall, Vihara one example from each; construction methods and ornamentation.

UNIT V

Temple Architecture in India

5.1 Evolution of temple and its various parts.

5.2 Dravidian style (Southern) General characteristics, construction methods and material (e.g. shore temple at Mahabalipuram,)

5.3 Indo Aryan Temple (North Indian)

- Sun Temple Konark; Lingaraja Temple at Bhubhaneshwar; Kandariya Mahadeo at Khajuraho. These examples must be studied with reference to architectural form, planning components, construction methods, materials, motifs (ornamentation).

5.4 Jain temples in India (Delwara temple, Mt. Abu)

RECOMMENDED BOOKS

1. Sir Banister Fletcher, "History of Architecture", Architectural Press, Oxford, UK.
2. Dennis Sharp, "Encyclopedia of Architecture", Mc. Graw Hill Publishers, New Delhi.
3. Satish Grover (Hindu), "History of Architecture", Roli Books (P) Ltd. Delhi.
4. Percy Brown, "Indian Architecture (Hindu and Buddhist)", Taraporevala Sons, Bombay.
5. Michael Raeburn, "World Architecture", LBS Ltd. Faraday Close Durrington Worthing West Sussex.
6. Satish Grover (Hindu), "History of Architecture", Roli Books (P) Ltd. Delhi.

INSTRUCTIONAL STRATEGY

While imparting instructions in this subject, the teachers should organize site visits to the old monuments and buildings with extra-ordinary architectural features. Experts/Guides from state and national Archaeology departments may be invited to deliver lectures on the relevant themes in order to generate interest in the students. Audio-visual material available on the subject, in the country and abroad, may be procured and presented to the students from time to time to enrich the quality of classroom institutions. Special architectural features of some old/historical famous Indian and International buildings may be presented to the students as case studies. Students may be encouraged to prepare case studies of at least one famous old/historical building. Web sites, relevant to the history of architecture may be visited by the teachers and students. This subject contains five units of equal weightage.

3.5 CLIMATOLOGY

L	P/S
3	-

RATIONALE

Understanding of the basic principles of climatology and environment are very important for diploma holders in Architectural Assistantship. The knowledge of this subject will be very useful in the design of buildings. The students will also understand the importance of environmental systems, its relation with human development and to reduce energy use in buildings to reduce humans' overall environmental impact.

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

CO1: State the role and importance of climate as one of the major determinant of built form

CO2: Describe the human thermal comfort as an essential function of a building, its analysis & use in Architecture.

CO3: Explain natural sources of heating and cooling, such as sun and breezes, and to reduce demand on energy production.

CO4: Select building material appropriate for the climate so as to create necessary internal comfort.

CO5: Discuss building's site, climate, and materials to minimize energy use and design strategies for different climatic regions

DETAILED CONTENTS

UNIT I

General Introduction

- Introduction to Climatology
- Movement of earth around sun.
- Different elements of climate like: Wind, temperature, humidity, precipitation and pressure.

- Different climatic zones
- Orientation of building with respect to above mentioned elements of climate
- Effect of climate on man and shelter.

UNIT II

Relation of Climate and comfort

- Macro-micro climatic effects
- Concept of comfort zone and bio-climatic chart
- Climatic evaluation by season

UNIT III

Sun Control and shading devices (without calculations)

- Solar Chart (sun path diagram)
- Orientation for sun
- Internal and external sun protection devices
- Natural lighting
- Introduction and objectives of Solar Passive Design
- Passive solar heating and cooling

UNIT IV

Wind control

- Orientation with respect to wind
- Wind protection devices

Use of building materials with respect to climate

- Concrete
- Brick
- Glass
- Plastics
- Stone
- Insulating material

UNIT V

Environment and Ecology

- Basic elements of ecology

- Concepts of natural cycles in Eco-system
- Source of noise and air pollution, their effects and controls
- Use of landscape elements for micro and macro climate control
- Introduction to climate change, principle causes and effects- methods of mitigating climate change.

NOTE: STUDY REPORT AS AN ASSIGNMENT

A study report on the effect of climate and environment on contemporary buildings such as residential, commercial and public buildings should be prepared by the students. The study should emphasize on orientation of court-yards, windows, jallies, chajjas, landscape and various other sun and wind control devices.

RECOMMENDED BOOKS

1. Santosh Sarkar, "Environmental Engineering and Management".
2. Wolfgang Lauber, "Tropical Architecture", Prestel Publishing, ISBN: 3791331353, ISBN-13.
3. C.P. Kukreja, "Tropical Architecture", McGraw-Hill, New Delhi.
4. EP Odem, "Ecology: The Link Between The Natural And The Social Sciences", Oxford and IBH Publishing Co. New. Delhi.
5. Arvind Krishan, "Design With Climate", Tata McGraw-Hill, New Delhi.

INSTRUCTIONAL STRATEGY

Audio-video should be used for explaining various component of climatology and environment. Teachers are expected to impart instructions of the above course keeping in view the effect of above course in the design of buildings. The course contents should be taught with reference to tropical climates. This subject contains five units of equal weightage.

3.6 ARCHITECTURAL DRAWING-III

L	P/S
-	4

RATIONALE

To improve the visualization skills of students are taught the subject of Architectural Drawing. The students of diploma should have sufficient skills to draw and understand the perspective drawings. Besides this they should also be aware of Sciography in plans and elevations. They should be given sufficient exercises in perspective drawings and Sciography so that they are able to perform well in the field/industry.

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

CO1: State the concept of shade and shadows in architecture.
CO2: Draw various geometrical shapes in 3D form
CO3: Use the 3D of basic building blocks.
CO4: Draw & Visualise 3D views from different angles and viewpoints
CO5: Rendering of different drawings in Pen and Ink/colour mediums.

PRACTICAL EXERCISES

UNIT I

1. Basic of Perspective (01 sheets)

- Introduction to basic terminology (picture plane, Vanishing point. Station point, cone of vision), Types of Perspective (One-point, Two-point, Bird's eye view, worm's eye view, normal eye view etc.) (vanishing point method)

UNIT II

2. Drawing of Two-Point Perceptive Views

- Geometrical shapes such as: Planes, cones, cubes, cylinders, pyramid etc. (02 sheets)
- 2-point perspective of a simple building such as Guard room, kiosk etc. (01 sheets)

UNIT III

3. Drawing of One-Point Perceptive Views

- Geometrical shapes such as: Planes, cones, cubes, cylinders, pyramid etc. (02 sheets)
- 1-point perspective of given plans (drawing room and kitchen) (01 sheets)

UNIT IV

4. Introduction to Sciography (in plans and Elevations)

- Geometrical shapes such as: Planes, cones, cubes, cylinders, pyramid etc. (02 sheets)
- Sciography of simple building such as Guard room, kiosk etc. (01 sheets)

UNIT V

5. Introduction to Rendering

- Demo by teacher in different mediums-colour pencils, crayon. Colour wash, markers etc.
- Rendering techniques in pen and inks/ Different colour mediums (01 sheets)
- Rendering of a given perspectives (01 sheets)

RECOMMENDED BOOKS

1. P.S Gill, “Engineering Drawing”, S K Kataria and Sons, Ludhiana.
2. Sikka, “Building Construction”, Tata McGraw Hill Publisher, New Delhi.
3. Arthur L. Guptill, Susan E. Meyer, “Rendering with Pen and Ink”.

INSTRUCTIONAL STRATEGY

This subject is one of the most important, fundamental and practical subject for diploma in Architectural Assistantship. Teachers should lay emphasis on practical work by the students and give repetitive exercises in free hand sketching, colouring and rendering like sketching, shades and shadows, lettering, printing forms and other important component of architecture. Teachers should lay stress upon perfect line work, properties, dimensioning, lettering and printing by the students in the classroom. Students should maintain portfolio of the work done by them throughout the session. Viva voce examination shall be conducted by the teacher on completion of each assignment

3.7 BUILDING SERVICES

L	P/S
3	-

RATIONALE

Students of Architectural Assistantship at diploma level are expected to prepare working drawings for fixing of various fittings and fixtures, water supply and sanitary installations. Also students should be well conversant with electrical and mechanical installations in the buildings. For this purpose, it is essential that the students are taught various aspects of building services like: sanitation, water supply, electrical layout and air conditioning. Therefore, the subject of building services is very important for students undergoing diploma courses in Architectural Assistantship.

Teachers while imparting instructions are expected to show various fixtures and fittings, water supply and sanitary installations at work sites and by making use of literature, models, chart and other audio-visual aids so that students are able to comprehend the hardware used. Teacher should specifically point out problem areas and other environmental considerations while teaching this subject.

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

CO1: State the basics of building services
CO2: Explain water supply and drainage systems in a building
CO3: Describe basics of Heating, Ventilation and Air conditioning
CO4: Explain the basics of Fire-fighting Services
CO5: Explain the vertical transportation system in a building

DETAILED CONTENTS

UNIT I

1.1 Water Supply

- Water as a natural resource, public health significance of water quality, demand of water for domestic, commercial, industrial and public utility purposes as per BIS standards. Per

capita demand, leakage and wastage of water and its preventive measures

- System of water supply – continuous, intermittent, their advantages and disadvantages
- Storage and Distribution of Water: Different methods of water distribution boosting water, gravity and pressure distribution by storage tanks of individual buildings
- Hot water supply for buildings including solar water heating.
- Service connections, types and sizes of pipes, water supply fixture and installations
- Concept of Rain water harvesting

1.2 Drainage

- Principles of drainage, surface drainage; combined and separate system of drainage, shape and sizes of drains and sewers, storm water over flow chambers, methods of laying and construction of sewers
- House drainage: traps – shapes, sizes, types, materials and function
- Inspection chambers – sizes, and construction
- Ventilation of house drainage – anti-siphonage and vent pipes, single stack and double stack system
- Functions and working of sinks, wash basins, water closets, flushing cisterns, urinals, – sizes and types
- Septic tanks, seepage and soak pits
- Simple exercises on layout plans for toilet and kitchens for public and residential buildings including the placement, distances and fixing details.

UNIT II

2. Lighting and Electrical Fittings

- Electrical distribution-conduits for wiring, types of wiring, types of switches, various terms used in lighting-illumination, Lux, lumen etc. distribution panels, MCB'S, ELCBS
- Methods of lighting, quality of light of mercury lamps, incandescent types of lamps, fluorescent tubes, CFL and other lamps, thumb rules for calculation of illuminating level, various systems of wiring and their sustainability
- Symbolic representation of electrical fittings for different work areas in residential building (e.g. bed room, living room, kitchen, study and toilet)
- Preparation of electrical layout of a simple residential building, Precautions to avoid electrical accidents

UNIT III

3. Heat, Ventilation and Air Conditioning (HVAC)

- Behavior of heat propagation, thermal insulating materials and their co-efficient of thermal conductivity, General methods of thermal insulation. Thermal insulation of roofs, exposed walls
- Ventilation: Definition and necessity, System of ventilation (Mechanical)
- Principles of air conditioning, Air cooling, Different types of Air conditioning systems and their use in buildings, Essentials of air-conditioning system

UNIT IV

4. Fire Fighting Services

- Causes of fire in Buildings, classification of building materials according to fire rating; fire alarm systems
- Introduction to fire-fighting system, precaution and controlling devices (fire panels, door and windows automation, fire hydrants and sprinklers)
- Fire escape elements (staircases, ramps,), provisions in building from fire safety angle as per BIS; heat detectors, and fire detection system.

UNIT V

5. Vertical Transportation Systems

- Classification and types of lifts, lift sizes, provision and installation, escalators, sizes, safety norms to be adopted

RECOMMENDED BOOKS

1. VK Jain, “Handbook of Designing and Installation of Services in Building Complex – High-rise Buildings”, Khanna Publishers, New Delhi.
2. Mark J. Hammer and Mark J. Hammer (Jr.), “Water and Waste Water Technology”, Prentice Hall of India (P) Ltd., New Delhi.
3. Subramanian, “A Text Book of Environmental Science”, Narora Publicity (Pvt.) Ltd., New Delhi.
4. “National Building Code”.

INSTRUCTIONAL STRATEGY

Building services are as important as any other part of the building. The teachers, besides classroom teaching should supplement the instruction by arranging field visits. Students may be encouraged to collect information, pamphlets and catalogues from different market/ manufacturing sources and prepare a scrapbook of the latest machines/fittings available for building services. Teachers may also encourage the students to go through relevant BIS codes for each topic. The subject knowledge should be used in preparing services drawings in the subject of Architectural design. This subject contains five units of equal weightage.

3.8 MULTIDISCIPLINARY ELECTIVE

L	P
2	-

RATIONALE

Multidisciplinary electives are very important and play major role in implementation of National Education Policy. Multidisciplinary is a subject which is useful for two or more disciplines in which students are asked to understand the concept of multidisciplinary or interdisciplinary. It will help the students to gain an arsenal of skills that are easily transferable across work environments.

COURSE OUTCOMES

At the end of the open elective, the students will be able to:

CO1: Apply critical thinking problem solving.
CO2: Demonstrate self and time management.
CO3: Display analytical and research abilities.
CO4: Integrate multiple knowledge domains.
CO5: Enhance the scope and depth of learning.

LIST OF MULTIDISCIPLINARY ELECTIVES

(The list is indicative and not exhaustive)

1. Introduction to Internet of Things
2. Introduction to Robotics
3. Introduction to Embedded System Design
4. Fundamentals of Artificial Intelligence
5. Digital Image Processing
6. Introduction to Machine Learning
7. Fundamentals of Artificial Intelligence
8. The Joy of Computing Using Python
9. Cloud Computing
10. Introduction to Industry 4.0
11. Industrial Internet of Things

12. Object Oriented System Development using UML, Java and Patterns

GUIDELINES

Multidisciplinary Elective shall be offered preferably in online mode. Online mode multidisciplinary elective shall preferably be through Massive Open Online Courses (MOOCs) from Swayam, NPTEL, Upgrad, Udemy, Khan Academy or any other online portal to promote self-learning. A flexible basket of large number of multidisciplinary electives is suggested which can be modified depending upon the availability of courses at suggested portals and requirements. For online multidisciplinary electives, department coordinators shall be assigned to monitor and guide the group of students for selection of minimum 20 hours duration online course of their choice. For offline multidisciplinary electives, a suitable relevant subject shall be offered by the respective department to the students with minimum 40% of the total class strength as per present and future requirements.

Assessment of MOOCs multidisciplinary elective shall be based on continuous evaluation by the respective coordinator. The coordinator shall consider the submitted assignments by the students from time to time during the conduct of MOOCs. The MOOCs assessment shall be conducted by the coordinator along with one external expert by considering submitted assignments out of 100 marks.

In case, no suitable open elective is available online, only then the course may be conducted in offline mode. The assessment of offline multidisciplinary elective shall be internal and external. The offline multidisciplinary elective internal assessment of 40 marks shall be based on internal sessional tests, assignments etc. and external assessment of 60 marks shall be based on external examination at institute level.

SUGGESTED WEBSITES

1. https://swayam.gov.in/
2. https://www.udemy.com/
3. https://www.upgrad.com/
4. https://www.khanacademy.org/

FOURTH SEMESTER

4.1 ENGLISH AND COMMUNICATION SKILLS - II

L	P
2	2

RATIONALE

Communication II moves a step further from Communication Skills I and is aimed at enhancing the linguistic competency of the students. Language as the most commonly used medium of self-expression remains indispensable in all spheres of human life – personal, social and professional. This course is intended to make fresh ground in teaching of Communicative English as per the requirements of National Skill Quality Framework.

COURSE OUTCOMES

After undergoing this course, the learners will be able to:

CO1: Communicate effectively with an increased confidence; read, write and speak in English language fluently.

CO2: Comprehend special features of format and style of formal communication through various modes.

CO3: Write a Report, Resume, make a Presentation, Participate in GDs and Face Interviews

CO4: Illustrate use of communication to build a positive self-image through self-expression and develop more productive interpersonal relationships.

DETAILED CONTENTS

UNIT I
Reading

1.1 Portrait of a Lady - Khushwant Singh

1.2 The Doctor's Word by R K Narayan

1.3 Speech by Dr Kiran Bedi at IIM Indore2007 Leadership Concepts

1.4 The Bet - by Anton Chekov

UNIT II

Effective Communication Skills

2.1 Modern means of Communication (Video Conferencing, e- mail, Teleconferencing)
2.2 Effective Communication Skills: 7 C's of Communication
2.3 Non-verbal Communication – Significance, Types and Techniques for Effective Communication
2.4 Barriers and Effectiveness in Listening Skills
2.5 Barriers and Effectiveness in Speaking Skills

Unit III

Professional Writing

3.1 Correspondence: Enquiry letters, placing orders, complaint letters
3.2 Report Writing
3.3 Memos
3.4 Circulars
3.5 Press Release
3.6 Inspection Notes and tips for Note-taking
3.7 Corrigendum writing
3.8 Cover Letter

UNIT IV

Grammar and Vocabulary

4.1 Prepositions
4.2 Conjunctions
4.3 Punctuation
4.4 Idioms and Phrases: A bird of ill omen, A bird's eye view, A burning question, A child's play, A cat and dog life, A feather in one's cap, A fish out of water, A shark, A snail's pace, A snake in the grass, A wild goose chase, As busy as a bee, As faithful as dog, Apple of One's eye, Behind one's back, Breath one's last, Below the belt, Beat about the bush, Birds of a feather flock together, Black Sheep, Blue blood, By hook or crook, Chicken hearted, Cut a sorry figure ,Hand in glove, In black and white, In the twinkling, In full swing ,Is blind as a bat, No rose without a thorn, Once in a blue moon, Out of the frying pan in to the fire, know no bounds ,To back out, To bell the cat, To blow one's

trumpet, To call a spade a spade, To cut one's coat according to one's cloth, To eat humble pie, To give ear to, To have a thing on one's finger tips, To have one's foot in the grave, To hold one's tongue, To kill two birds with one stone, To make an ass of oneself, To put two and two together, To the back bone, Turn coat, ups and downs.

4.5 Pairs of words commonly misused and confused: Accept-except, Access-excess, Affect-effect, Artificial- artful, Aspire-expire, Bail-bale, Bare-bear, Berth-birth, Beside-besides, Break-brake, Canvas-canvass, Course- coarse, Casual-causal, Council-counsel, Continual-continuous, Coma-comma, Cue- queue, Corpse- corps-core, Dairy-diary, Desert-dessert, Dual-duel, Dew- due, Die-dye, Draft- draught-drought, Device-devise, Doze-dose, Eligible-illegible, Emigrant- immigrant, Envelop-envelope, Farther-further, Gate-gait, Goal-goal, Human-humane, Honorable-honorary, Hail-hale, Hair-heir-hare, Industrial-industrious, Impossible- impassable, Idle-idol-ideal, Lose-loose, Later-latter, Lesson-lessen, Main-Mane, Mental-mantle, Metal-mettle, Meter-metre, Oar-ore, Pray-prey, Plain-plan, Principal - principle, Personal- personnel, Roll- role, Route-rout- roote, Stationary-stationery, Union- unity, Urban- urbane, Vocation- vacation, Vain- vein-vane, Vary- very.

4.6 Translation of Administrative and Technical Terms in Hindi or Mother tongue: Academy, Abandon, Acting in official capacity, Administrator, Admission, Aforesaid, Affidavit, Agenda, Alma Master, Ambiguous, Appointing Authority, Apprentice, Additional, Advertisement, Assistant, Assumption of charge, Assurance, Attested copy, Bonafide, Bond, Cashier, Chief Minister, Chief Justice Clerical error, Commanding ,Officer, Consent, Contractor, corruption, Craftsman, Compensation, Code, Compensatory allowance, Compile, Confidential letter, Daily Wager, Data, Dearness allowance, Death - Cum Retirement, Dispatch, Dispatch Register, Disciplinary, Disciplinary Action, Disparity Department, Dictionary, Director, Director of Technical Education, Earned Leave, Efficiency Bar, Estate, Exemption, Executive Engineer, Extraordinary, Employment Exchange, Flying Squad, General Body, Head Clerk, Head Office, High Commission, Inconvenience, Income Tax, Indian Assembly Service, Justify, Legislative Assembly, Negligence, Officiating ,Office Record, Office Discipline, On Probation, Part Time, Performance, Polytechnic, Proof Reader Precautionary, Provisional, Qualified, Regret, Responsibility, Self-Sufficient, Senior, Simultaneous ,Staff, Stenography ,Superior, Slate, Takeover, Target Data Technical Approval, Tenure, Temporary, Timely Compliance, Under Investigation, Under Consideration, Verification, Viva-voce, Write off, Working Committee, Warning, Yours Faithfully , Zero Hour.

UNIT V

Employability Skills

5.1 Presentation Skills: How to prepare and deliver a good presentation
5.2 Telephone Etiquettes
5.3 Importance of developing employable and soft skills
5.4 Resume Writing: Definition, Kinds of Resume, Difference between Bio-data and Curriculum Vitae and Preparing a Resume for Job/ Internship
5.5 Group discussions: Concept and fundamentals of GD, and learning Group Dynamics.
5.6 Case Studies and Role Plays

PRACTICAL EXERCISES

1. Reading Practice of the above lessons in the Lab Activity classes.
2. Comprehension exercises of unseen passages along with the given lessons.
3. Vocabulary enrichment and grammar exercises based on the above selective readings.
4. Situational Conversation: Requesting and responding to requests; Expressing sympathy and condolence.
5. Warning; Asking and giving information.
6. Getting and giving permission.
7. Asking for and giving opinions.
8. A small formal and informal speech.
9. Seminar.
10. Debate.
11. Interview Skills: Preparing for the Interview and guidelines for success in the Interview and significance of acceptable body-language during the Interview.
12. Written Drills will be undertaken in the class to facilitate a holistic linguistic competency among learners.
13. Participation in a GD, Functional and Non-functional roles in GD, Case Studies and Role Plays
14. Presentations, using audio-visual aids (including power-point).
15. Telephonic interviews, face to face interviews.
16. Presentations as Mode of Communication: Persuasive Presentations using multi-media aids.
17. Practice of idioms and phrases on: Above board , Apple of One's eye , At sea, At random, At large, A burning question, A child's play, A wolf in sheep's clothing, A deal, Breath

one's last, Bid fair to, Beat about the bush, Blue Blood, Big Gun, Bring to Book, Cut a sorry figure, Call names, Carry weight, Dark Horse, Eat Humble pie, Feel small, French leave, Grease the palm, Go against the grains, Get One's nerves, Hard and Fast, Hue and Cry, Head and ears, In full swing, Jack of all trades, know no bounds, kiss the dust, Keep an eye on, Lion's share, learn by rote, Null and void, on the cards, Pull a long face, Run amuck, Right and Left, Rain on Shine, Small talk, Take to one's heels, Tooth and nail, to take by storm, , Wet blanket, Yearn for.

RECOMMENDED BOOKS

1. Alvinder Dhillon and Parmod Kumar Singla, "Text Book of English and Communication Skills Vol – 1, 2", M/s Abhishek Publications, Chandigarh.
2. J Sethi, Kamlesh Sadanand & DV Jindal, "Course in English Pronunciation", PHI Learning Pvt. Ltd., New Delhi.
3. Wren and Martin, "High School English Grammar and Composition" .
4. NK Aggarwal and FT Wood, "English Grammar, Composition and Usage", Macmillan Publishers India Ltd., New Delhi.
5. RC Sharma, and Krishna Mohan, "Business Correspondence & Report Writing", (4th Edition), by Tata MC Graw Hills, New Delhi.
6. Varinder Kumar, Bodh Raj & NP Manocha, "Business Communication Skills", Kalyani Publisher, New Delhi.
7. Kavita Tyagi & Padma Misra, "Professional Communication", PHI Learning Pvt. Ltd., New Delhi.
8. Nira Konar, "Communication Skills for Professionals", PHI Learning Pvt. Ltd., New Delhi.
9. Krishna Mohan & Meera Banerji, "Developing Communication Skills", (2nd Edition), Macmillan Publishers India Ltd., New Delhi.
10. M. Ashraf Rizwi, "Effective Technical Communication", Tata MC Graw Hills, New Delhi.
11. Andrea J Rutherford, "Basic Communication Skills for Technology", Pearson Education, New Delhi.

INSTRUCTIONAL STRATEGY

This is practice based subject and topics taught in the class should be practiced in the Lab regularly for development of required communication skills in the students. Emphasis should be given on practicing of communication skills. This subject contains five unit of equal weightage.

4.2 BUILDING BYELAWS

L	P/S
3	-

RATIONALE

In any architectural organization, diploma holders are expected to prepare the municipal drawings to get it sanctioned from the local development body. For this purpose, diploma holders in Architectural Assistantship must have the knowledge of the set of norms, rules and regulations and building bye laws of the local body. Therefore, this course is essential to be taught to diploma holders. Teachers should refer to local bye- laws/building bye-laws while teaching this subject.

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

CO1: State need and importance of building bye laws and their applications.
CO2: Explain the various laws for regulation of building operations and urban development.
CO3: Describe various codes of practices /acts related to building construction.
CO4: Discuss concept of zoning.

DETAILED CONTENTS

UNIT I

Need of building byelaws for urban development.
Basic Terminology used in building byelaws

UNIT II

Factors affecting planning of byelaws:

- Light and ventilation
- Mass
- Volume
- Open space
- Skyline
- Setbacks.

- Parking and Fire Safety
- Calculation of area, FAR, FSI etc.

UNIT III

Bye laws

- Study Building Bye- laws of local development authorities
- Introduction to National Building Code.

UNIT IV

Zoning

- Concept of zoning
- Objectives of zoning
- Types of zoning

UNIT V

Case Study of existing residential and commercial building with respect to implementation of local Bye laws.

Study of various performa to be used

Development/ Building Permit - Requirements for submission (Municipal) drawings]- sub division/ layout plan, key plan, Site plan, Floor plans, elevations, sections, Services plans, specifications, Structural stability Certificate, Scale, & coloring; Preparation & Signing of plans; Fees, Duration of sanction; Deviations, Violations and Penalties, Completion Certificate, Qualifications and Competence of professionals, Introduction to compounding.

RECOMMENDED BOOKS

1. Charanjit Shah, “Architect's Hand Book”, S Shah Publisher: New Delhi.
2. “PUDA Bye Laws”, McGraw Hill Book, New Delhi.
3. “N.B.C.”, Frank J Catanzaro Publishing.
4. “Local Bodies Legislation”, Allied Publishers, New Delhi.
5. “Chandigarh Bye Laws”, Charotar Publishing House Pvt. Ltd., New Delhi.

INSTRUCTIONAL STRATEGY

This is a practical oriented subject. The teacher should make efforts to procure local bye-laws/building bye-laws and refer them to the students while imparting instructions in the class room. The relevant theory/instructions should be dovetailed with the design/ drawing exercises. Experts working in the Municipal Corporations/Municipal Committees/ State Public Works Department/Consultants/Professional Architects may be invited to present case studies to the students. Students may be taken to some typical sites where the municipal drawings are maintained to demonstrate to them the real life applicability and importance of the subject. Some real life municipal drawings may also be presented to the students in the classroom. The students should maintain portfolio of the work done by them throughout the session. The teachers may conduct viva voce on completion of each assignment. The students may be given group and independent assignments. This subject contains five units of equal weightage.

4.3 BUILDING MATERIALS & CONSTRUCTION - III

L	P/S
2	4

RATIONALE

Students are supposed to prepare working drawings of buildings and detailed drawings of various components of buildings. Knowledge of building materials and construction is very essential from the point of construction materials as well as providing detailed specifications in the detailed drawings. Therefore, the course in building construction and materials includes imparting basic knowledge in the properties and use of important materials like plastics, alloys and metals, paints and varnishes etc. Faculty is expected to show the samples of different materials, discuss their properties with particular reference to their use and appearance in particular situations depending upon climate and environmental conditions of the site where the materials are to be used. Students should be encouraged to collect samples of various materials and efforts should be made to maintain a good building materials museum. Also faculty is expected to show various components of buildings under construction, make use of models or other audio-visual media to clarify the concepts.

COURSE OUTCOMES

After undergoing the subject, students will be able to:

CO1: Explain about the plastics, polymers, alloys & metals and their properties.
CO2: Discuss about the floor finishes and their properties.
CO3: Explain about the paints and varnishes and their properties
CO4: Discuss exterior & interior wall finishes and their applications

DETAILED CONTENTS

UNIT I

Plastics

- Natural (Shellac, casein and cellulose) and synthetic plastics Thermosetting and thermoplastics and their uses ,
- Plastics used as materials in building, industry e.g. flooring, roofing, wall panelling, pipes, doors etc.

- Polymers – carbon fiber, polymer concrete, polycarbonate sheet etc.

UNIT II

Alloys and Metals

- Ferrous and non-ferrous metals (Aluminum, copper, lead, zinc, tin etc) their uses and applications in buildings.

UNIT III

Paints and Varnishes, Drying Oil, Pigment, Drier, Thinner , Adhesives Synthetic resins (their trade names, uses of synthetic resins, costs, application in various situations as compared to traditional materials and methods . Packing sizes, rates, brands, performance guarantees as given by the manufacturer and collection of catalogues and their covering capacity, uses and availability of paints and varnishes.

- Water based paints
- Distempers
- Oil based paints and emulsions
- Cement paints
- Acrylic emulsions
- Melamine finishes
- Varnishes
- Spirit polish, wax polish
- Lacquers
- Stucco
- Tar and Bitumen paint
- Glazing putty

UNIT IV

Floor Finishes (Laying sizes, availability, popular brand names, quality of polish, uses and current market rates)

- Terrazzo Tiles and Flooring
- Glazed terracotta and ceramic tiles
- Cement Concrete Tiles
- Marble stone, Kota stone, slate, red sand stone, granite – their tiles and slabs
- Parquet (Wooden)
- Linoleum tiles and rolls
- PVC

- Heavy duty flooring for industrial building

UNIT V

Exterior & Interior Wall Finishes (along with application method)

- Wall board homogeneous
- Laminated fiber boards – types
- Plastic wall tiles – tiles available
- Wall papers
- Cork sheets and tiles
- Thermocol
- Foam rubber tiles and rolls
- Textured paint finishes
- Exterior wall finishes

PRACTICAL EXERCISES

1. Flooring
   - Types of flooring and constituents (ground and upper flooring)
   - Different types of floor finishes (2 sheets)
2. Doors and Windows
   - Using different aluminum sections
   - Anodizing of aluminum sections
   - Beadings in conjunction with aluminum section

   Drawing of aluminum door and window showing fixing, beading, hardware's etc. Drawing of sliding, and revolving doors (2 sheets)
3. Staircases and ramps
   - Definition and types of staircases as per nomenclature
   - Staircases of different materials
   - Relation between different components

   3. Drawing a dog leg wooden staircase
   4. Steel spiral staircase
   5. RCC staircase cast-in-situ and also precast (3 sheets)
4. Expansion joints
   - Viva-voce based upon theory syllabus
   - Preparation of drawing file

   Expansion joint in walls and roof, framed structure (2 sheets)

Total No. of Sheets-9

RECOMMENDED BOOKS

1 W.B. Mc Kay, “Building Construction”.
2 R. Barry, “Building Construction”.
3 Francis Ching D.K., “Building Construction Illustrated”
4 V.B. Sikka, “Civil Engineering Drawing”.
5 Sushil Kumar, “Building Construction”.
6 SK Sharma, and GC Mathur, "Engineering Materials”, Delhi-Jalandhar, S. Chand and Co.
7 Singh Surendra, "Engineering Materials", New Delhi, Vikas Publishing House Pvt. Ltd.
8 N Choudhary, "Engineering Materials", Calcutta, Technical Publishers of India.

SUGGESTED WEBSITES

1. https://www.youtube.com/watch?v=IpzkAwWMkkY(For Brick)
2. https://www.youtube.com/watch?v=EIDXE28_8eQ&list=PL8BA090E69BF01BC2(building material and construction)
3. https://www.youtube.com/watch?v=R2dNp5tLni0 (Building material and construction)
4. https://www.youtube.com/watch?v=raeXjtLPS7k(various(levels in building)
5. https://www.youtube.com/watch?v=5zOOm2fhhwA(For stones)
6. https://www.youtube.com/watch?v=oWYSLxVJAR8 (DPC)
7. https://www.youtube.com/watch?v=vN8smpxhL9c (FOOTING)
8. https://www.youtube.com/watch?v=oXtUtANZqWQ (Foundation)
9. https://www.youtube.com/watch?v=Z_jieunkTtw&list=RDCMUCNCaoN3_OYmMC-rXeoCt4YA&index=3(bonds)
10. https://www.youtube.com/watch?v=CD2QOsa1RMc&list=RDCMUCNCaoN3_OYmMC-rXeoCt4YA&index=1(arches and lintels)

INSTRUCTIONAL STRATEGY

This is one of the fundamental subject covering basic building materials and construction and finishing materials. Teachers should demonstrate samples of various materials while imparting classroom instruction. Teachers may also arrange some field visits to manufacturing/ production units and retailer shops like cement, kilns, timber saw mills and seasoning plants, hardware

shops, glass houses etc. Students should be encouraged to collect samples of various materials and catalogues of manufacturer. The students may maintain a scrapbook for this purpose. A museum of building construction, materials may be developed where samples of latest materials their specifications, characteristics, rates, manufacturer (supplier and relevant codes may be kept) to enhance the level of understanding of the students. This subject contains five units of equal weightage.

4.4 WORKING DRAWING AND DETAILING

L	P/S
-	4

RATIONALE

Preparation of working drawings and detailing forms the most important activities of diploma holders in Architectural Assistantship. Students are expected to develop mastery of skills in preparing workingdrawings of different building components and their detailing.
Teachers while imparting instructions are expected to show various components of building under construction by organizing field visits or use models and other audio-visual media to clarify the concepts involved in preparing working drawings. Teachers are expected to lay considerable stress on proportioning, dimensioning, specification writing, lettering and composition of drawing work whilst supervising students. Teachers should also take into consideration environmental aspects while teachingpreparation of working drawings.

COURSE OUTCOMES

After undergoing the subject, students will be able to:
CO1: State basic rules of measurement, dimensioning, and writing specifications
CO2: Use symbols used in technical drawings
CO3: Prepare details that can be easily readable and execute on site
CO4: Prepare detailed drawings of like Toilet, Kitchen etc.
CO5: Prepare working drawings for a simple single storeyed residential building

PRACTICAL EXERCISES

1. Preparation of working drawings for a simple single storeyed residential building:
1.1 Site Plan - Preparing site plan on a suitable scale with complete dimensioning showing plot area,covered built-up portion within the site, Approach road, side roads, adjoining buildings/features, boundary wall with gates layout of sewage pipes, water supply pipes, Rain-water pipes. (01 sheet)
1.2 Foundation plan with sectional details. (01 sheet)
1.3 Ground Floor Plan - Various building components, schedule of joinery i.e. doors, window ventilators etc. along with showing the layout of sewage pipes, water supply pipes, Rain water pipe. (01 sheet)

1.4 Terrace Plan - Rain water disposal details and overhead water tank (01 sheet)
1.5 Section - Cross and longitudinal sections (Complete vertical section through external wall from foundation to terrace/ parapet level.) (01 sheet)
1.6 Elevations - Front and rear elevations (01 sheet)
1.7 Toilet and Kitchen Details (Plan, Elevations and Sections as required) with specifications and details (02 sheet)
1.8 Electrical layout (01 sheet)

RECOMMENDED BOOKS

1. DK Ching, “Construction Details”, Standard Publishers, New Delhi.
2. MG Shah, CM Kale, SY Patki, “Building Drawing”, Tata McGraw Hill Publisher, New Delhi.

SUGGESTED WEBSITES

1. http://swayam.gov.in

INSTRUCTIONAL STRATEGY

This subject forms the basis for making the students ready to work in the field and is highly practical oriented. Teachers, while imparting instructions in the class room, should lay emphasis on proportioning, dimensioning, specification writing, lettering and composition of the drawing work of the students. Field visits may be arranged to the construction sites of residential, commercial and public buildings to demonstrate various components/stages of buildings under construction. Students should be exposed to: the system of preservation and maintenance of working drawings at the site during the field visits. Teachers may procure some working drawings of existing/live buildings and present the same to the students. The students should be encouraged to maintain portfolio) of the work done by them throughout the session and give seminar. 'Teachers may conduct viva voce on completion of each assignment. Experts from the design organizations may be invited to present case studies, to motivate the students. Repetitive exercises should be given to the students, till they develop confidence and attain proficiency. Relevant BIS codes and conventions may be referred/followed, while imparting instructions. Teachers may introduce the topics by giving simple set of instructions before giving any assignment to the students.

4.5 COMPUTER APPLICATIONS IN ARCHITECTURE - I

L	P/S
-	4

RATIONALE

To enable the student to develop the confidence to prepare the drawings of a given project through knowledge acquired in previous semester by preparing a set of drawings for any one project. To enable the student to create three dimensional objects in space with special emphasis on presentation and visualization of interiors and exteriors of building using different rendering techniques using AutoCAD (latest version).

COURSE OUTCOMES

After undergoing the subject, the students will be able to:
CO1: State about 2D and 3D commands.
CO2: Convert 2D drawings in to 3D drawings.
CO3: Draw 3D Rendering in drawing
CO4: Develop 3D modeling of different shape.
CO5: Set 3D drawings for printing.

PRACTICAL EXERCISES

Note: Relevant theory may be taught along with practical exercises in each topic.

UNIT I

1.1 Making and Inserting Blocks

Blocks, Insert block, Base, using library for blocks, W-block, X-ref, Explode

1.2 Dimensioning and Text

Dimension type, style, units; Dimension utilities; Dimension variables; Dimensioning of different elements like (Horizontal, vertical, inclined). Arc. Circle Radius, diameter), continuous dimensioning etc.; Editing dimension text and updating (adding new text and editing existing text); Text style – font types, height, width factor etc. as per plotting paper size.

UNIT II

2.1 Plotting Drawings

Plot command, selecting area for plotting, Scale of plot, scale to fit, selecting plotting device, selecting paper size and type, selecting black and white or colored plots, selecting appropriate print speed, quality; Print preview, working in Paper space and plotting, Project (Rendering of CAD drawing)

2.2 The **design problem of Minor Project** shall be taken up for preparing a complete set of drawings. These include all plans, elevations (minimum 2) and sections (2 minimum), showing all interior layouts, door-window schedule, tree plantations, parking layout etc.

UNIT III

3. Making an existing 2-D plan drawing compatible to 3-D drafting

3.1 Commands and modifications to 2-D drawings

3.2 B. Poly, rectangle, elevation, extrude – requirements and applications

3.3 3-D of exterior of blocks – preparation, modification of 2-D drawing

3.4 3-D of interiors of block – preparation, modification of 2-D drawings

UNIT IV

4. Fundamentals of 3-D Drafting

4.1 Basic Features

4.2 Coordinate system

4.3 3-D entities and surfaces

Exercises – 1: Converting simple geometric shapes into 3-D Objects

UNIT V

5. 3-D Modeling

5.1 Wire frame, surface and 3-D solid modeling

5.2 Viewing 3-D models

5.3 Rendering, shading, hide commands, lights and Camera

5.4 Material representation

5.5 Importing, exporting library and printing 3-D

Exercises – 2: 4th Semester design proposal to be converted in 3-D model

RECOMMENDED BOOKS

1. Dorothy Kent, "AutoCAD Reference Guide: Everything You Wanted to Know about AutoCAD–Fast!", New Riders Pub, USA.
2. Arshad N Siddique, Zahid Khab, and Mukhtar Ahmed, "Engineering Drawing with a primer on AutoCAD", Prentice Hall of India, New Delhi.
3. Kevin Carton, "AutoCAD Interface: AutoCAD Fundamentals: Understanding the Basic Interface", Kevin Catron publisher at San Antonio, Texas.
4. Jayanta Sarkar, "Sketch Entities & Sketch Tools: Computer-aided Design: a Conceptual Approach", Taylor & Francis Group, Milton Park, Oxfordshire.
5. Elliot J. Ginidis, "Dimensions & Dimensions Styles: Up and Running with AutoCAD 2013: 2D and 3D Drawing and Modelling", Academic Press.
6. Hari Krishan, "Cartesian Coordinate System: Coordinate Geometry of Three Dimensions", Atlantic, New Delhi.

INSTRUCTIONAL STRATEGY

This is a highly practical oriented subject. Efforts should be made by the teachers to procure relevant softwares and give practical exercises to individual students, so that they develop proficiency in operating computer softwares as applied to the profession of architecture. The theoretical instructions should be dovetailed with practical work. Toward the end of the session each student should be given independent computer based project assignment. Expert lectures from practicing architectural field may be invited to deliver talks and for presentation of live case studies on computers to motivate the students and increase their level of awareness. Special efforts should be made by the teachers to develop well defined small tutorial exercises on each topic and supervise the exercises being performed by the student throughout the session. If need be some basic operational fundamental exercises may be repeated in the beginning of the session. Special emphasis may be laid in training the students, to avail help from the user friendly software so that they develop confidence and are able to work independently.

4.6 HISTORY OF ARCHITECTURE - II

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RATIONALE

The course on History of Architecture develops appreciation regarding past and current trends in the field of architecture. The knowledge of this course will help the students to understand how political, physical, social, economical and technological change affect the architecture, materials and construction techniques. The course covers broad topics like: pre-historic architecture, important civilizations, (Indian, Egyptian, Greek and Roman), medieval architecture in Europe, and temple architecture and Buddhist architecture in India.

The teacher should try to create interest among the students for this course by organizing site visits to the local old monuments. Audio-visual aids should also be used to explain various architectural developments. While imparting instructions, teacher should stress upon the context of form and space, construction methods structural systems and materials. The teacher should motivate the students to take general reference for form, drawings structural solutions and materials from the history, while designing their project.

COURSE OUTCOMES

After undergoing the subject, students will be able to:

CO1: State features of various architectural periods in Europe.

CO2: Explain development of architecture in Europe in the form of various architectural styles.

CO3: Discuss various architectural periods and styles of Mughal Architecture in India.

CO4: Describe Modern Movement, and philosophies of Master Architects in Modern Architecture in Europe and America.

CO5: Explain architectural styles by Contemporary Architects and incorporate them in building design.

DETAILED CONTENTS

UNIT I

European Architecture-I

1.1 **Early Christian Architecture**

Development of church plan (Basilican), construction method and general architectural characteristics of St. Peters, Rome

1.2 Romanesque Architecture

General architectural characteristics, materials and construction method for the Pisa group of buildings.

UNIT II

European Architecture –II

2.1 Gothic Architecture

- Main visual and construction vocabulary of Gothic Arch at Notre Dame Paris.

2.2 Renaissance Architecture

2.2.1 Early Renaissance Architecture. General architectural characteristics (Florence cathedral)

2.2.2 Late Renaissance architecture. General characteristics (St. Peter's Rome)

UNIT III

Islamic Architecture in India.

3.1 Imperial Architecture- Introduction of Islam in India, new building types, structural system and ornamentation (Qutb Complex)

3.2 Provincial Styles-Jaunpur and Bijapur (Jami Masjid, Jaunpur and Gol Gumbaz, Bijapur)

3.3 Mughal Architecture-General architectural characteristics to understand architectural vocabulary & construction methods in (Humayun Tomb, Fatehpur Sikri, Red Fort, Taj Mahal at Agra and Jama Masjid at Delhi).

UNIT IV

Modern Architecture in Europe and America.

4.1 Emergence of modern architecture in Europe. Social, technological and aesthetic concerns of modern movement. New building materials (concrete, steel and glass) and their architectural expression.

4.2 Philosophies of Walter Gropius, Frank Lloyd Wright, Mies Van De Rohe. (Minimum one work of each to be studied).

UNIT V

Contemporary/post-Independence Architecture in India

- Works of Le Corbusier in India, Charles Correa, B.V. Doshi, Joseph Allen Stein and Raj Rewal.

(Minimum one building of each architect to be studied)

RECOMMENDED BOOKS

1. Arthur B. Gallion, "Urban Pattern", Van Nostrand Reinhold, 1993, New York.
2. Arthur Kohn, "History Builds the Town", Khanna Book Publishing Co. (P) Ltd., New Delhi.
3. Trewin Copplestone, "World Architecture: An Illustrated History From Earliest Times", Publisher, Crescent Books, New York.
4. Paul D. Spreinegen, "Architecture of Towns and Cities", Rainbow Book Co.New Delhi.
5. "Space, Time and Architecture", Sigfried B. Giedeon Publisher, Harvard University Press, UK.
6. "The New Landscape", Charles Correa Bombay: Book Society of India, Bombay.
7. Arthur B, Gallion and B Fischer, "Urban Pattern", McGraw Hill Book, NewDelhi.
8. Spiro Kostof, "A History of Architecture: Settings and Rituals", Oxford University Press UK.
9. Hirons, "Town Building in History", Vikas Publishing House Pvt., New Delhi.
10. Internet Sources/Various search engine may also be used for additional information on some topics.

INSTRUCTIONAL STRATEGY

The subject may be taught through audiovisual aids, slides, PowerPoint presentations so as to explain salient architecture features and techniques. Emphasis must be laid on freehand drawing and each student should maintain a sketchbook. This subject contains five units of equal weightage.

4.7 OPEN ELECTIVE

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RATIONALE

Open electives are very important and play major role in implementation of National Education Policy. These subjects provide greater autonomy to the students in the curriculum, giving them the opportunity to customize it to reflect their passions and interests. The system of open electives also encourages cross learning, as students pick and choose subjects from the different streams.

COURSE OUTCOMES

At the end of the open elective, the students will be able to:

CO1: State the basic concepts and principles about the subject of interest.
CO2: Perform in a better way in the professional world.
CO3: Select and learn the subject related to own interest.
CO4: Explore latest developments in the field of interest.
CO5: Develop the habit of self-learning through online courses.

LIST OF OPEN ELECTIVES

(The list is indicative and not exhaustive)

1. Computer Application in Business
2. Introduction to NGO Management
3. Basics of Event Management
4. Event Planning
5. Administrative Law
6. Introduction to Advertising
7. Moodle Learning Management System
8. Linux Operating System
9. E-Commerce Technologies
10. NCC
11. Marketing and Sales
12. Graphics and Animations

13. Digital Marketing
14. Human Resource Management
15. Supply Chain Management
16. TQM

GUIDELINES

Open Elective shall be offered preferably in online mode. Online mode open elective shall preferably be through Massive Open Online Courses (MOOCs) from Swayam, NPTEL, Upgrad, Udemy, Khan Academy or any other online portal to promote self-learning. A flexible basket of large number of open electives is suggested which can be modified depending upon the availability of courses at suggested portals and requirements. For online open electives, department coordinators shall be assigned to monitor and guide the group of students for selection of minimum 20 hours duration online course of their choice. For offline open electives, a suitable relevant subject shall be offered by the respective department to the students with minimum 40% of the total class strength as per present and future requirements.

Assessment of MOOCs open elective shall be based on continuous evaluation by the respective coordinator. The coordinator shall consider the submitted assignments by the students from time to time during the conduct of MOOCs. The MOOCs assessment shall be conducted by the coordinator along with one external expert by considering submitted assignments out of 100 marks.

In case, no suitable open elective is available online, only then the course may be conducted in offline mode. The assessment of offline open elective shall be internal and external. The offline open elective internal assessment of 40 marks shall be based on internal sessional tests; assignments etc. and external assessment of 60 marks shall be based on external examination at institute level.

NOTE

The students enrolled under NCC will compulsorily undertake NCC as an open elective subject.

SUGGESTED WEBSITES

1. https://swayam.gov.in/
2. https://www.udemy.com/
3. https://www.upgrad.com/
4. https://www.khanacademy.org/

4.8 MINOR PROJECT

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RATIONALE

Minor project work will help in developing the relevant skills among the students as per National Skill Qualification Framework. It aims at exposing the students to the present and future needs of various relevant industries. It is expected from the students to get acquainted with desired attributes for industrial environment. For this purpose, students are required to be involved in Minor Project Work in different establishments.

COURSE OUTCOMES

After undergoing this course, the students will be able to:

CO1: Define the problem statement of the minor project according to the need of industry.
CO2: Work as a team member for successful completion of minor project.
CO3: Write the minor project report effectively.
CO4: Present the minor project report using PPT.

GUIDELINES

Depending upon the interest of the students, they can develop minor projects/design problems as per present and future demand of the industry. The supervisors may guide the students to identify their minor project work and chalk out their plan of action well in advance. As a minor project activity each student is supposed to study the operations at site and prepare a detailed project report of the observations/processes/activities. The supervisor may create a group of 4-5 students as per their interest to work as a team for successful completion of the minor project.

The supervisor shall evaluate the students along with one external expert by considering the following parameters:

	Parameter	**Weightage**
i	Defining problem statement, focus and approach	20%
ii	Innovation / creativity	20%
iii	Report Writing	20%
iv	Power Point Presentation	20%
v	Viva - voce	20%

THIRD YEAR

NSQF LEVEL - 5

18. STUDY AND EVALUATION SCHEME

FIFTH SEMESTER

Sr. No.	SUBJECTS	STUDY SCHEME Periods/Week		Credits (C) L+P = C	MARKS IN EVALUATION SCHEME						Total Marks of Internal & External
					INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT			
		L	P/S***		Th	Pr	Tot	Th	Pr	Tot	
5.1	Industrial Training-II	-	2	0+1=1	-	40	40	-	60	60	100
5.2	Architectural Design	-	8	0+4=4	-	40	40	-	60	60	100
5.3	Building Materials & Construction - IV	2	4	2+2=4	40	40	80	60	60	120	200
5.4	Structure Systems-I	3	-	3+0=3	40	-	40	60	-	60	100
5.5	Quantity Surveying & Costing	4	-	4+0=4	40	-	40	60	-	60	100
5.6	Computer Applications in Architecture-II	-	6	0+3=3	-	40	40	-	60	60	100
5.7	Programme Elective-I	3	-	3+0=3	40	-	40	60	-	60	100
# Student Centered Activities(SCA)		-	3	-	-	-	-	-	-	-	-
	Total	**12**	**23**	**22**	**160**	**160**	**320**	**240**	**240**	**480**	**800**

*** P/S is studio for architectural subjects & practical for other subjects.

Student Centered Activities will comprise of co-curricular activities like extension lectures on Constitution of India, Electoral Literacy, Motor Vehicles (Driving) Regulations 2017 etc., games, hobby clubs e.g. photography etc., seminars, declamation contests, educational field visits, N.C.C., NSS, Cultural Activities and self-study etc.

Programme Elective-1: 5.7.1 Landscape Design 5.7.2 Architectural Photography& Documentation 5.7.3 Housing

SIXTH SEMESTER

Sr. No.	SUBJECTS	STUDY SCHEME Periods/Week		Credits (C) L+P = C	MARKS IN EVALUATION SCHEME						Total Marks of Internal & External
					INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT			
		L	P/S***		Th	Pr	Tot	Th	Pr	Tot	
6.1	* Entrepreneurship Development and Management	3	-	3+0=3	40	-	40	60	-	60	100
6.2	Computer Applications in Architecture-III	-	4	0+2=2	-	40	40	-	60	60	100
6.3	Interior Design	3	-	3+0=3	40	-	40	60	-	60	100
6.4	Structure Systems-II	3	-	3+0=3	40	-	40	60	-	60	100
6.5	Programme Elective -II	3	-	3+0=3	40	-	40	60	-	60	100
6.6	Major Project/ Industrial Training	-	16	0+8=8	-	40	40	-	60	60	100
# Student Centered Activities(SCA)		-	3	-	-	-	-	-	-	-	-
	Total	**12**	**23**	**22**	**160**	**80**	**240**	**240**	**120**	**360**	**600**

* Common with other Diploma Courses

*** P/S is studio for architectural subjects & practical for other subjects.

\# Student Centered Activities will comprise of co-curricular activities like extension lectures on Constitution of India, Electoral Literacy, Motor Vehicles (Driving) Regulations 2017 etc., games, hobby clubs e.g. photography etc., seminars, declamation contests, educational field visits, N.C.C., NSS, Cultural Activities and self-study etc.

Programm Elective II : 6.5.1 Vernacular Architecture 6.5.2 Building Maintenance 6.5.3 Sustainable Architecture

19. HORIZONTAL AND VERTICAL SUBJECTS ORGANISATION

Sr. No.	Subjects/Areas	Hours Per Week	
		Fifth Semester	Sixth Semester
1.	Industrial Training-II	2	-
2.	Architectural Design	8	-
3.	Building Materials & Construction -IV	6	-
4.	Structure Systems-I	3	-
5.	Quantity Surveying & Costing	4	-
6.	Computer Applications in Architecture-II	6	-
7.	Programme Elective-I	3	-
8.	Entrepreneurship Development and Management	-	3
9.	Computer Applications in Architecture-III	-	4
10.	Interior Design	-	3
11.	Structure Systems-II	-	3
12.	Programme Elective -II	-	3
13.	Major Project/ Industrial Training	-	16
	Student Centered Activities(SCA)	3	3
	Total	**35**	**35**

20. COMPETENCY PROFILE & EMPLOYMENT OPPORTUNITIES

Government and private sectors related to **Architectural Assistantship** require **supervisors** having well developed skills with clear choice of procedures. They are expected to have complete knowledge and practical skills related to architectural assistantship field. They shall be able to communicate clearly with others. Diploma holders after passing level 5 shall have understanding of desired mathematical skills and understanding of social and natural environment. They are expected to collect, organize and communicate information effectively.

Work requiring knowledge, skills and aptitudes at level 5 will also be carried out in familiar situations, but also ones where problems may arise. Job holders will be able to make choices about the best procedures to adopt to address problems where the choices are clear. Individuals in jobs which require level 5 qualifications will normally be responsible for the completion of their own work and expected to learn and improve their performance on the job. They will require well developed practical and cognitive skills to complete their work. They may also have some responsibility for others' work and learning.

Architectural Assistantship diploma pass out students will be expected to understand what constitutes quality in the occupation and will distinguish between good and bad quality in the context of their work. They will be expected to operate hygienically and in ways which show an understanding of environmental issues. They will take account of health and safety issues as they affect the work they carry out or supervise. They are expected have good theoretical and practical knowledge of various architectural assistantship procedures to work efficiently in architectural organizations.

They find employment in service sector in the following organizations:

- The private enterprises consisting of firms of Architects or engineers
- Builders, contractors, interior designers, web-page designers and survey companies Government departments namely:
    a) State Department of Architecture
    b) State Department of Town and Country Planning
    c) Central Public Works Department
    d) State Housing Boards and Corporations
    e) State Urban Development Agency
    f) Railways
    g) Military Engineering Services
    h) Local Bodies
    i) Survey of India

j) State Electricity Department/Boards
k) Telecommunication Department

Self-Employment

- Private Practice with local bodies
- Own unit/enterprise for
  a) Model Making
  b) Perspective making
  c) Landscaping
  d) Drawings and CAD
- Service to Private Architects
- Sub Contracts of Construction, renovation, repair and interior design
- Site Supervision
- Site Surveying
- Estimation and Billing
- Site/marketing of building components
- Liaison work

21. PROGRAMME OUTCOMES

The program outcomes are derived from five domains of NSQF Level – 5 namely Process, Professional Knowledge, Professional Skill, Core Skill, Responsibility. After completing this level, the student will be able to:

PO1: Perform task that require well developed skills with clear choice of procedures.

PO2: Acquire knowledge of facts, principles and processes related to architectural assistantship

PO3: Demonstrate cognitive and practical skills to complete tasks and solve problems.

PO4: Develop skills to collect, organize and communicate information.

PO5: Accomplish own work and supervise others work.

22. ASSESSMENT OF PROGRAMME AND COURSE OUTCOMES

Programme Outcomes to be assessed	Assessment criteria for the Course Outcomes
PO1: Perform task that require well developed skills with clear choice of procedures.	• Describe the complexities and constraints in designing building complexes. • Apply architectural principles to develop creative solutions for various building types. • Proficient in site planning, services integration, and parking design. • Conduct thorough case studies and site visits to inform design decisions effectively. • Demonstrate knowledge of architectural precedents and best practices through library • research. • Describe basic structural principles for architectural design. • Analyze structural elements under different loads. • Design appropriate structures for buildings. • Create diagrams to check if buildings are strong enough. • Recognize key elements essential in landscape design including plants, water features, earth forms, and man-made elements. • Apply principles such as symmetry, balance, texture, color, and proportion to create harmonious landscape designs. • Describe the relationship between landscape design and climate, including considerations for sun and wind control.

	• Design outdoor functional spaces tailored to different building types to enhance their architectural functions. • Explore various types of gardens including Japanese, Mughal, and English gardens, and apply their design principles in landscape projects. • Explain RCC concepts, steel reinforcement materials, and structural loading principles. • Differentiate between shallow and deep foundations, and understand basic design principles. • Comprehend columns' role, identify types based on loading, and learn design principles for axially loaded columns. • Discuss beams' function in load distribution, perform flexural analysis, and learn reinforced concrete beam design principles. • Describe different types of vernacular architecture in India and their unique characteristics. • Explain cultural and contextual aspects embedded in vernacular architecture. • Discuss the influences of historical, geographical, and cultural factors on the design and construction of vernacular buildings. • Interpret the spatial planning, materials, and construction techniques used in vernacular architecture.

	• Discuss the aesthetic and symbolic element present in vernacular buildings and their relevance to local communities.
PO2: Acquire knowledge of facts, principles and processes related to architectural assistantship.	• Describe the characteristics, availability, and application methods of ceiling materials such as Hession cloth, gypsum plaster boards, and fiberboards. • Explain roofing materials including asbestos sheets, GI sheets, and slates, including their • standard sizes, uses, and supporting systems. • Discuss additives and admixtures used in construction, such as water repellents and accelerators, and their properties and costs under different conditions. • Explore kitchen and toilet fixtures, including sanitary fittings and accessories, understanding their specifications, popular brands, and costs. • Apply theoretical concepts through practical exercises on earthquake-resistant building configurations, steel sections, roofs, and frame connections • Estimate building costs using methods like plinth area and cubic rate estimates. • Develop skills in measuring materials and creating Bill of Quantities (BOQ) for small residential buildings. • Record measurements, prepare bills, and manage contracts in construction projects. • Discuss tender documents and processes to participate effectively in tendering for

	construction projects. • Describe fundamentals of photography and how they apply to architectural subjects. • Capture architectural details, composition, and lighting. • Explore the role of photography in documenting architectural heritage and contemporary structures. • Develop an eye for the aesthetic and artistic aspects of architectural photography. • Proficient in post-processing techniques for enhancing architectural photographs. • Explore ethical considerations and best practices in architectural documentation. • Explain fundamental principles of interior design. • Apply space planning techniques for various interior spaces. • Analyze live interior design projects for practical insights. • Identify and evaluate materials relevant to interior design. • Discuss detailed interior design solutions for diverse spaces. • Explain sustainability and its importance • Identify basic principles of sustainable architecture and how they influence building design. • Recognize different materials and construction methods that are environmentally friendly.

	• Implement simple strategies for energy efficiency, water conservation, and waste management in building design. • Comprehend the role of codes and regulations in promoting sustainable construction practices.
PO3: Demonstrate cognitive and practical skills to complete tasks and solve problems.	• Prepare detailed working drawings using AutoCAD for a minor project, including site plans, foundation layouts, floor plans, and terrace plans with drainage details. • Design built-in furniture by developing plans, elevations, and sections with various fitting details. • Develop detailed drawings for entrance gates, boundary walls, and railings. • Design electrical layout plans to ensure proper placement of fixtures and wiring. • Create comprehensive layouts for water supply, sewage, and drainage systems to ensure efficient functionality. • Describe the basic concepts of housing and its significance in architecture and urban planning. • Identify different types of dwelling structures, including detached houses, semi-detached houses, flats, and multi-storied buildings. • Apply principles of site selection and orientation in housing design. • Demonstrate knowledge of residential bylaws and regulations governing plot proportions, road access, parking, and conservation of green spaces.

	• Develop an awareness of sustainable housing practices and their importance in modern urban development. • Use advanced rendering software to enhance 2D architectural drawings like floor plans and elevations. • Apply rendering techniques to make 3D architectural models more realistic with materials, lighting, and textures. • Create attractive presentations and design portfolios using rendered images and animations for effective communication of architectural designs. • Explore virtual reality (VR) and augmented reality (AR) for immersive architectural visualization experiences. • Demonstrate proficiency in rendering software through projects showcasing professional-quality architectural renderings and presentations.
PO4: Develop skills to collect, organize and communicate information.	• Understand the working environment of industries • Learn about present and future requirement of industries. • Develop writing, speaking and presentations skills. • Observe technological developments as per present and future needs of industries. • Collect, communicate and manage the data from connected devices. • Comprehend the importance of entrepreneurship and its role in nation's development.

	• Classify the various types of business and business organizations. • Identify the various resources / sources and / or schemes for starting a new venture. • Explain the principles of management including its functions in an organisation. • Conduct market survey and prepare project report. • Define the problem statement of the Industrial training / Major project according to the need of industry. • Write the Internship / Major project report effectively. • Present the Internship / Major project report using PPT. • Describe importance and economic aspects of building maintenance, along with the selection of materials for repair. • Identify defects in building interiors and exteriors, and learn the appropriate repair methods, especially concerning surface finishes. • Recognize the causes and effects of dampness in buildings, and implement remedies for its removal. • Implement preventive maintenance practices like sweeping, joint maintenance, dusting, and termite control to ensure longevity and functionality. • Manage scheduled maintenance tasks related to water supply and sanitary systems to maintain the building's functionality and hygiene.

PO5: Accomplish own work and supervise others work.	• Take necessary safety precautions and measures. • Work in team for solving industrial problems • Develop competencies and skills required by relevant industries. • Define the problem statement of the Industrial training / Major project according to the need of industry. • Work as a team member for successful completion of Industrial training / Major project. • Write the Internship / Major project report effectively. • Present the Internship / Major project report using PPT.

23. SUBJECTS & DETAILED CONTENTS

FIFTH SEMESTER

5.1 INDUSTRIAL TRAINING - II

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RATIONALE

Industrial training will help the students to understand the working environment of relevant industries. The student will learn to work in team to solve the industrial problems. It willalso give exposure about the present and future requirements of the relevant industries. This trainingis very important for development of required competencies and skills for employment and start– ups.

COURSE OUTCOMES

After undergoing the training, the students will be able to:

CO1: Understand the working environment of industries
CO2: Take necessary safety precautions and measures.
CO3: Learn about present and future requirement of industries.
CO4: Work in team for solving industrial problems.
CO5: Develop competencies and skills required by relevant industries.
CO6: Develop writing, speaking and presentations skills.

PRACTICAL EXERCISES

1. Report writing based on industrial training.
2. Preparation of Power Point Slides based on industrial training and presentation by the candidate.
3. Internal Evaluation based on quality of Report, PPT preparation, PPT presentation and answerto queries.
4. External Evaluation based on quality of Report, PPT preparation, PPT presentation and answerto queries.

GUIDELINES

Students will be evaluated based on Industrial training report and their presentation using Power Point about the knowledge and skills gained during the training. The Head of the Department will depute faculty coordinators by assigning a group of students to each. The coordinators will mentor and guide the students in preparing the PPTs for final presentation. The following performance parameters are to be considered for assessment of the students out of 100 marks:

	Parameter	Weightage
i	Industrial assessment of the candidate by the trainer	40%
ii	Report Writing	20%
iii	Power Point Presentation	20%
iv	Viva-voce	20%

5.2 ARCHITECTURAL DESIGN

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RATIONALE

This course is designed to equip students with the necessary skills and knowledge to understand the complexities and constraints involved in designing building complexes. Through a series of exercises focused on various building typologies, students will apply architectural principles to develop creative solutions while addressing site planning, services integration, and parking design. Additionally, students will engage in thorough case studies and site visits to inform their design decisions effectively, demonstrating a comprehensive understanding of architectural precedents and best practices through library research.

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

CO1: Describe the complexities and constraints in designing building complexes.
CO2: Apply architectural principles to develop creative solutions for various building types.
CO3: Proficient in site planning, services integration, and parking design.
CO4: Conduct thorough case studies and site visits to inform design decisions effectively.
CO5: Demonstrate knowledge of architectural precedents and best practices through library research.

PRACTICAL EXERCISES

Two exercises of upto 3-storied buildings of 8 weeks duration each to be done individually. The exercise could be any of the following:

- Small housing complex. (1 to 2 acre)
- Museum/ Exhibition centre.
- Motel
- Shopping centre
- High school

Note:

1. Special Emphasis to be laid on site planning, Services, Parking.

2. Case study and library study must be done for each exercise.
3. Site Visits and related case studies to be carried out

RECOMMENDED BOOKS

- Time Saver Standards for Building Types by Joseph De Chiara and John Callendera
- Architects Data by Neufert
- Space, Time and Order by DK Ching
- Architectural Aesthetics by Sangeet Sharma, Abhishek Publication, Chandigarh

SUGGESTED WEBSITES

1. ArchDaily (www.archdaily.com)
2. Dezeen (www.dezeen.com)
3. The Getty Research Institute (www.getty.edu/research)
4. Council on Tall Buildings and Urban Habitat (CTBUH) (www.ctbuh.org)
5. Academia.edu (www.academia.edu)

INSTRUCTIONAL STRATEGY

This is one of the most important practical oriented subjects for diploma in architectural assistantship. While imparting instruction, special visits may be arranged to demonstrate and explain important architectural features of different types of residential, commercial and public buildings. Teacher may present some of the already completed design works of practicing architects to the students and explain the important features and elements. Audio- visual material available in this field may be procured and presented to the students from time to time. Students should be encouraged to visit relevant web-sites and teachers should develop the design problems/assignments which can be taken up by the students using relevant and appropriate software. Students should be given group and independent design/drawing assignments and they should also maintain sketch book/portfolio of all the assignments given to them throughout the session. Teachers may conduct viva-voce on completion of each assignment. Students may present seminars towards the end of the session.

5.3 BUILDING MATERIALS AND CONSTRUCTION-IV

L	P
2	4

RATIONALE:

This course aims to provide students with comprehensive knowledge and practical skills related to various construction materials and structural systems commonly used in architectural practice. By focusing on ceiling materials, roofing materials, additives and admixtures, and kitchen and toilet fixtures, students will develop an understanding of material characteristics, applications, and specifications. Furthermore, through practical exercises on earthquake-resistant building configurations, steel sections, roofs, and frame connections, students will develop proficiency in building construction techniques.

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

CO1: Describe the characteristics, availability, and application methods of ceiling materials such as Hession cloth, gypsum plaster boards, and fiberboards.

CO2: Explain roofing materials including asbestos sheets, GI sheets, and slates, including their standard sizes, uses, and supporting systems.

CO3: Discuss additives and admixtures used in construction, such as water repellents and accelerators, and their properties and costs under different conditions.

CO4: Explore kitchen and toilet fixtures, including sanitary fittings and accessories, understanding their specifications, popular brands, and costs.

CO5: Apply theoretical concepts through practical exercises on earthquake-resistant building configurations, steel sections, roofs, and frame connections

DETAILED CONTENTS

UNIT I

Ceiling Materials (Size, quality, availability, types of finishes, uses, trade names, market rate and application methods)

- Hession cloth
- Gypsum plaster boards plaster of Paris board
- Plain AC sheets – E board etc.

- Plywood
- Hard Board
- Cellotex
- Fiber Boards
- Fiber glass
- Asbestos tiles
- Thermocoal
- Medium density fiber board (MDF)

UNIT II

Roofing Materials

- GI sheets
- Shingles
- Ferro-cement sheets
- Fiber sheets
- Slates
- Manglore tiles
- Pan tiles
- Corrugated PVC sheets
- Their standard sizes, uses, availability, prices and knowledge about supporting system

UNIT III

Additives and Admixtures

- Water repellants and water proofing agents
- Accelerators
- Air entraining agents
- Hardeners
- Workability increasing agents
- Fly ash
- Their availability, uses, costs, performance specifications, and properties used under various conditions.

UNIT IV

Kitchen and Toilet Fixtures

- Market survey of various materials and collection of data with reference to their properties, sizes, costs, designs etc. (Specifications of kitchen and toilet fittings and fixtures, their popular brand names, shapes and sizes)
- **Note:** Sizes, specifications and availability of sanitary fittings e.g. W.C/ Cisterns/Urinals/Wash basins/Kitchen sinks, related accessories their types, brands and costs.

PRACTICAL EXERCISES

1. Earthquake resistant building configuration (Principles of earthquake resistance, effect of building form on seismic behavior, building configuration for improved earthquake resistance) (**2 sheets** showing Architecture and Structural details/sketches)
2. **Steel Sections**
   - Steel doors and windows using standard rolled sections **(2 sheets)**
   - Rolling and collapsible structure **(2 sheets)**
3. **Steel Roofs**
   - Line diagram of steel roofs for various spans
   - Construction details of steel roofs
   - Roof covering: AC, GI sheets **(2 sheets)**
   - North light truss **(1 sheet)**
4. **Frame and Sealed Connections Built Up Steel Columns and Beams**
   - Beam to beam framed connection
   - Beam to column framed connection
   - Beam to column seated connection **(2 sheets)**

Total sheets-11

RECOMMENDED BOOKS

1. Building Construction by WB Mackay; Khanna Publisher, New Delhi
2. Building Construction by SP Bindra and SP Arora; Publisher Dhanpat Rai & Co. New Delhi
3. Building Construction by BC Punmia; Publisher Laxmi Publication, New Delhi
4. Building Construction by Sushil Kumar; Standard Publisher, New Delhi
5. Construction of Buildings (Vol I and II) by Barry
6. Building Construction by VB Sikka; Publisher Tata McGraw Hill Publisher, New Delhi

7. Building Construction by Rangwala; Publisher Charotar Publishing House Pvt. Ltd., New Delhi

SUGGESTED WEBSITES

1. The Indian Green Building Council (IGBC) (www.igbc.in)
2. The National Building Code of India (NBC) (www.bis.gov.in)
3. The Bureau of Indian Standards (BIS) (www.bis.gov.in)
4. The Construction Industry Development Council (CIDC) (www.cidc.in)
5. The Indian Ceramic Society (ICS) (www.indianceramicsociety.org)
6. The Indian Institute of Architects (IIA) (www.iia-india.org)
7. The Indian Plywood Industries Research & Training Institute (IPIRTI) (www.ipirti.gov.in)

INSTRUCTIONAL STRATEGY

This is one of the fundamental subjects covering basic building materials and construction and finishing materials. Teachers should demonstrate samples of various materials while imparting classroom instruction. Teachers may also arrange some field visits to manufacturing/ production units. Students should be encouraged to collect samples of various materials and catalogues of manufacturer. The students may maintain a scrapbook for this purpose. A museum of building construction, materials may be developed where samples of latest materials their specifications, characteristics, rates, manufacturer (supplier and relevant codes may be kept) to enhance the level of understanding of the students. This subject contains five units of equal weightage.

5.4 STRUCTURE SYSTEMS-I

L	P
3	-

RATIONALE:

To provide students with a comprehensive understanding of the fundamental principles of structural mechanics and their applications in engineering. The students will be imparted instructions to analyze structural elements under different loads and design appropriate structures for buildings.

COURSE OUTCOMES:

After undergoing the subject, the students will be able to:

CO1: Describe basic structural principles for architectural design.
CO2: Analyze structural elements under different loads.
CO3: Design appropriate structures for buildings.
CO4: Create diagrams to check if buildings are strong enough.

DETAILED CONTENTS

UNIT I

Force system and Equilibrium

- Force: Definition, effect, characteristics, representation and types of forces
- Force Systems: Coplanar and non-coplanar force systems
- Types of coplanar Forces: Collinear, Concurrent, Parallel, non-concurrent and non-parallel.
- Resultant force and components of a force
- Laws of forces: Parallelogram, Triangle and polygon Laws of forces

UNIT II

Centroid and Moment of Inertia

- Definition of centre of Gravity and Centroid
- Centroid by method of moments of areas for square, rectangular, triangular, L-shape, T-shape and I shape cross- sections.
- Moments of Inertia by methods of moments and Radius of Gyration.

UNIT III

Stress and Strain

- Elasticity, Elastic limit
- Definition of stress and strain
- Types of stress and strain
- Stress strain curve for mild steel
- Hook's Law (Theory)

UNIT IV

Shear Force and Bending Moment

- Types of loads- Dead load, Live load, snow, wind and seismic loads as per IS:875
- Types of loading: Point load, uniformly distributed load and uniformly varying load.
- Types of Supports: Hinged, fixed supports, types of reactions provided by each type of support.
- Types of Beams: Simply supported, cantilever, overhanging and continuous beams (description only)
- Concept of bending moment and shear force.
- Bending moment and shear force diagrams for simply supported, cantilever and over hanging beams subjected to point loads and uniformly distributed loads only

UNIT V

Types of Structure Systems & its applications

- Load-Bearing Structures
- Frame Structures
- Shell Structures
- Truss Structures
- Cable and Tensile Structures
- Hybrid Structure Systems

RECOMMENDED BOOKS

1. Structure Mechanics for Architects – Prof. Harbhajan Singh, Pub. Abhishek Publications, Chandigarh
2. Mechanics of Solids- DK Singh-Galgotia Publications Pvt. Ltd., New Delhi.

3. Fundamentals of Applied Mechanics- AS Sarao Victor Gambhir Gaurav Agrawal. By Satya Prakashan New Delhi.
4. Structural Mechanics-VS Prasad-Golgotia Publication Pvt. Ltd., New Delhi.
5. Engineering Mechanics and strength of Materials-Dr RK Bansal –Laxmi Publications Pvt. Ltd., New Delhi.
6. A text book of Engineering Mechanics- RK Rajput-Dhanpat Rai Publications Pvt. Ltd., New Delhi
7. Introduction to structural Mechanics- PS Smith-Macmillan Press Ltd., (UK).
8. Applied strength of Materials-Alfred Jensen and Harry Mcgraw- Hill Book Company London.
9. Theory of Structures by Rajeev Kumar; Satya Prakashan, New Delhi.
10. Structural Analysis (Vo. 1 & 2) by SS Bhavikatti; Vikas Publishing House Pvt. Ltd., New Delhi-110014

SUGGESTED WEBSITES

1. **The Structural World:** https://www.thestructuralworld.com/
2. https://youtu.be/54-dtTsTwM4?si=idIquVo1WXA4QyWW
3. https://www.youtube.com/@engineerskipathshala1111
4. https://youtu.be/-WfwIeUgMvA?si=aPtYHKVprOHFt77F

INSTRUCTIONAL STRATEGY:

This subject is introduced so that diploma holder in Architectural Assistantship may appreciate the concepts and principles of structural design of various elements of building and are able to apply the knowledge gained through the subject for the design of simple and small components. Teacher should give simple exercises involving the applications of various concepts and principles being taught in the subject. Efforts should be made to prepare tutorial sheets on various topics and students should be encouraged/guided to solve the tutorial problems independently. Teacher may conduct weekly small quiz sessions to know the students' level of understanding and if need be, teacher may reinforce the concepts and principles related to structural behaviour of elements/members of building components. This subject contains five units of equal weightage.

5.5 QUANTITY SURVEYING AND COSTING

L	P
4	-

RATIONALE:

Quantity Surveying plays a pivotal role in accurately estimating the quantities and costs of materials, labor, and resources required for construction projects. Understanding the principles and techniques of Quantity Surveying is crucial for ensuring project feasibility, cost control, and adherence to budget constraints. Thus, this subject holds significant importance for diploma holders in Architectural Assistantship, as it equips them with the essential skills and knowledge needed to effectively perform their roles in estimating, budgeting, and financial management within the construction industry.

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

CO1: Estimate building costs using methods like plinth area and cubic rate estimates.
CO2: Develop skills in measuring materials and creating Bill of Quantities (BOQ) for small residential buildings.
CO3: Record measurements, prepare bills, and manage contracts in construction projects.
CO4: Discuss tender documents and processes to participate effectively in tendering for construction projects.

DETAILED CONTENTS

UNIT I

Introduction to Quantity surveying and Costing

- Definitions
- Importance of Quantity Surveying
- Duties of quantity surveyor
- Types of estimates
- Preliminary estimates
    - Plinth area estimate
    - Cubic rate estimate
    - Estimate per unit base

- Detailed estimates
    - Definition
    - Stages of preparation – details of measurement and calculation of quantities and abstract

UNIT II

Measurement & Preparation of Detailed Estimates from Drawings

- Units of measurement for various items of work as per BIS:1200
- Rules for measurements
- Different methods of taking out quantities – centre line method and short wall and long wall method
- Bill of Quantities (BOQ) preparation for a small residential building with a flat roof

UNIT III

Measurement Book and Billing

- Entries in measurement book, standard measurement book, checking of measurement
- preparation of bill, first and final bill, running account bill,
- advance payment, secured, advance payment, refund of security money

UNIT IV

Contracts

- Meaning & Essentials of a contract
- Types of contracts, their advantages, dis-advantages and suitability, system of Payment

UNIT V

Tender Documents & its Terminologies

- Tender, tender forms and documents, Detailed notice inviting Tender (DNIT)
- Single and two cover-bids;
- Submission of tender and deposit of earnest money, security deposit, retention money, maintenance period etc.

RECOMMENDED BOOKS

1. “Estimating, Costing and Valuation (Civil)”, Pasrija, HD; Arora, CL and S. Inderjit Singh, Delhi, New Asian Publishers
2. Estimating and Costing”, Rangwala, BS; Anand, Charotar Book Stall

3. “A Text Book on Estimating and Costing (Civil) with Drawings” Kohli, D; and Kohli, RC; Ambala; Ramesh Publications
4. “Estimating, Costing and Specification in Civil Engineering”, Chakraborti, M; Calcutta
5. “Estimating and Costing” Dutta, BN;

SUGGESTED WEBSITES

1. Civil Guruji: https://youtu.be/jQNwUINusck?si=dClsPnD1iUr063oF
2. https://www.youtube.com/live/Dv0PN2Sgsww?si=BIlaNjMXKdvOYsyM
3. https://youtu.be/_WNjvZRP9cg?si=kuovX6JBknLoXTa-
4. https://youtu.be/E9jDR543g9A?si=wz768WyXvtpV0eb7
5. https://youtu.be/bqrq47VnFaE?si=1w5hz4FSm4jCD5-i

INSTRUCTIONAL STRATEGY

This course will employ a diverse teaching approach to impart knowledge and practical skills in Quantity Surveying and Costing. Through lectures, students will grasp foundational concepts and principles, including types of estimates and contract essentials. Hands-on exercises and workshops will reinforce learning, allowing students to practice measurement methods, estimate preparation, and contract administration. Case studies and site visits will provide real-world context, enabling students to analyze practical challenges and best practices in Quantity Surveying. Guest lectures from industry professionals will offer valuable insights and perspectives. Technology integration will enhance students' technical skills, utilizing software tools for cost estimation and project management. Assessments will evaluate students' understanding and application of Quantity Surveying concepts. By combining theoretical learning with practical experience, this holistic approach aims to prepare students for successful careers in Quantity Surveying and Costing. This subject contains five units of equal weightage.

5.6 COMPUTER APPLICATIONS IN ARCHITECTURE-II

L	P
-	6

RATIONALE

In this course, students will utilize AutoCAD software to master the art of preparing detailed working drawings for architectural projects. Emphasis will be placed on understanding building components, proportioning and dimensioning.

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

CO1: Prepare detailed working drawings using AutoCAD for a minor project, including site plans, foundation layouts, floor plans, and terrace plans with drainage details.

CO2: Design built-in furniture by developing plans, elevations, and sections with various fitting details.

CO3: Develop detailed drawings for entrance gates, boundary walls, and railings.

CO4: Design electrical layout plans to ensure proper placement of fixtures and wiring.

CO5: Create comprehensive layouts for water supply, sewage, and drainage systems to ensure efficient functionality.

PRACTICAL EXERCISES

UNIT I

Preparation of working drawings using AutoCAD for the Minor Project work of 4th Semester:

- Site Plan
- Foundation layout plan & sectional details
- Ground Floor Plan
- Upper Floor Plans (one for each floor)
- Terrace Plan with rainwater drainage and disposal details

UNIT II

Built-in furniture design:

- Plans, elevations, and sections of various fitting details

UNIT III

Entrance gate, boundary wall, and railing details

UNIT IV

Electrical layout plan

UNIT V

Water supply, sewage & drainage layout plan.

RECOMMENDED BOOKS

1. "Instruction Details" by OK Ching; Tata McGraw Hill Publishing Co Ltd., New Delhi
2. "Building Drawing" by MG Shah, CM Kale, SY Patki; Tata McGraw Hill Publisher, New Delhi.
3. "AutoCAD and Its Applications Basics 202x" by Terence M. Shumaker, David A. Madsen, and David P. Madsen
4. "Architectural Drafting and Design" by Alan Jefferis and David A. Madsen

SUGGESTED WEBSITES

1. Official AutoCAD Tutorials (https://www.autodesk.com/products/autocad/learn)
2. AutoCAD Architecture Blog (https://blogs.autodesk.com/revit/)
3. The CAD Setter Out (https://www.thecadsetterout.com/)
4. Balkan Architect (https://www.youtube.com/@balkanarchitect)
5. SourceCAD (https://www.youtube.com/@sourcecad)
6. CAD Intentions (https://www.youtube.com/@Cadintentions)
7. Civil Engineering Portal (https://www.engineeringcivil.com/)

INSTRUCTIONAL STRATEGY

This course focuses on practical application, with students using AutoCAD to create accurate working drawings. Classroom instructions will emphasize proportioning and dimensioning. Field visits to construction sites and presentations of existing building drawings will enhance learning. Students will maintain portfolios and give seminars on their work, while viva voce sessions and repetitive exercises will ensure proficiency.

5.7 PROGRAMME ELECTIVE

5.7.1 LANDSCAPE DESIGN

L	P
3	-

RATIONALE:

The basic knowledge of elements related to landscaping and their principles are very essential for the students of Architecture Assistantship. Through this subject, the students shall be introduced to relationship of landscaping and climate, besides an understanding of outdoor functional spaces.

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

CO1: Recognize key elements essential in landscape design including plants, water features, earth forms, and man-made elements.

CO2: Apply principles such as symmetry, balance, texture, color, and proportion to create harmonious landscape designs.

CO3: Describe the relationship between landscape design and climate, including considerations for sun and wind control.

CO4: Design outdoor functional spaces tailored to different building types to enhance their architectural functions.

CO5: Explore various types of gardens including Japanese, Mughal, and English gardens, and apply their design principles in landscape projects.

DETAILED CONTENTS

UNIT I

Elements of Landscape

- Plants (Trees, shrubs, ground covers, Flowering species, climbers)
- Water
- Earth forms and stones
- Artificial or man-made elements

UNIT II

Principles of landscape design with respect to architectural functions

- Form
- Symmetry and Balance
- Texture
- Colour
- Contrast
- Proportions and scale
- Simplicity
- Focus
- Rhythm
- Aesthetics (Visual aspects and functional aspects)

UNIT III

Relationship of landscape & climate

- Orientation
- Sun Control by Plants
- Wind control by plants
- Microclimate and Human comfort

UNIT IV

Outdoor functional spaces with respect to different building types

UNIT V

Various types of gardens

- Japanese gardens
- Mughal gardens
- Topiary gardens

Exercises:

- Landscape design of an outdoor area within an existing building or group of buildings/ Park design
- Landscape design of the architectural design project students are currently working on.
- Representation of Landscape drawings.

RECOMMENDED BOOKS

1. Landscape Architecture by John O. Simonds published by MC. Graw Hill, Book Company

2. Urban Landscape Design by Garnett Eckko Published by M.C. Graw Hill, Book Company
3. Landscape Design that save energy by Anne Simon Majfat & Marc Schiler
4. Flowering trees of India and beautiful gardens of India by M.S. Randhawa
5. The Landscape of Man – Geoffrey Jellicoe, Publisher Thames and Hudson London (1995)
6. A Visual Approach to Park Design – Albert J Rutledge, Publisher Garland STPM Press, New York (1981)
7. Landscape Architecture – Simonds John O, Publisher Mc Graw Hill Book Company London (1961)
8. Earthscape: A Manual of Environmental Planning – John O. Simonds, Publisher McGraw Hill Book Company London (1978)
9. Trees of Chandigarh – Chhattar Singh, Dhillon and Rajnish Wattas,

SUGGESTED WEBSITES

1. Indian Institute of Landscape Architects (IILA) - https://www.iila.in/
2. Indian Society of Landscape Architects (ISOLA) - https://www.isola.org.in/
3. Architectural Digest India - https://www.architecturaldigest.in/
4. Indian Institute of Architects (IIA) - https://www.iia-india.org/
5. Design Decoded: https://www.youtube.com/@design.decoded
6. Green Space Architects: https://www.youtube.com/@GREENSPACEARCHITECTS
7. Landscape Design Studio: www.youtube.com/@LandscapeDesignStud

INSTRUCTIONAL STRATEGY

Independent assignments for drawings and case studies followed by viva-voce way and may be given to the students. Students should be encouraged to prepare reports/audio visual presentation of the observations made by them during the field visits. Experts from the field may be invited to deliver lectures and presentations. This subject contains five units of equal weightage.

5.7.2 ARCHITECTURAL PHOTOGRAPHY AND DOCUMENTATION

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RATIONALE

This course structure aims to provide students with a comprehensive understanding of architectural photography, from the technical aspects of capturing images to the artistic considerations involved in creating compelling visual narratives of architectural subjects. This course will delve into the techniques, principles, and considerations involved in capturing architectural structures through photography for documentation and artistic purposes. Students will learn about the technical aspects of photography as well as the aesthetic and conceptual aspects unique to architectural subjects.

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

CO1: Describe fundamentals of photography and how they apply to architectural subjects.

CO2: Capture architectural details, composition, and lighting.

CO3: Explore the role of photography in documenting architectural heritage and contemporary structures.

CO4: Develop an eye for the aesthetic and artistic aspects of architectural photography.

CO5: Proficient in post-processing techniques for enhancing architectural photographs.

CO6: Explore ethical considerations and best practices in architectural documentation.

DETAILED CONTENTS

UNIT I

Foundations of Architectural Photography

- Overview of the course objectives and structure
- Brief history of architectural photography
- Importance of architectural documentation
- Basic camera operation: understanding exposure (aperture, shutter speed, ISO)
- Basic composition techniques for architectural photography
- Introduction to cameras, lenses, and tripods

UNIT II

Techniques for Capturing Architecture

- Understanding natural and artificial lighting
- Basic lighting techniques for indoor and outdoor photography
- Introduction to basic tools for manipulating light
- Focus on capturing textures, patterns, and materials in architecture
- Techniques for photographing building interiors and exteriors
- Basics of composition: symmetry and lines in architectural photography

UNIT III

Composition and Aesthetics

- Introduction to compositional guidelines: rule of thirds
- Basics of perspective control and distortion correction
- Simple framing techniques for architectural subjects

UNIT IV

Post-Processing and Documentation

- Introduction to basic photo editing software (e.g., simple editing apps)
- Basic techniques for enhancing architectural photographs
- Basic color correction and exposure adjustments
- Importance of documenting local historical architecture
- Ethical considerations in photography
- Basic overview of successful architectural documentation projects

UNIT V

Contemporary Practices and Final Project

- Exploring local architectural trends and designs
- Capturing the essence of modern architecture in rural areas
- Introduction to local architectural photographers and their work
- Field trip to a local architectural site for practical application of techniques
- Review and discussion of captured images
- Students will choose a local architectural subject for documentation
- Planning, capturing, and simple editing of a series of photographs

- Presentation and discussion of final projects

RECOMMENDED BOOKS

1. "Architectural Photography: Composition, Capture, and Digital Image Processing" by Adrian Schulz
2. "Understanding Architecture: A Primer on Architectural Theory" by Leland M. Roth and Amanda C. Roth Clark
3. "Photographing Architecture and Interiors" by Julius Shulman
4. "Photography and Architecture: 1839-1939" by Eve Blau and Edward Kaufman
5. "Architectural Photography: The Digital Way" by Gerry Kopelow
6. "The Complete Guide to Architectural Photography" by Gerry Kopelow
7. "Photography and Architecture: 12 Views of Contemporary Architectural Photography" by Richard Pare
8. "Building with Light: The International History of Architectural Photography" by Robert Elwall

SUGGESTED WEBSITES

1. B&H Photo Video (https://www.youtube.com/@BandH)
2. The Art of Photography (https://www.youtube.com/@theartofphotography)
3. Adorama (https://www.youtube.com/@Adorama)
4. Udemy (https://www.udemy.com/)
5. Coursera (https://www.coursera.org/)
6. Skillshare (https://www.skillshare.com/)
7. Digital Photography School (https://digital-photography-school.com/)
8. ArchDaily (https://www.archdaily.com/)
9. Architectural Digest (https://www.architecturaldigest.com/)

INSTRUCTIONAL STRATEGY

In this architectural photography course, students will engage in a dynamic learning experience designed to deepen their understanding and skills. Through interactive lectures, practical exercises, field trips, and collaborative projects, students will explore the intricacies of capturing architectural subjects. Hands-on workshops will provide opportunities for experimentation with camera settings, lighting techniques, and composition principles, guided by the instructor. Guest speakers and online resources will offer diverse perspectives and insights into contemporary practices. By actively participating in discussions, peer reviews, and real-world applications, students will develop the expertise and ethical awareness essential for success in architectural photography. This subject contains five units of equal weightage.

5.7.3. HOUSING

L	P
3	-

RATIONALE

This course aims to introduce students to the fundamental concepts of housing design and related regulations. Housing plays a crucial role in shaping our communities and cities, and understanding its principles is essential for aspiring architects and urban planners. By providing students with a basic understanding of housing design, types of dwelling structures, site selection, and related bylaws, this course aims to lay the foundation for further exploration in the field of architecture and urban planning.

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

CO1: Describe the basic concepts of housing and its significance in architecture and urban planning.

CO2: Identify different types of dwelling structures, including detached houses, semi-detached houses, flats, and multi-storied buildings.

CO3: Apply principles of site selection and orientation in housing design.

CO4: Demonstrate knowledge of residential bylaws and regulations governing plot proportions, road access, parking, and conservation of green spaces.

CO5: Develop an awareness of sustainable housing practices and their importance in modern urban development.

DETAILED CONTENTS

UNIT I

Introduction to Housing

- Definition of house and housing.
- Importance of housing in architecture.
- Basic understanding of neighborhood and city planning.

UNIT II

Types of Dwelling Structures

- Introduction to different types of dwelling structures: detached houses, semi-detached houses.

- Introduction to flats and multi-storied buildings.
- Basic classification of flats based on access types.

UNIT III

Site Selection and Basics of Housing Design

- Basics of selecting a site for housing.
- Consideration of physical characteristics and location factors.
- Importance of orientation and topography in housing design.

UNIT IV

Residential Infrastructure and Bylaws

- Basics of residential bylaws and regulations.
- Understanding plot proportions and road access.
- Introduction to parking regulations and conservation of green spaces.

UNIT V

Practical Aspects and Applications

- Application of housing design principles in real-world scenarios.
- Basic understanding of housing-related documentation and permits.

RECOMMENDED BOOKS

1. "Housing: Analysis, Planning, and Design" by Vastuvidya Parampara Series
2. "Indian Housing: Trends, Policies, and Programs" edited by K. C. Sivaramakrishnan and Ravi Kalia
3. "Urban Housing in India" by Achyut Kanvinde
4. "Basic Housing: A Guide to Programmes and Policies" by Jane Jacobs and Ann Forsyth
5. "Low-Cost Housing: Problems and Prospects" by V. K. Jain

SUGGESTED WEBSITES:

1. www.architecturaldigest.in
2. Architectural Digest India: https://www.youtube.com/@ArchitecturalDigestIndia
3. Down to Earth: https://www.youtube.com/@D2E
4. www.igbc.in
5. https://youtu.be/zFrQ0wy-yTo?si=WCZgO3Fa8QITe4jA
6. https://unhabitat.org/sites/default/files/documents/2019-05/sustainable_social_housing_in_india.pdf

INSTRUCTIONAL STRATEGY

In this course, we will adopt a learner-centric approach, focusing on simplicity and practicality to ensure comprehension among students from diverse backgrounds. The course will employ a combination of interactive lectures, visual aids such as diagrams and photographs, case studies of real-world housing projects, and hands-on exercises. Additionally, guest lectures by professionals from the field of architecture and urban planning will provide students with valuable insights and practical examples. Assessments will include quizzes, assignments, and a final project where students will apply their knowledge to analyze and propose solutions for a housing scenario. Regular feedback and discussions will encourage active participation and reinforce learning objectives. This subject contains five units of equal weightage.

SIXTH SEMESTER

6.1 ENTREPRENEURSHIP DEVELOPMENT AND MANAGEMENT

L	P
3	-

RATIONALE

In the present day scenario, it has become imperative to impart entrepreneurship and management concepts to students so that a significant percentage of them can be directed towards setting up and managing their own small enterprises. This subject focuses on imparting the necessary competencies and skills of enterprise set up and its management.

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

CO1: Comprehend the importance of entrepreneurship and its role in nation's development.
CO2: Classify the various types of business and business organizations.
CO3: Identify the various resources / sources and / or schemes for starting a new venture.
CO4: Explain the principles of management including its functions in an organisation.
CO5: Conduct market survey and prepare project report.

DETAILED CONTENTS

UNIT I

Entrepreneurship: Concept and definitions, classification and types of entrepreneurs, entrepreneurial competencies, Traits / Qualities of entrepreneurs, manager v/s entrepreneur, role of Entrepreneur, barriers in entrepreneurship, Sole proprietorship and partnership forms of business organisations, small business vs startup, critical components for establishing a start-up, Leadership: Definition and Need, Manager Vs leader, Types of leadership

UNIT II

Definition of MSME (micro, small and medium enterprises), significant provisions of MSME Act, importance of feasibility studies, technical, marketing and finance related problems faced by new enterprises, major labor issues in MSMEs and its related laws, Obtaining financial assistance through various government schemes like Prime Minister Employment Generation Program (PMEGP) Pradhan Mantri Mudra Yogna (PMMY) , Make in India, Start up India, Stand up India , National Urban Livelihood Mission (NULM); Schemes of assistance by entrepreneurial support agencies at National, State, District level: NSIC, NRDC, DC:MSME, SIDBI, NABARD, Commercial Banks, SFC's TCO, KVIB, DIC, Technology Business Incubator (TBI) and Science and Technology Entrepreneur Parks (STEP).

UNIT III

NATURE AND FUNCTIONS OF MANAGEMENT: Definition, Nature of Management, Management as a Process, Management as Science and Art, Management Functions, Management and Administration, Managerial Skills, Levels of Management; Leadership.

PLANNING AND DECISION MAKING: Planning and Forecasting - Meaning and definition, Features, Steps in Planning Process, Approaches, Principles, Importance, Advantages and Disadvantages of Planning, Types of Plans, Types of Planning, Management by Objective. Decision Making-Meaning, Characteristics.

UNIT IV

ORGANISING AND ORGANISATION STRUCTURE: Organizing Process - Meaning and Definition, Characteristics Process, Need and Importance, Principles, Span of Management, Organisational Chart - Types, Contents, Uses, Limitations, Factors Affecting Organisational Chart.

STAFFING: Meaning, Nature, Importance, Staffing process. Manpower Planning, Recruitment, Selection, Orientation and Placement, Training, Remuneration.

CONTROLLING AND CO-ORDINATION Controlling - Meaning, Features, Importance, Control Process, Characteristics of an effective control system, Types of Control. Co-ordination - characteristics, essentials.

UNIT V

Market Survey and Opportunity Identification, Scanning of business environment, Assessment of demand and supply in potential areas of growth, Project report Preparation, Detailed project report including technical, economic and market feasibility, Common errors in project report preparations, Exercises on preparation of project report.

RECOMMENDED BOOKS

1. BS Rathore and Dr JS Saini, “A Handbook of Entrepreneurship”, Aapga Publications, Panchkula (Haryana).
2. Entrepreneurship Development, Tata McGraw Hill Publishing Company Ltd., New Delhi.
3. CB Gupta and P Srinivasan, “Entrepreneurship Development in India”, Sultan Chand and Sons, New Delhi.
4. Poornima M Charantimath, “Entrepreneurship Development - Small Business Enterprises”, Pearson Education, New Delhi.
5. David H Holt, “Entrepreneurship: New Venture Creation”, Prentice Hall of India Pvt. Ltd., New Delhi.
6. PM Bhandari, “Handbook of Small Scale Industry”.
7. L M Prasad, “Principles and Practice of Management”, Sultan Chand & Sons, New Delhi.

SUGGESTED WEBSITES

1. https://ipindia.gov.in/

INSTRUCTIONAL STRATEGY

Some of the topics may be taught using question/answer, assignment or seminar method. The teacher will discuss stories and case studies with students, which in turn will develop appropriate managerial and entrepreneurial qualities in the students. In addition, expert lecturers may also be arranged from outside experts and students may be taken to nearby industrial organizations on visit. Approach extracted reading and handouts may be provided. In addition, different activities like conduct of entrepreneurship awareness camp extension lecturers by outside experts, interactions sessions with entrepreneurs and industrial visits may also be organized. This subject containsfive units of equal weightage.

6.2 COMPUTER APPLICATIONS IN ARCHITECTURE-III

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RATIONALE

This course focuses on teaching students rendering software for creating visually compelling architectural drawings in both 2D and 3D. Building upon their knowledge of drafting software like AutoCAD and SketchUp, students will learn advanced rendering techniques to enhance their architectural designs and presentations.

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

CO1: Use advanced rendering software to enhance 2D architectural drawings like floor plans and elevations.

CO2: Apply rendering techniques to make 3D architectural models more realistic with materials, lighting, and textures.

CO3: Create attractive presentations and design portfolios using rendered images and animations for effective communication of architectural designs.

CO4: Explore virtual reality (VR) and augmented reality (AR) for immersive architectural visualization experiences.

CO5: Demonstrate proficiency in rendering software through projects showcasing professional-quality architectural renderings and presentations.

PRACTICAL EXERCISES

UNIT I

Introduction to Rendering Software

- Overview of rendering software for architectural drawings
- Understanding the interface and basic tools
- Importing 2D drawings and 3D models from drafting software
- Introduction to rendering concepts such as materials, textures, and lighting

UNIT II

2D Rendering Techniques using AutoCAD and Adobe Photoshop

- Applying materials and textures to 2D drawings
- Adding shadows, gradients, and effects
- Adjusting lighting and environment settings for realistic rendering
- Project: Rendering a floor plan and elevation from AutoCAD drawings

UNIT III

3D Rendering Fundamentals

1. Basic 3D rendering techniques: modeling, texturing, and lighting
2. Creating scenes and camera perspectives
3. Rendering 3D models imported from SketchUp
4. Project: Rendering a simple architectural model in 3D

UNIT IV

Advanced 3D Rendering Techniques

- Enhancing 3D models with advanced materials and textures
- Adding realism with procedural textures and displacement mapping
- Fine-tuning lighting and shadow settings
- Project: Rendering a detailed architectural model with interior and exterior views

UNIT V

Presentation and Visualization

- Creating professional presentations using rendered images and animations
- Integrating rendered images into design portfolios and presentations
- Exploring virtual reality (VR) and augmented reality (AR) applications for architectural visualization
- Project: Creating a portfolio showcasing rendered architectural drawings and presentations

Note:

- Weekly assignments to practice rendering techniques
- Mid-term and final projects to demonstrate proficiency in 2D and 3D rendering
- Peer review sessions and critiques for feedback and improvement

RECOMMENDED BOOKS

1. "Architectural Rendering Techniques: A Color Reference" by Mike W. Lin
2. "Architectural Rendering with 3ds Max and V-Ray: Photorealistic Visualization" by Markus Kuhlo and Enrico Eggert
3. "SketchUp for Site Design: A Guide to Modeling Site Plans, Terrain, and Architecture" by Daniel Tal
4. "Photoshop for Architects" by Scott Onstott
5. "Architectural Rendering: The Techniques of Contemporary Presentation" by Albert O. Halse
6. "AutoCAD and Its Applications Basics" by Terence M. Shumaker, David A. Madsen, and David P. Madsen

SUGGESTED WEBSITES

1. Architectural Digest India: https://www.architecturaldigest.in/
2. ArchDaily India: https://www.archdaily.com/
3. Skill-Lync: https://skill-lync.com/
4. Architecture Inspirations: https://www.youtube.com/@ArchitectureInspirations
5. Surviving Architecture: https://www.youtube.com/@SurvivingArchitecture
6. https://youtu.be/cFgYlx30U54?si=xIBczV0ULOIV5qvP

INSTRUCTIONAL STRATEGY

A blended approach is employed in this course, combining theoretical learning with hands-on practical exercises. Each unit commences with a comprehensive overview of the rendering software, followed by interactive demonstrations of essential tools and techniques. Students are encouraged to actively engage in discussions and ask questions to clarify concepts. Step-by-step tutorials and guided practice sessions are provided, enabling students to apply learned skills to real-world architectural drawings and models. Additionally, case studies and examples from professionals in the field are incorporated to illustrate practical applications. Collaborative learning is promoted through peer review sessions and critiques, fostering a supportive environment where students can receive constructive feedback and refine their skills.

6.3 INTERIOR DESIGN

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RATIONALE

Students of Architectural Assistantship at the diploma level are expected to know, design and execute building interiors. Therefore, the basic knowledge of building construction and detailed knowledge of building materials is required. With the knowledge of this subject the students can help in handling interior projects from the concept stage to the project implementation stage. Also, this exercise is necessary since the interiors are becoming more integral part of architecture and considerable stress is being laid in interior design. Teachers while imparting instructions are expected to explain concepts and principles introducing various building finishing materials. The course would be supplemented with literature and samples of materials.

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

CO1: Explain fundamental principles of interior design.
CO2: Apply space planning techniques for various interior spaces.
CO3: Analyze live interior design projects for practical insights.
CO4: Identify and evaluate materials relevant to interior design.
CO5: Discuss detailed interior design solutions for diverse spaces.

DETAILED CONTENTS

UNIT I

Introduction to Interior Design

- Principles, elements, objectives of the Interior design.

UNIT II

Space Analysis

- Prepare the layout of the following on scale.
    - Living Room
    - Dinning
    - Kitchen

- Bedrooms, Children bedrooms
- Toilets (Public, Residential)
- Restaurants/fast foods
- Lobbies/Waiting space
- Office
- Shops

UNIT III

Case Studies of Live projects with respect to circulation, activities, furniture, colour scheme, wall, floor finishes, Electrical fixtures and other items (Paintings, murals, water falls etc.)

- Houses
- Offices
- Shops
- Restaurant/Fast Food

Note: Any one case study to be taken in the form of report with the help of sketches and photographs. Students should carry out the case study by measuring the existing interior space and should represent it through plan elevations and sections along with photographs to show the real effects.

UNIT IV

Materials

- Market survey of materials relevant to interior only, materials for wall finishes, flooring/ceiling and arrangement of electrical fixtures, lighting systems and other items.
- Collection of samples and catalogue from market

UNIT V

Interior Design problem of Restaurants, Houses, Offices, Shop (Any one project to be taken up for design and detailing)

- Detailed Plan showing furniture, partition, storage and plants etc.
- Elevations
- Sectional elevations (wall treatments)
- Colour schemes and one point perspective
- False ceiling and electrical layout

RECOMMENDED BOOKS

1. Following books/magazines may be used for reference study material:
   A. Time Saver standards for Interior Design and space planning.
   B. Interior Design by Ahmed Kasu.
   C. Nufert Architect's data
   D. Interior Design and Detailing by OK Ching
2. Magazines
   A. Inside Outside Magazine
   B. Indian design magazine
   C. Architecture + Design (A+D)
3. Time saver for store planning and design-Charles E. Brondy, publishing, Charles H. Kerr & Company began
4. The best interiors and life styles of India-by the Indian and Eastern Engineering Co Ltd.,
5. Human Relations oliver (latest volume), Publishers: New Brunswick, NJ, 2007)
6. Indian Interiors (by Angelika Tashen.). Publisher: Taschen GmbH; Greene Street, New York
7. Inter-wood (Publiched by Monica International)
8. Design & decorate: Living room; Wardell Publications Inc, P.O. Box 480069, Fort Lauderdale, FL, USA 33348-0069
9. Design & decorate: Bathroom; Publisher: Adams Media Corporation, UK

SUGGESTED WEBSITES

1. https://thefabhome.com/how-to-pick-color-schemes-for-your-home/
2. Interior Maata: https://www.youtube.com/@InteriorMaata
3. Interior Iosis by Nihara: https://www.youtube.com/@interioriosisbynihara7525
4. Buildofy: https://www.youtube.com/@Buildofy/
5. Bonito Designs: https://www.youtube.com/@bonitodesigns
6. Beautiful Homes: https://www.youtube.com/@BeautifulHomes
7. Interior Coach- Construction & Interiors: https://www.youtube.com/@interiorcoach
8. Fulcrum Home Decor: https://www.youtube.com/@FulcrumHomeDecor
9. Interiors: https://www.youtube.com/@Interiorz

INSTRUCTIONAL STRATEGY

While imparting the instructions in the class room, teachers should present case studies of some typical interior design works of houses, offices, shops, restaurants and other public buildings of national and international fame. The teacher should procure relevant audiovisual material on the subject and present them to the students. Field visits to the local buildings with typical interior designs may also be arranged. Experts working in the area of interior design may be invited to deliver lectures and presenting case studies. Students may be encouraged to take up some independent assignment for interiors of local buildings with the help of practicing interior designers. Students should maintain portfolio and give seminar towards the end of the session. This subject containsfive units of equal weightage.

6.4 STRUCTURE SYSTEMS-II

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RATIONALE

Student of Architectural apprenticeship diploma is expected to understand the behaviour of structures under load. They should understand the theory and design of simple RCC structures and should be able to sketch the RCC details of reinforcement.

COURSE OUTCOME

After undergoing the subject, the students will be able to:

CO1: Explain RCC concepts, steel reinforcement materials, and structural loading principles.
CO2: Differentiate between shallow and deep foundations, and understand basic design principles.
CO3: Comprehend columns' role, identify types based on loading, and learn design principles for axially loaded columns.
CO4: Discuss beams' function in load distribution, perform flexural analysis, and learn reinforced concrete beam design principles.

DETAILED CONTENTS

UNIT I

Introduction

- Concept of Reinforced Cement Concrete (RCC)
- Reinforcement Materials:
    - Suitability of steel as reinforcing material
    - Physical properties of mild steel and HYSD/TMT steel

UNIT II

Foundations

- Introduction to Foundations
- Types of foundations: shallow and deep
- Basic principles of foundation design
- Foundation construction techniques

UNIT III

Columns

- Introduction to Columns
- Types of columns based on loading and support conditions
- Understanding of Axially Loaded Columns
- Understanding Design considerations for columns under axial loads

UNIT IV

Beams

- Introduction to Beams
- Flexural analysis of beams
- Understanding of Reinforced Concrete Beams
- Basic principles of beam design

UNIT V

Slabs

- Introduction to Slabs
- One-Way Slab
- Two-Way Slab
- Basic principles of slab design

Important Note:

Use of BIS: 456-2000 is permitted in the examination.

RECOMMENDED BOOKS

1. Singh Harbhajan “Design of Reinforced Concrete Structures for Architects” Abhishek Publishers, Chandigarh
2. Ramamurtham, S; "Design and Testing of Reinforced Structures", Dhanpat Rai and Sons, Delhi
3. Singh Harbhajan “Limit State Designs for Architects” Abhishek Publishers, Chandigarh
4. Gambhir, M.L., "Reinforced Concrete Design", Macmillan India Limited
5. Singh, Birinder “RCC Design and Drawing”, Kaption Publishing House, New Delhi
6. Mallick, SK; and Gupta, AP; "Reinforced Concrete", Oxford and IBH Publishing Co, New Delhi.

SUGGESTED WEBSITES

1. https://youtu.be/yxIe71VkewQ?si=K5UGfLZ3Cr_TfTgk
2. https://youtu.be/-r5VetfACVc?si=EfzRhe_Ph2JNFAvY
3. Structural Analysis: https://www.youtube.com/@structuralanalysisanddesign
4. https://youtube.com/playlist?list=PL51300B0778FB5784&si=jHzJSGaw6DVrLI8m
5. https://youtube.com/playlist?list=PL9RcWoqXmzaKAMBJsHDZYzMPpbFaVW8T0&si=8D5a0ZadaDZ5LgQD

INSTRUCTIONAL STRATEGY

Teachers are expected to give simple problems for designing various RCC structural members. For creating comprehension of the subject, teachers may prepare tutorial sheets, which may be given to the students for solving. It would be advantageous if students are taken at construction site to show form work for RCC as well as placement of reinforcement in various structural members. Commentary on BIS:456 may be referred along with code for relevant clauses. This subject contains five units of equal weightage.

6.5 PROGRAMME ELECTIVE-II

6.5.1 VERNACULAR ARCHITECTURE

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RATIONALE

This course aims to help students understand vernacular architecture better, seeing it as a unique part of our heritage. By studying how it relates to the local environment, culture, and economy, students can appreciate its significance. Through exploring various styles across India, students can grasp the rich cultural and contextual aspects of these buildings. The goal is to equip students with the skills to recognize, analyze, and appreciate vernacular architecture, connecting them more deeply to our architectural heritage.

COURSE OUTCOME

After undergoing the subject, the students will be able to:

CO1: Describe different types of vernacular architecture in India and their unique characteristics.
CO2: Explain cultural and contextual aspects embedded in vernacular architecture.
CO3: Discuss the influences of historical, geographical, and cultural factors on the design and construction of vernacular buildings.
CO4: Interpret the spatial planning, materials, and construction techniques used in vernacular architecture.
CO5: Discuss the aesthetic and symbolic elements present in vernacular buildings and their relevance to local communities.

DETAILED CONTENTS

UNIT I

Introduction

- Definition and classification of Vernacular architecture
- Study of vernacular architecture: methodology
- Cultural and contextual responsiveness of vernacular architecture: an overview

UNIT II

Vernacular Architecture of the Western and Northern Regions of India

- Forms, spatial planning, cultural aspects, symbolism, colour, art, materials of construction, and construction technique of the vernacular architecture of the following:
    i. Deserts of Kutch and Rajasthan
    ii. Havelis of Rajasthan and Haryana
    iii. Rural and urban Gujarat; wooden mansions (havelis); Havelis of the Bohra Muslims
    iv. Geographical regions of Kashmir; houseboats

UNIT III

Vernacular Architecture of South India

- Forms, spatial planning, cultural aspects, symbolism, art, colour, materials of construction, and construction technique, proportioning systems, religious beliefs, and practices in the vernacular architecture of the following:
    i. Kerala: Houses of the Nair & Namboothri community; Koothambalam, Padmanabhapuram palace.
    ii. Chennai: Houses and palaces of the Chettinad region; Agraharams.

UNIT IV

Western Influences on Vernacular Architecture of India

- Colonial influences on the Traditional house
- Evolution of the Bungalow from the traditional bangla, Victoria Villas
- Planning principles and materials and methods of construction
- Settlement pattern and house typologies

RECOMMENDED BOOKS

1. Brunskill, R.W. (2000). Vernacular Architecture: An Illustrated Handbook.
2. Richardson, Vicky (2001). New Vernacular Architecture.
3. Asquith, Lindsay and Vellinga, Marcel (2005). Vernacular Architecture in the 21st Century: Theory, Education and Practice.
4. Oliver, Paul (2006). Built to Meet Needs: Cultural Issues in Vernacular Architecture.
5. May, John (2010). Handmade Houses & Other Buildings: The World of Vernacular Architecture
6. Weber, Willi and Yannas, Simos (2013). Lessons from Vernacular Architecture.
7. Tipnis, Aishwarya. Vernacular Traditions: contemporary architecture.

SUGGESTED WEBSITES

1. Indian National Trust for Art and Cultural Heritage (INTACH): https://www.intach.org/
2. https://youtu.be/uwans1haljE?si=OhRcQwRCARG2v5M3
3. INTACH Heritage Academy: https://www.youtube.com/@intach_heritageacademy
4. Vernacular Architecture: The Path to Sustainability: https://youtu.be/m-leUMOaic4?si=gk5JondLRt7o1H0z
5. Kath Kuni: Restoring these majestic wood and stone buildings of Himachal Pradesh: https://youtu.be/jSyuMssVPSM?si=-U8shVlCDeriWoVJ
6. https://youtu.be/FydIVlE0TNs?si=yXtOcIbLTsi_ANHG
7. NPTEL: https://youtu.be/_a-QGF4p__c?si=amEIbH9A6DFvZHKF
8. https://youtu.be/mEZOMwXnE6U?si=s6hXLRTFDE55Vmhs

INSTRUCTIONAL STRATEGY

The course employs diverse teaching methods: lectures introduce key concepts with real-life examples, site visits allow firsthand observation, case studies analyze specific examples, group discussions promote collaboration, projects encourage independent research, guest lectures offer expert insights, and fieldwork hones observational skills. This subject containsfive units of equal weightage.

6.5.2 BUILDING MAINTENANCE

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RATIONALE

Besides planning/designing new buildings, the students of Architectural Assistantship working in the estate development have to plan and execute the repair works of existing civil works. The aim is to provide in depth understanding of building repair and maintenance to the students.

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

CO1: Describe importance and economic aspects of building maintenance, along with the selection of materials for repair.

CO2: Identify defects in building interiors and exteriors, and learn the appropriate repair methods, especially concerning surface finishes.

CO3: Recognize the causes and effects of dampness in buildings, and implement remedies for its removal.

CO4: Implement preventive maintenance practices like sweeping, joint maintenance, dusting, and termite control to ensure longevity and functionality.

CO5: Manage scheduled maintenance tasks related to water supply and sanitary systems to maintain the building's functionality and hygiene.

DETAILED CONTENTS

UNIT I

Introduction to Building Maintenance

- Importance of Building Maintenance, its significance, objectives and economic considerations
- Materials for repair and maintenance

UNIT II

Defects and Repairs

- Identification of defects in interiors and exteriors of building and their repairs
- Surface finishes: Types of defects and repairs

UNIT III

Dampness

- Causes and Defects due to dampness
- Remedies for their removal

UNIT IV

Preventive maintenance considerations:

- Sweeping/washing
- Joint maintenance
- Dusting of floors,
- Termite control etc.

UNIT V

Scheduled Maintenance

- Water supply and sanitary systems

RECOMMENDED BOOKS

1. Building Repair and Maintenance Management by PS Gahlot and Sanjay Sharma, CBS Publishers and Distributors, New Delhi
2. Building construction by Sushil Kumar
3. Building construction by B.C. Punia
4. Maintenance of building by Gurcharan Singh

SUGGESTED WEBSITES

1. Indian Society for Maintenance and Reliability (ISMR): https://www.ismr.co.in/
2. Construction Week Online India: https://www.constructionweekonline.in/
3. Indian Building Congress (IBC): http://www.indianbuildingcongress.com/
4. Construction Zone: https://www.youtube.com/@ConstructionZone
5. Civil Guruji: https://www.youtube.com/@Civil_Guruji
6. Civil Dimensions: https://www.youtube.com/@CivilDimensions
7. https://youtu.be/NUdvZcMnud8?si=LuPgNAdq_QtXOwjX
8. https://youtu.be/jDZEEdftKvc?si=WImnARJ0G37JWNnK

INSTRUCTIONAL STRATEGY

The instructional strategy for this course entails a multifaceted approach encompassing theoretical understanding and practical application. Each unit begins with an in-depth exploration of building maintenance principles, followed by interactive sessions focusing on defect identification, repair methodologies, and preventive measures. Hands-on experiences through simulations, case studies, and site visits enhance comprehension and skill development. Collaborative projects foster teamwork and critical thinking, while peer feedback sessions promote reflection and refinement of techniques. Guest lectures and industry partnerships provide real-world insights and opportunities for networking. Continuous assessment ensures student engagement and mastery of essential concepts. This subject containsfive units of equal weightage.

6.5.3 SUSTAINABLE ARCHITECTURE

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RATIONALE

In this course, students delve into the critical domain of sustainable architecture, gaining insight into its pivotal role in environmental preservation and the creation of healthier living environments. Through comprehensive exploration, learners develop a nuanced understanding of sustainability and its significance. By identifying the fundamental principles underpinning sustainable architecture, students acquire the ability to integrate these principles into their design processes. They engage with diverse materials and construction methods, discerning their environmental impact and appropriateness for sustainable projects. Moreover, students learn to implement pragmatic strategies for energy efficiency, water conservation, and waste management, thereby contributing to sustainable building practices.

COURSE OUTCOMES

After undergoing the subject, the students will be able to:

CO1: Explain sustainability and its importance
CO2: Identify basic principles of sustainable architecture and how they influence building design.
CO3: Recognize different materials and construction methods that are environmentally friendly.
CO4: Implement simple strategies for energy efficiency, water conservation, and waste management in building design.
CO5: Comprehend the role of codes and regulations in promoting sustainable construction practices.

DETAILED CONTENTS

UNIT I

Introduction to Sustainable Architecture

- Understanding Sustainability
- Principles of Sustainability
- Evolution of Sustainable Architecture
- Architectural Design Principles

- Characteristics of Sustainable Architecture
- Sustainable Building Materials
- Low-impact Construction Methods
- Terminologies in Sustainable Buildings

UNIT II

Environmental Impact on Sustainability

- Environmental Science Basics
- Impacts of Built Environment on Nature

UNIT III

Sustainable Design Strategies

- Passive Design Techniques
- Daylighting and Natural Ventilation
- Energy Efficiency in Building Design
- Water Management and Conservation
- Waste Management and Recycling

UNIT IV

Energy and Codes

- Basics of Energy Efficiency
- Energy Conservation Building Code (ECBC)
- Codes and Compliances

RECOMMENDED BOOKS

1. "Sustainable, Affordable, Prefab: The ecoMOD Project" by John D Quale
2. "Sustainable Urbanism: Urban Design with Nature" by Douglas Farr
3. "Sustainable Urbanism: Indian Perspectives" by Aromar Revi and Sarbjit Bahga
4. "Sustainable Architecture: A Handbook for Architects and Builders" by Gaurav Shorey

SUGGESTED WEBSITES

1. Centre for Environmental Planning and Technology (CEPT): https://www.cept.ac.in/
2. Indian Green Building Council (IGBC): https://www.igbc.in/

3. Green Dream Foundation: https://www.youtube.com/@greendreamfoundation
4. Eco-Build India: https://ecobuildindia.in/
5. Indian Architect & Builder (IA&B): https://www.indian-architects.com/
6. Architecture Live!: https://www.youtube.com/@ARCHITECTURELIVE
7. Sustainable Urbanism India: https://sustainableurbanismindia.com/

INSTRUCTIONAL STRATEGY

In this instructional approach, the utilization of visual aids like diagrams, videos, and images is pivotal to elucidate concepts with clarity. Encouraging discussions and facilitating group activities serves to stimulate active learning among students. Moreover, hands-on experiences through simple experiments or mini-projects pertaining to sustainable design are provided, fostering practical engagement. Local examples of sustainable architecture are seamlessly integrated to enhance relatability and contextual understanding. To facilitate comprehension, complex topics are systematically broken down into smaller, digestible chunks, with explanations delivered in straightforward language. This subject containsfive units of equal weightage.

6.6 MAJOR PROJECT/INDUSTRIAL TRAINING

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RATIONALE

Major project / Industrial training will help in developing the relevant skills among the students as per National Skill Qualification Framework. It aims at exposing the students to the present and future needs of various relevant industries. It is expected from the students to get acquainted with desired attributes for industrial environment. For this purpose, students are required to be involved in major project / industrial training in different establishments.

COURSE OUTCOMES

After undergoing this course, the students will be able to:

CO1: Define the problem statement of the Major project / Industrial training according to the need of industry.

CO2: Work as a team member for successful completion of Major project / Industrial training.

CO3: Write the Major project / Industrial training report effectively.

CO4: Present the Major project / Industrial training report using PPT.

GUIDELINES

Depending upon the interest of the students, they can go for Major project / Industrial training as per present and future demand of the industry. The supervisors may guide the students to identify their project work and chalk out their plan of action well in advance. As an Major project / Industrial training activity each student is supposed to study the operations at site and prepare a detailed project report of the observations/processes/activities. The supervisor may create a group of 4-5 students as per their interest to work as a team for successful completion of the Major project / Industrial training. The supervisor shall evaluate the students along with one external industry / academic expert by considering the following parameters:

	Parameter	**Weightage**
I	Defining problem statement, focus and approach	20%
ii	Innovation / creativity	20%
iii	Report Writing	20%
iv	Power Point Presentation	20%
v	Viva - voce	20%

Suggested Architectural Projects:

One project chosen by individual student/team to be developed in the following stages:

1. Emphasis to be laid on conserving and harnessing energy resources such as:
   - Rainwater harvesting
   - Solar energy
   - Low energy building materials and techniques
   - Other emerging concepts for green buildings and zero discharge buildings should be studied
2. Pre-design studies culminating in a report comprising study of activity, users, individual space analysis, inter-relationship of spaces and conclusions regarding above mentioned aspects.
3. Detailed design of the project showing structural systems used to be presented through rendering presentation drawings and detailed model to be presented through preliminary and final stage.

PRACTICAL EXERCISE AND DELIVERABLES

Stage 1: Project Initiation

- Formation of project groups and selection of project leaders
- Identification of project scope, objectives, and key stakeholders
- Initial research and analysis of site conditions, context, and client requirements
- Submission of project proposal outlining the intended design approach and project goals

Deliverable: Project Proposal Document

Stage 2: Conceptual Design Development

- Ideation sessions to generate design concepts and solutions
- Development of conceptual sketches, diagrams, and preliminary models
- Exploration of spatial arrangements, circulation, and programmatic requirements
- Integration of sustainable design principles and consideration of environmental factors

Deliverable: Conceptual Design Presentation

Stage 3: Design Refinement and Development

- Iterative refinement of selected design concept based on feedback and critique

- Development of detailed architectural drawings, plans, sections, and elevations
- Specification of materials, finishes, and construction methods

Deliverable: Design Development Package (Drawings and Specifications)

Stage 4: Design Documentation

- Compilation of comprehensive project documentation including drawings, digital renderings and physical models
- Review and coordination of design documentation to ensure accuracy and compliance with regulatory standards

Deliverable: Design Documentation Package (Drawings, Renderings, Models)

Stage 5: Presentation and Finalization

- Presentation of the completed architectural design to faculty, peers, and external reviewers
- Incorporation of feedback and revisions as necessary
- Finalization of design documentation and preparation for submission
- Reflection on the project experience and lessons learned

Deliverable: Final Presentation and Design Documentation

INSTRUCTIONAL STRATEGY

The course unfolds in five stages with specific deliverables at each step. In the initial stage, students form project groups, identify objectives, and conduct preliminary research. They then propose their design approach in a project proposal document. Next, they delve into conceptual design, brainstorming ideas, and creating sketches and models. Sustainable practices and environmental factors are integrated into their designs. The subsequent stage involves refining the chosen concept based on feedback, developing detailed architectural drawings, and specifying materials and construction methods. Throughout the course, students compile comprehensive project documentation, including drawings, renderings, and models, ensuring accuracy and compliance with standards. They present their completed designs to faculty, peers, and external reviewers, incorporating feedback and reflections to finalize their projects.

24. ASSESMENT TOOLS AND CRITERION

The assessment is carried out by conducting:

1. Formative assessments
2. Summative assessments

1. FORMATIVE ASSESSEMENT

The formative assessment will be evaluated on the basis of the internal assessments for theory subjects and practical by the concerned teachers for evaluating the knowledge and skill acquired by students and the behavioral transformation of the students. This internal assessment is primarily carried out by collecting evidence of competence gained by the students by evaluating them at work based on assessment criteria, asking questions and initiating formative discussions to assess understanding and by evaluating records and reports, and sessional marks are awarded to them.

2. SUMMATIVE ASSESSMENT

The summative assessment will include end semester examination for theory part for each candidate and practical examination with viva voice. Each Performance Criteria will be assigned marks proportional to its importance and proportion of marks for Theory and Skills Practical for each subject should be laid down. The following assessment tools are used for effective student evaluation:

1. Theory
2. Practical
3. Minor & Major Project
4. Massive Online Open Courses(MOOCs)
5. Viva Voce
6. Industrial / In House-training
7. Professional Industrial Training

1. Theory Assessment

Evaluation in theory aims at assessing students' understanding of concepts, principles and procedures related to a course/subject, and their ability to apply learnt principles and solve problems.

The formative evaluation for theory subjects may be caused through

i. Sessional/class-tests,
ii. Quizzes,
iii. Assignments,
iv. Seminars /Presentations
v. Attendance
vi. Case Studies

For Summative evaluation of theory, the question paper may comprise of three sections.

i. It should contain objective type question and multiple choice questions. The objective type items should be used to evaluate students' performance in knowledge, comprehension and at the most application domains only.

ii. It should contain short answer questions.

iii. Descriptive type questions, with some internal choice of the questions set may be given in this section

2. Practical Assessment

Evaluation of students performance in practical work (Laboratory experiments, Workshop practical /field exercises) aims at assessing students ability to apply or practice the concepts, principles and procedures, manipulative skills, ability to observe and record, ability to interpret and draw conclusions and work related attitudes. This will comprise of a creation of mock environment, wherever applicable in the skill lab which is equipped withal required equipment for development of desired skills. Candidate's soft skills, communication, aptitude, safety consciousness, quality consciousness etc. will be ascertained by observation and will be marked in observation checklist along with the assessment of Job carried out in labs and maintenance of Lab Record Files.

Formative and summative evaluation may comprise of weight ages to performance on task, quality of product, general behavior and it should be followed by viva-voce of the relevant subject. The end product will be measured against the specified dimensions and standards to gauge the level of skill achievements.

3. Minor and Major Project Assessment

The purpose of evaluation of project work is to assess student's ability to apply, in an integrated manner, knowledge and skills in solving real life problems, manipulative skills, ability to observe, record, creativity and communication skills. The project work assigned should be of relevance to the core skill, state of the art topics and the project areas that are pertaining to enhance job skill and enhance occupational opportunities. For both, minor and major project, Formative and summative evaluation may comprise of weight ages to performance on task, quality of product, nature and relevance of project and general behavior.

The formative assessment should include the continuous assessment based on the work allocated and mid semester viva voice or presentation. The final assessment will be the combination of the project undertaken, report submission and should be followed by viva- voce of the relevant subject.

In case of the assessment of this component, the team of examiners should be constituted and half of the examiners in the team should be invited from outside of the institute as expert for conducting the examination.

4. Massive Open Online Courses (MOOCs) Assessment

Open Elective and Multi-Disciplinary Elective may be covered through Massive Open Online Courses (MOOCs) to promote self-learning. These platforms promise open, online courses to massive numbers of students as they are free to join; they provide a wide range of courses. They allow for space and time flexibility and their participants can benefit from various online communication tools and access to quality content.

The coordinating Department/Centre/Office shall monitor every student to adopt the courses online of their choice and preference on Swayam portal. The duration of courses will vary depending on the level and credit points. Courses offered in the duration of 4-10 weeks for 2 to 3 credits at diploma level are to be opted. Students can get a certificate after registering and attending the classes and submitting the assignments/quizzes and qualifying nationwide conducted written exam.

On successful completion of each course, the institution offering the MOOCs course would issue the certificate, along with the number of credits and grades, through which the student can get credits transferred into his marks certificate issued by the parent institution. There may be standard norms for the host Institution to conduct the course that may include continuous evaluation through assignments, online quizzes, case studies, online writing exercises, term examinations, student feedback, online forum management, etc. The coordinating Department/Centre/Office of the

respective department shall monitor every student and submit to the Office of Examinations, a score sheet before the close of the even semester.

5. Viva Voce Assessment

This tool will be used to assess the conceptual understanding and the behavioral aspects as regards the job role and the specific task at hand. It will also include questions on safety, quality, environment and equipment's etc. Ask questions on non-prescribed tasks to ensure that the learners have complete knowledge on the assessment

6. Industrial / In-house Training Assessment

The two mandatory internships after First and Second Year of are to be assessed in 3rd and 5th semester subsequently. The training should be preferably done in the industry but can also be in house depending upon the stream and availability of resources in and around the institute. Faculty should be assigned each student and made responsible for the evaluation and assessment of the training. Formative assessment should be taken from the industry/institute/ department on the basis of performance, behavior and learning capabilities. Summative evaluation may comprise of weight ages on the basis of report submission / presentation followed by viva-voce of the relevant subject.

7. Professional Industrial Training Assessment

Evaluation of professional industrial training report and viva-voce/ presentation aims at assessing students' understanding of industrial processes, practices in the industry/field and their ability to engage in activities related to problem-solving in industrial setting as well as understanding of application of learnt knowledge and skills in real life situation. Formative and summative evaluation may comprise of weight ages to performance on task, quality of product, general behavior and it should be followed by viva-voce of the relevant subject.

The formative assessment should include the evaluation from the employer where the student is doing his training in the ratio of 40:60. The final assessment will be the combination of the employer assessment and evaluation by the faculty of the institute which shall include report submission/ presentation/ seminar followed by viva-voce of the relevant subject.

SGPA AND CGPA ASSESSMENT

The UGC recommends the following procedure to compute the Semester Grade Point Average

(SGPA) and Cumulative Grade Point Average (CGPA):

i. The SGPA is the ratio of sum of the product of the number of credits with the marks scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student,i.e

   SGPA (Si) = $\sum$(Ci x Gi) / $\sum$Ci

   where Ci is the number of credits of the ith course and Gi is the marks scored by the student in the its course.

ii. The CGPA is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme,i.e.

   CGPA = $\sum$(Ci x Si) / $\sum$ Ci

   where Si is the SGPA of the ith semester and Ci is the total number of credits in that semester.

iii. The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

25. TEACHING LEARNING TOOLS FOR EFFECTIVE IMPLEMENTATION

For effective implementation of curriculum, the faculty and staff of institutions have to play a vital role in planning instructional experiences for the courses in four different environments viz. class-room, laboratory, library and field and execute them in right perspective. It is emphasized that only a proper mix of different teaching methods in all these places of instruction can bring the changes in students behaviour as stipulated in the curriculum document. It is important to understand curriculum document holistically and further be aware of intricacies of Teaching- Learning Tools for achieving curriculum objectives. Given below are certain recommendations which may help in carrying out teaching-learning effectively:

PROGRAMME LEVEL RECOMMENDATIONS

1. Curriculum implementation takes place at programme, course and class-room level respectively and synchronization among them is required for its success. The first step towards achieving synchronization is to read curriculum document holistically and understand its rationale and philosophy.

2. An academic plan needs to be prepared at institute level. The Head of the institute has a great role to play in its dissemination and percolation up to grass-root level.

3. Heads of Department are required to prepare academic plan at department level referring to institutional academic plan.

COURSE LEVEL RECOMMENDATIONS

Teachers are educational managers at class room level and their success in achieving course level objectives lies in using course plan and their judicious execution which is very important for the success of Programme by achieving its objectives. Teachers are required to plan various instructional experiences viz. theory lecture, expert lectures, lab/workshop practical's, guided library exercises, field visits, study tours, camps etc. In addition, they have to carry out progressive assessment of theory, assignments, library, practical's and field experiences. Teachers are also required to do all these activities within a stipulated period which is made available to them in the academic plan at Board level. With the amount of time to their credit, it is essential for them to use it judiciously by planning all above activities properly and ensure execution of the plan effectively.

Following is the gist of suggestions for subject teachers for effective utilization of Teaching Learning Tools to achieve the course objectives:

1. Teachers need to ensure attainment of course outcomes so as to help the students achieve program outcomes and also meet the desired learning outcomes in five domains of NSQF i.e. Process, Professional knowledge, Professional skills, Core skills and Responsibility.

2. Teachers are required to prepare a course plan, taking into account number of weeks available and courses to be taught.

3. Teachers are required to prepare lesson plan for every theory class. This plan may comprise of contents to be covered, learning material for execution of a lesson plan.

4. Teachers are required to plan for expert lectures from field/industry. For this, necessary steps need to be taken such as planning in advance, identifying field experts, making correspondence to invite them, taking necessary budgetary approval etc.

5. Teachers are required to plan for guided library exercises by identification of course specific experience requirement, setting time, assessment, etc. The assignments and seminars can be thought of as terminal outcome of library experiences.

6. Concept based industrial/field visits may be planned and executed for such contents of course which are abstract in nature and no other requisite resources are readily available in institute to impart them effectively.

7. Lot of focus needs to be laid on skill development. There is need for planning practical experiences in right perspective. These slots in a course are the avenues to use problem based learning and experiential learning effectively. The development and use of lab manuals will enable the institutes to provide lab experiences effectively.

8. Emphasis should to laid on developing soft skills like communication skills, personality Development, self-learning, inter personal skills, problem solving, and creativities.

9. Where ever possible, it is essential to use activity based learning rather than relying on delivery based conventional teaching all the time. While teaching, the teacher should make extensive use of audio visual aids such as video films, power point presentations and IT tools.

10. Teachers may take an initiative in establishing liaison with industries and field organizations for imparting field experiences to the students.

11. To enhance digital learning, open electives and multi-disciplinary electives have been provided in the curriculum to be taken up in the form of MOOCs. For Open electives, some courses may be identified out of the prescribed list given in the curriculum keeping in mind the interest of students. Similarly, for multi-disciplinary electives, courses to be offered may be identified by considering their relevance and utility. Every year SWAYAM is notifying the list of courses which are going to be offered in forthcoming even and odd semester. The institute needs to select the courses that are offered on SWAYAM platform or any other online platform.

12. For effective implementation of Massive Open Online Courses (MOOCs), a faculty member in the department may be identified and given the responsibility to coordinate various activities related to MOOCs. The concerned faculty member will facilitate in registration of students for MOOCs. The faculty member will also be responsible for compiling the result of students on the completion of MOOCs and pass on the information to the concerned authority.

13. Flexibility has been provided in the curriculum for the students to choose a course related to the discipline as per their interest. For effective implementation of discipline-specific electives, the institute should identify some courses from the list of courses prescribed in the curriculum. The courses should be selected and offered keeping in mind the interest of students, infrastructure and expertise available in and around the institute related to the courses. Option for discipline-specific elective may be taken from students through a form and a course, with more than 10 students opting for it, may be run.

14. Students should be made aware about issues related to ecology and environment, safety, concern for wastage of energy and other resources etc.

15. Any relevant contents beyond the syllabus may be covered by the teacher or experts in extra time.

16. Minor project should be identified and allocated taking into consideration the inputs from industry stake-holders, and departmental faculty. The minor project work should be such that it enhances the fundamental skill-sets of the students from industry perspective and subsequently helps them to handle major project.

17. For major project work, students may be given relevant and well thought out problems, which are purposeful and develop practical skills. This will help the students in developing creativity and confidence for their gainful employment.

18. A Project bank may be developed in consultation with related industry, research institutes and other relevant field organizations. It may be ensured that that the students take up some live problems being faced by industry as part of project work.

26. LIST OF EXPERTS

1. Controller of Examination, Haryana State Board of Technical Education, Panchkula.
2. Controller of Admn. & Finance, Haryana State Board of Technical Education, Panchkula.
3. Joint Secretary, Haryana State Board of Technical Education, Panchkula.
4. Deputy Secretary, Training & Placement, Haryana State Board of Technical Education, Panchkula.
5. Deputy Secretary, Examination, Haryana State Board of Technical Education, Panchkula.
6. Deputy Secretary, Academic, Haryana State Board of Technical Education, Panchkula.
7. Assistant Secretary, Academic, Haryana State Board of Technical Education, Panchkula.
8. Ms. Reena Kapoor, HOD, Department of Architectural Assistantship, Government Polytechnic for Women, Faridabad.
9. Mr. Harish Gupta, HOD, Architecture Assistantship, Government Polytechnic, Panchkula
10. Ms. Serebdeep Kaur, HOD, Architecture Assistantship, Govt. Polytechnic, Ambala.
11. Ms. Esha Mehta, HOD, Architecture Assistantship, Govt. Polytechnic, Panchkula.
12. Mr. Rajesh Duhan, Senior Lecturer, Department of Architectural Assistantship, Government Polytechnic for Women, Faridabad.
13. Mr. Sunil Rai, Senior Lecturer, Department of Architecture Assistantship, Government Polytechnic, Ambala
14. Ms. Preyank Shori, Senior Lecturer, Department of Architecture Assistantship, Govt. Polytechnic, Panchkula.
15. Mr. Sahil Pahal, Lecturer, Department of Architecture Assistantship, Govt. Polytechnic, Panchkula.
16. Ms. Divya Rathi, Lecturer, Department of Architecture Assistantship, Govt. Polytechnic, Ambala.
17. Mrs. Sangeeta Bagga, Principal, Chandigarh College of Architecture, Chandigarh.
18. Mr. Sohan Lal Saharan, Associate Professor Chandigarh College of Architecture, Chandigarh.
19. Mr. Suresh Kumar Sharma, Practicing Architect, Chandigarh.
20. Mr. Jit Kumar Gupta, Practicing Architect, Chandigarh.

21. Mrs. Navneet Kaur, Incharge, Department of Architectural Assistantship, Government Polytechnic for Women, Chandigarh.
22. Smt. Pushpa Rani, Senior Lecturer, Applied Science Department, Government Polytechnic, Sonipat, Haryana.
23. Smt. Krishna Bhoria, Lecturer, Applied Science Department, Government Polytechnic, Ambala, Haryana.
24. Smt. Preetpal Kaur, Guest Faculty, Applied Science Department, Government Polytechnic, Ambala, Haryana.
25. Ms. Monika, Lecturer, Applied Science Department, Seth Jai Parkash Polytechnic, Damla, Haryana.
26. Dr Neena Sharma, English Department, MCM College, Chandigarh.
27. Dr. KG Srinivasa, Professor CSE, IIIT Raipur, Chhattisgarh.
28. Dr. Vidhi Grover, Lecturer, Applied Science Department, Seth Jai Parkash Polytechnic, Damla.
29. Mr. Tavinder Singh, Lecturer, Applied Science Department, Government Polytechnic, Sirsa.
30. Ms. Sunita Rani, Lecturer, Applied Science Department, Government Polytechnic, Ambala.
31. Dr. Rajesh Mehra, Professor and H e a d , CDC, NITTTR, Chandigarh.
32. Dr. AB Gupta, Professor and Head, Education & Educational Management Department, NITTTR, Chandigarh.
33. Sh. PK Singla, Associate Professor, Curriculum Development Centre, NITTTR, Chandigarh.
34. Dr. SK Gupta, Associate Professor, Curriculum Development Centre, NITTTR, Chandigarh. Coordinator
35. Dr. Meenakshi Sood, Associate Professor, Curriculum Development Centre, NITTTR, Chandigarh.

27. APPENDIX

Sr. No.	LIST OF EQUIPMENT
1.	Adjustable Drafting tables with acrylic parallel bars A0 size
2.	Drawing instruments Box (Set of 12 pieces) for demonstration purpose Only
3.	Set up templates for Furniture, Sanitary, Geometric and Electric Symbols
4.	Different type of scales, French curves, pencils and colours (water, poster or oil),Brushes of different sizes, mixing pallets, different types of drawing sheets
5.	Rapidograph pens
6.	Soft board panels for display of drawings
7.	Different types of bricks
8.	Different types of building stones
9.	Different types of sands
10.	Different types of paints and distempers
11.	Different types of wood
12.	Different types of wood products
13.	Different types of glass samples
14.	Different types of fasteners and adhesives
15.	Different types of sanitary wares
16.	Samples of plumbing, fixtures to be installed as working prototypes
17.	Samples of electric wires and conducting materials
18.	Samples of electric fixtures and fittings
19.	Samples of floor finishes and wall finishes
20.	Samples of different roofing materials
21.	Samples of false ceiling fixtures and finishes
22.	Samples of acoustics materials
23.	Samples of thermal insulating materials
24.	Samples of building hard ware
25.	Models, charts and other teaching aids
26.	Jig saw, 300 mm x 300 mm with 1/2 horse power motor
27.	Wood planner, 2 horse power, 440 volts, width of plank 300 mm and length of table 1100 mm
28.	Drilling machine, bench type 600x4000 rpm, size of table 250x250 mm

29.	Universal wood working machine - 14 in one
30.	Bench grinder
31.	Carpentry work benches 4'x8'
32.	Chain and chiesel mortising machine
33.	Wood turning lathe
34.	Vertical sander
35.	Carpentry hand tools, vices, holds, gauges and measuring tools
36.	Cutters, saws, blades for Acrilic Model Making
37.	The material required for Building Yard is mostly bricks, stones, cement, sand, mason tools, mild steel rods and timber planks
38.	Metric Chain 20 m length and set of arrows as per IS 1492
39.	Metallic tape 20 m length in leather case and winding device as per IS 1492
40.	Ranging rods made of conduit pipe 30 mm dia painted white and black with iron shoe
41.	Optical square, prism type as per IS 7009
42.	Prismatic Compass as per IS 1957 100m diameter made of brass
43.	Plane table with all accessories as per IS 2539
44.	Dumpy level as per IS 9613, Telescope lens 300 mm with plate bubble
45.	Levelling staves, telescope type, 4m long
46.	Transit vernier theodolite
47.	Total Station
48.	i7 PCs
49.	Laser Printer HP 1200 series or Equivalent UPS 0.652 Kw (one for each system)
50.	DGW based Softwares
51.	Auto CAD
52.	Plotter
53.	Scanner


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