

Curriculum for
Diploma Programme in
ARCHITECTURAL ASSISTANTSHIP
For the State of Punjab
(As per NSQF Guidelines)



Prepared by:

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STUDY AND EVALUATION SCHEME FOR DIPLOMA COURSE IN ARCHITECTURAL ASSISTANTSHIP

FIRST SEMESTER

Sr. No.	SUBJECTS	STUDY SCHEME		Credits	MARKS IN EVALUATION SCHEME								Total Marks of Internal & External
		Periods/Week			INTERNAL ASSESSMENT				EXTERNAL ASSESSMENT				
		L/T	P/S**		Th	Pr	Tot	Th	Hrs	Pr	Hrs	Tot	
1.1	* English & Communication Skills-I	3	2	4	20	10	30	50	3	20	3	70	100
1.2	*Applied Mathematics-I	4	-	4	50	-	50	50	3	-	-	50	100
1.3	*Applied Physics-I	3	2	4	20	10	30	50	3	20	3	70	100
1.4	* Applied Chemistry	3	2	4	20	10	30	50	3	20	3	70	100
1.5	Architectural Drawing-I	-	8	4	-	50	50	50	3	-	-	50	100
1.6	Free Hand Sketching	-	4	2	-	50	50	50	3	-	-	50	100
1.7	Model Making	-	2	1	-	50	50	-	-	50	3	50	100
	#Student Centred Activities including Traffic Awareness & Road Safety Camp(1)	-	2	-	-	-	-	-	-	-	-	-	-
	Total	13	22	23	110	180	290	300	-	110	-	410	700

* Common with other diploma programmes.

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

SCA will comprise of co-curricular activities like extension lectures, games, hobby clubs e.g. photography etc., seminars, declamation contests, educational field visits, N.C.C., NSS, Cultural Activities and other activities to promote experiential learning.

SECOND SEMESTER

Sr No.	SUBJECTS	STUDY SCHEME		Credits	MARKS IN EVALUATION SCHEME										Total Marks of Internal & External
		Periods/Week			INTERNAL ASSESSMENT					EXTERNAL ASSESSMENT					
		L/T	P/S**		Th	Pr	Tot	Th	Hrs	Pr	Hrs	Tot			
2.1	* English & Communication Skills -II	3	2	4	20	10	30	50	3	20	3	70	100		
2.2	*Environmental Studies	2	-	2	50	-	50	50	3	-	-	50	100		
2.3	* Basics of Information Technology	-	2	1	-	40	40	-	-	60	3	60	100		
2.4	Building Materials - I	4	-	4	50	-	50	50	3	-	-	50	100		
2.5	Building Construction- I	-	6	3	-	50	50	50	3	-	-	50	100		
2.6	Architectural Design -I	2	6	5	10	20	30	50	3	20	3	70	100		
2.7	Architectural Drawing- II	-	6	3	-	50	50	50	3	-	-	50	100		
#Student Centred Activities including Traffic Awareness & Road Safety Camp(11)		-	2	-	-	-	-	-	-	-	-	-	-		
Total		11	24	22	130	170	300	300	-	100	-	400	700		

* Common with other diploma programmes.

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SCA will comprise of co-curricular activities like extension lectures, games, hobby clubs e.g. photography etc., seminars, declamation contests, educational field visits, N.C.C., NSS, Cultural Activities and other activities to promote experiential learning.

THIRD SEMESTER

Sr. No.	SUBJECTS	STUDY SCHEME Periods/Week		Credits	MARKS IN EVALUATION SCHEME										Total Marks of Internal & External
		L/T	P/S**		INTERNAL ASSESSMENT					EXTERNAL ASSESSMENT					
					Th	Pr	Tot	Th	Hrs	Pr	Hrs	Tot			
3.1	Architectural Design II	-	8	4	-	50	-	50	50	3+3	-	-	-	50	100
3.2	Building Materials -II	4	-	4	50	-	50	50	3	-	-	-	50	100	
3.3	Building Construction -II	-	6	3	-	50	50	50	3	-	-	-	50	100	
3.4	History of Architecture -I	4	-	4	50	-	50	50	3	-	-	-	50	100	
3.5	Climatology	3	-	3	50	-	50	50	3	-	-	-	50	100	
3.6	Surveying	2	4	4	20	10	30	50	3	20	3	70	100		
3.7	Open Elective (Offline/MOOCs)	2	-	2	50	-	50	50	3	-	-	50	100		
	# Student Centred Activities including Energy Conservation Awareness Camp Drug Use and Abuse Awareness Camp	-	2	-	-	-	-	-	-	-	-	-	-	-	
	Total	15	20	24	220	110	330	350	-	20	-	370	700		

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

SCA will comprise of co-curricular activities like extension lectures, games, hobby clubs e.g. photography etc., seminars, declamation contests, educational field visits, N.C.C., NSS, Cultural Activities and other activities to promote experiential learning.

FOURTH SEMESTER

Sr No.	SUBJECTS	STUDY SCHEME		Credits	MARKS IN EVALUATION SCHEME										Total Marks of Internal & External
		Periods/Week			INTERNAL ASSESSMENT					EXTERNAL ASSESSMENT					
		L/T	P/S**		Th	Pr	Tot	Th	Hrs	Pr	Hrs	Tot			
4.1	Architectural Design III	-	6	3	-	50	-	50	3+3	-	-	-	-	50	100
4.2	Building Construction III	-	6	3	-	50	-	50	3	-	-	-	-	50	100
4.3	Working Drawing -I	-	6	3	-	50	-	50	3	-	-	-	-	50	100
4.4	Computer Applications in Architecture-I	-	4	2	-	50	-	50	-	50	3	-	-	50	100
4.5	Structural Mechanics	3	-	3	50	-	50	3	-	-	-	-	-	50	100
4.6	Building Services	3	-	3	50	-	50	3	-	-	-	-	-	50	100
4.7	History of Architecture -II	4	-	4	50	-	50	3	-	-	-	-	-	50	100
# Student Centred Activities including Entrepreneurial Awareness camp		-	3	-	-	-	-	-	-	-	-	-	-	-	-
Total		10	25	21	150	200	350	300	-	50	-	350	-	350	700

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

SCA will comprise of co-curricular activities like extension lectures, games, hobby clubs e.g. photography etc., seminars, declamation contests, educational field visits, N.C.C., NSS, Cultural Activities and other activities to promote experiential learning.

Industrial Training - After examination of 4th Semester, the students shall go for training in a relevant industry/field organisation for a minimum period of 6 weeks and shall prepare a diary. It shall be evaluated during 5th semester by his/her teacher for 50 marks. The students shall also prepare a report at the end of training and shall present it in a seminar, which will be evaluated for another 50 marks. This evaluation will be done by HOD and lecturer incharge – training in the presence of one representative from training organizations.

1.1 ENGLISH AND COMMUNICATION SKILLS – I

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3	2

RATIONALE

Communication skills play an important role in career development. This subject aims at introducing basic concepts of communication besides laying emphasis on developing listening, speaking, reading and writing skills.

LEARNING OUTCOMES

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

- Pronounce properly.
- Overcome communication barriers.
- Write legibly and effectively.
- Listen in proper prospective.
- Read various genres adopting different reading techniques.
- Converse logically.

DETAILED CONTENTS

- | | | |
|-----|---|----------|
| 1. | Basics of Communication | (12 hrs) |
| 1.1 | Definition and process of communication | |
| 1.2 | Introduction to types of communication - formal and informal, oral and written, verbal and non-verbal | |
| 1.3 | Objectives of communication | |
| 1.4 | Essentials of communication | |
| 1.5 | Introduction to channels of communication- formal (upward, downward, diagonal, horizontal), informal (grapevine, consensus) | |
| 1.6 | Barriers to communication | |
| 2. | Functional Grammar and Vocabulary | (12 hrs) |
| 2.1 | Parts of speech | |
| 2.2 | Article | |
| 2.3 | Tenses | |
| 2.4 | Subject verb agreement sentences | |
| 2.5 | Active and passive voice | |
| 2.6 | Synonyms and antonyms | |
| 2.7 | Pair of words | |
| 2.8 | Correction of incorrect sentences | |

3. Listening (04 hrs)
- 3.1 Meaning of listening
 - 3.2 Listening and hearing
 - 3.3 Importance of listening
 - 3.4 Active listening – Meaning and strategies
 - 3.5 Methods to improve listening skills
4. Speaking (03hrs)
- 4.1 Importance
 - 4.2 Methods to improve speaking
5. Reading (12 hrs)
- 5.1 Meaning
 - 5.2 Techniques of reading: skimming, scanning, intensive and extensive reading
 - 5.3 Comprehension, vocabulary enrichment and grammar exercises based on following readings:
- Section - I
- My Struggle for an Education – Booker T. Washington
 - Abraham Lincoln’s letter to his son’s headmaster – Abraham Lincoln
 - Gateman’s Gift – R.K Narayan
 - The Selfish Giant - Oscar Wilde
- Section - II
- Say Not, the Struggle Nought Availeth – A H Clough
 - Stopping by Woods on a Snowy Evening – Robert Frost
 - Where the Mind is Without Fear – Rabindranath Tagore
6. Writing (02hrs)
- 6.1 Significance and effectiveness of writing
 - 6.2 Paragraph writing – Word choice, sentence formation and construction of paragraph.

LIST OF PRACTICALS

1. Self and peer introduction
2. Newspaper reading
3. Just a Minute session – extempore
4. Situational conversation and role play
5. Language learning using open source software.

6. Greetings for different occasions
7. Improving pronunciation through tongue twisters.

INSTRUCTIONAL STRATEGY

Open source software should be used to help the students in developing listening skills. Student centred activities such as group discussions, role play should be used to ensure active participation of students in the classroom.

RECOMMENDED BOOKS

1. Revathi, Srinivas ,“Communicating Effectively in English, Book-I”, Abhishek Publications, Chandigarh.
2. Mohan, Krishna & Meera Banerji,“Developing Communication Skills (2nd Edition)”, Published by Macmillan Publishers India Ltd; New Delhi.
3. Eastwood, John, “Oxford Practice Grammar”, Oxford University Press, London
4. Chadha, R. K.,“Communication Techniques and Skills”, DhanpatRai Publications, New Delhi.
5. Wren & Martin,“High School English Grammar and Composition”, S. Chand & Company Ltd., Delhi.
6. Kumar, Sanjay & PushpLata,“Communication Skills”, Oxford University Press, New Delhi

WEBSITES FOR REFERENCE

1. [http://www.mindtools.com/ page 8.html](http://www.mindtools.com/page 8.html)
2. <http://www.letstalk.com.in>
3. <http://www.englishlearning.com>
4. <http://learnenglish.britishcouncil.org/en/>

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1	12	12
2	12	12
3	04	6
4	03	3
5	12	15
6	02	2
Total	45	50

1.2 APPLIED MATHEMATICS - I

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 binomial theorem, partial fractions, etc. for solving complex engineering problems with exact solutions in a way which involve less computational task. The analytical capabilities will enable the students to solve problems in engineering field.

LEARNING OUTCOMES

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

- Apply Complex Number and its representation for two dimensional designing and related calculations.
- Apply the basic concepts of permutation and combination to find out various ways or arrangements possible for a particular problem.
- Apply binomial theorem to find approximate value of certain expressions and extracting roots of certain expressions.
- Apply basics concepts of partial fractions to simplify the concept of rational expression.
- Solve engineering problems that are in matrix format by applying the basic understanding of matrices and their properties,
- Solve problems related to height, distance, elevation by making use of trigonometry.
- Write the equation of straight line and circle by using coordinate geometry.
- Optimize the utilization of resources by applying concepts of linear programming.

DETAILED CONTENTS

1. Algebra (20 hrs)
 - 1.1 Complex Numbers: Complex number, representation, modulus and amplitude.
 - 1.2 Partial fractions (linear factors, repeated linear factors, non-reducible quadratic factors excluding repeated factors).
 - 1.3 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 without proof), first and second binomial approximation with applications to engineering problems.
 - 1.4 Introduction to Matrices and Determinants – Addition, subtraction and multiplication (upto 3×3 matrices), Determinants, simple properties, Crammer Rule.

2. Trigonometry (15 hrs)
 - 2.1 Introduction to T ratios, 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). T-Ratios of multiple angles, sub-multiple angles ($2A, 3A, A/2$).
 - 2.2 Applications of Trigonometric terms in engineering problems such as to find an angle of elevation, height, distance etc.

3. Co-ordinate Geometry (18 hrs)
 - 3.1 Cartesian and Polar coordinates (two dimensional), conversion from Cartesian to Polar coordinates and vice-versa
 - 3.2 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), inter section of two straight lines, concurrency of lines, angle between straight lines.
 - 3.3 General equation of a circle and its characteristics. To find the equation of a circle, given:
 - * Centre and radius
 - * Three points lying on it
 - * Coordinates of end points of a diameter

4. Operations Research (7 hrs)
- 4.1 Linear Programming Problems formulations.
- 4.2 Graphical Method

INSTRUCTIONAL STATREGY

Basic of algebra, trigonometry, coordinate geometry, operations research 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.

RECOMMENDED BOOKS

1. Grewal, BS, "Elementary Engineering Mathematics", Khanna Publishers, New Delhi
2. Sabharwal, SS & Dr Sunita Jain, "Applied Mathematics, Vol. I & II", Eagle Parkashan, Jalandhar
3. Sastry, SS, "Engineering Mathematics, Vol I & II", Prentice Hall of India Pvt. Ltd.,
4. Pal, Srimanta and Subodh C. Bhunia, "Engineering Mathematics", Oxford University Press, New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1.	20	16
2.	15	12
3.	18	16
4	7	06
Total	60	50

1.3 APPLIED PHYSICS – I

L	P
3	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 fields of engineering and technology are given prominence in the course content.

Note: 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.

LEARNING OUTCOMES

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

- Select units of various physical quantities for use in engineering solutions.
- Represent physical quantities as scalar and vector.
- Use the concepts of force and motion to solve problems.
- Solve problems related to friction, work, power and energy,
- Comprehend properties of matter.
- Comprehend modes of heat transfer.
- Make measurements with accuracy.

DETAILED CONTENTS

- | | | |
|-----|--|--------|
| 1. | Units and Dimensions | (9hrs) |
| 1.1 | Physical quantities Units - fundamental and derived units, systems of units (FPS, CGS and SI units) | |
| 1.2 | Dimensions and dimensional formulae of physical quantities (area, volume, velocity, acceleration, momentum, force, impulse, work, power, energy, surface tension, stress, strain) | |
| 1.3 | Principle of homogeneity of dimensions | |
| 1.4 | Dimensional equations and their applications, conversion of units from one system to another for density, force, pressure, work, power, velocity and acceleration. Checking of dimensional equations | |
| 1.5 | Limitations of dimensional analysis | |

2. Force and Motion (10hrs)
- 2.1 Scalar and vector quantities – examples, representation of vector, types of vectors
 - 2.2 Addition and Subtraction of Vectors, Triangle and Parallelogram law (Statement only), Scalar and Vector Product.
 - 2.3 Resolution of Vectors
 - 2.4 Force, Momentum, Statement of Conservation of linear momentum, its applications
 - 2.5 Impulse and its Applications
 - 2.6 Circular motion, definition of angular displacement, angular velocity, angular acceleration, frequency, time period.
 - 2.7 Relation between linear and angular velocity, linear acceleration and angular acceleration (Only Formula), Angular momentum and torque (definition only)
 - 2.8 Concept of centripetal and centrifugal forces and their applications with examples such as banking of roads
3. Work, Power and Energy (8hrs)
- 3.1 Work: and its units, examples of zero work, positive work and negative work
 - 3.2 Friction: concept, types, laws of limiting friction
 - 3.3 Energy and its units: Kinetic energy and gravitational potential energy with examples and their derivation
 - 3.4 Principle of conservation of mechanical energy for freely falling bodies, examples of transformation of energy.
 - 3.5 Power and its units, calculation of power in numerical problems
4. Properties of Matter (9hrs)
- 4.1 Elasticity: definition of stress and strain, Moduli of elasticity (Only definition, No derivation) , Hooke's law, significance of stress strain curve
 - 4.2 Pressure: definition, its units, atmospheric pressure, gauge pressure, absolute pressure
 - 4.3 Surface tension: concept, its units, angle of contact, applications of surface tension, effect of temperature on surface tension
 - 4.4 Viscosity and coefficient of viscosity: Terminal velocity, Stoke's law

5. Thermometry (9hrs)
- 5.1 Difference between heat and temperature
 - 5.2 Modes of transfer of heat (Conduction, convection and radiation with examples)
 - 5.3 Different scales of temperature and their relationship
 - 5.4 Expansion of solids, liquids and gases, coefficient of linear, surface and cubical expansions and relation amongst them
 - 5.5 Concept of Co-efficient of thermal conductivity

LIST OF PRACTICALS (to perform minimum 8 experiments)

1. To find volume of solid sphere using a vernier caliper.
2. To find internal diameter and depth of a beaker using a vernier caliper and hence find its volume.
3. To find the diameter of wire using a screw gauge
4. To determine the thickness of glass strip using a spherometer
5. To verify parallelogram law of forces
6. To study conservation of energy of a ball or cylinder rolling down an inclined plane.
7. To determine the atmospheric pressure at a place using Fortin's Barometer
8. To determine the viscosity of glycerin by Stoke's method
9. To determine the coefficient of linear expansion of a metal rod
10. To determine force constant of spring using Hooks law

INSTRUCTIONAL STATREGY

Teacher may use various teaching aids like models, charts, graphs and experimental kits etc. for imparting effective instructions in the subject. The teacher should explain about field applications before teaching the basics. to develop proper understanding of the physical phenomenon. Use of demonstration can make the subject interesting and develop scientific temper in the students.

RECOMMENDED BOOKS

1. “Text Book of Physics for Class XI (Part-I, Part-II)”, N.C.E.R.T., Delhi
2. “Applied Physics, Vol. I and Vol. II”, TTTI Publications, Tata McGraw Hill, Delhi
3. Verma, HC, “Concepts in Physics Vol. I & II”, Bharti Bhawan Ltd. New Delhi
4. “Comprehensive Practical Physics, Vol, I & II”, JN Jaiswal, Laxmi Publications (P) Ltd., New Delhi
5. Naik, PV, “Engineering Physics”, Pearson Education Pvt. Ltd, New Delhi
6. Banwait, RA & R, Dogra, “Applied Physics I & II”, Eagle Parkashan, Jalandhar
7. Bhattacharya, DK & Poonam Tandan, “Engineering Physics”, Oxford University Press, New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1.	9	10
2.	10	12
3.	8	8
4.	9	10
5.	9	10
Total	45	50

1.4 APPLIED CHEMISTRY

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3 2

RATIONALE

The use of various chemicals and chemical products in diverse technical and engineering fields have repeatedly proved the importance of Applied Chemistry, which enhances its role to a new peak. On the other hand, ever increasing use of such materials will compel engineers, technocrats to acquire essential applied chemistry knowledge in order to select engineering materials, which not only suit them but also provide more environmental compatibility. This situation demands principles of Applied Chemistry in diploma-engineering courses. Principles of Applied Chemistry will enable budding diploma holders to develop scientific temper and appreciate importance of chemistry. Hence the subject of Applied Chemistry.

LEARNING OUTCOMES

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

- Interpret both qualitative and quantitative aspects of simple chemical substances.
- Substantiate the laws and principles on which structure of atom is established.
- Understand types of bonds in chemical substance and their influence on the properties of chemical substances.
- Prepare solution of required concentrations.
- Understand qualitatively and quantitatively pH and buffer solutions.
- Significance of pH and buffer solutions and their industrial applications (in the process such as electrolysis, electrochemical machining of materials etc).
- Explain cause and factors adversely affecting natural water quality and remedial measures available for water purification to achieve water quality standards required for domestic, agricultural and industrial applications.
- Appreciate and practice the water conservation techniques.
- Identify and classify the substance based on the electric behavior.
- Realize the laws/principles efficiently used in development of electrochemical cells towards the greener energy.
- Identify most efficient fuel for the engine and engineering applications.
- Understand the elementary idea of polymers and plastics
- Distinguish different type of plastics and their applications.

DETAILED CONTENTS

1. Basic Concept of Chemistry (2 hrs)
 - 1.1 Symbols of elements and valency, writing of chemical formulae of simple compounds.
 - 1.2 Calculation of molecular masses of CaCO_3 , NaCl , CuSO_4 , NaOH , Ca(OH)_2 , H_2SO_4 , $\text{C}_2\text{H}_2\text{O}_4$. (Atomic mass of elements should be provided)

2. Atomic Structure and Chemical Bonding (8 hrs)
 - 2.1 Bohr's model of atom (qualitative treatment only).
 - 2.2 Atomic number, atomic mass number isotopes and isobars.
 - 2.3 Definition of orbit and orbitals, shapes of s and p orbitals only, quantum numbers and their significance,
 - 2.4 Aufbau's principle, Pauli's exclusion principle and Hund's rule electronic configuration of elements with atomic number (Z) = 30 only. (Electronic configurations of elements with atomic number greater than 30 are excluded).
 - 2.5 Chemical bonding and cause of bonding and types of chemical bonding; Ionic bond (example NaCl) and Covalent bond (sigma (σ) and pi (π) bonds) with examples of H_2 , O_2 , N_2 and CH_4 Metallic bonding.

3. Solutions (05 hrs)
 - 3.1 Definition of solution, solute and solvent with examples
 - 3.2 Methods to express the concentration of solution- molarity (M) and molality (m), mass percentage, volume percentage and mole fraction and related simple numericals.
 - 3.3 Arrhenius concept of acids and bases. pH of solution, simple numericals on pH and industrial applications of pH.
 - 3.4 Definition of buffer solution and types of buffer solutions with examples and industrial applications of buffers solutions.

4. Water (10 hrs)
 - 4.1 Classification of water – soft water and hard water, action of soap on hard water, types of hardness, causes of hardness, units of hardness – mg per liter (mgL^{-1}) and part per million (ppm) and simple numericals.
 - 4.2 Disadvantages caused by the use of hard water in domestic industry and boiler feed water.
 - 4.3 Removal of hardness -Permutit process and Ion-exchange process.
 - 4.4 Drinking water and characteristics of drinking water.
 - 4.5 Natural water sterilization by chlorine and UV radiation and reverse osmosis (elementary idea).

5. Electro Chemistry (6 hrs)
 - 5.1 Electronic concept of oxidation, reduction and redox reactions
 - 5.2 Definition of terms: electrolytes, non-electrolytes with suitable examples
 - 5.3 Faradays laws of electrolysis and simple numerical problems.
 - 5.4 Industrial Application of Electrolysis – Electroplating.
 - 5.5 Application of redox reactions in electrochemical cells (qualitative idea only excluding reactions) - commercial dry cell (Primary) and elementary idea of secondary cell (Only lead storage battery)

6. Chemistry of Fuels and Lubricants (12 hrs)
 - 6.1. Definition of fuel, classification of fuels (primary and secondary), characteristics of good fuel.
 - 6.2 Calorific value-higher calorific value, lower calorific value, determination of calorific value of solid or liquid fuel using Bomb calorimeter and numerical examples.
 - 6.3 Coal - proximate analysis of coal
 - 6.4 Fuel rating – Octane number and Cetane number, fuel-structural influence on Octane and Cetane numbers
 - 6.5 Gaseous fuels – chemical composition, calorific value and applications of natural gas (CNG), LPG, producer gas, water gas and biogas. (preparation/manufacture excluded)
 - 6.6 Definition of Lubricant and characteristics of good lubricant
 - 6.7 Classification of lubricants –liquid lubricants, solid lubricants, semi-solid lubricants with examples
 - 6.8 Properties of lubricant: Physical properties –viscosity and viscosity index, cloud point and pour point, flash point and fire point, oiliness. Chemical properties- Total Acid Value or Number (TAV or TAN), carbon residue, saponification value.

7. Polymers and Plastics (02 hrs)
 - 7.1 Definition of polymer, monomer and degree of polymerization
 - 7.2 Brief introduction of plastics - thermo plastics and thermo setting plastics with suitable examples (PVC, PS, PTFE, Nylon 6, Nylon 66, bakelite) distinction between thermo and thermo setting plastics
 - 7.3 Applications of polymers in industry and daily life
 - 7.4 Introduction to nano materials and nano technology

LIST OF PRACTICALS

1. Preparation of standard solution of oxalic acid.
2. To determine strength of given sodium hydroxide solution by titrating against standard oxalic acid solution using phenolphthalein indicator.

3. To determine TDS in given sample of water.
4. To prepare Mohr's salt from ferrous sulfate and ammonium sulfate.
5. Determination of pH of given solution using pH meter.
6. Estimation of total alkalinity of given water sample by titrating it against standard sulfuric acid solution.
7. Gravimetric estimation of moisture in the given coal sample (proximate analysis).
8. Gravimetric estimation of ash content in the given coal sample (proximate analysis).
9. Determination of viscosity of given liquid using Redwood viscometers
10. To construct simple Daniel cell and measure its e.m.f. using voltmeter.
11. To estimate hardness of water using EDTA method.

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.

RECOMMENDED BOOKS

1. Kuricose, J.C. and J. Rajaram, "Chemistry in Engineering", Tata McGraw Hill, Publishing Company Limited, New Delhi.
2. Jain, P.C. & Monika Jain, "Engineering Chemistry", Dhanapat Rai Publishing Company, New Delhi.
3. Ahuja, S. C. and G. H. Hugar, "Eagle's Applied Chemistry (I and II)", Eagle Prakashan, Jalandhar.
4. Rao, C N R, "Understanding Chemistry", Universities Press (India) Pvt Ltd., 2011
5. Chopra, H. K. & A. Parmar, "Engineering Chemistry – A Text Book", Narosa Publishing House, New Delhi.
6. Pandey, Dr. Himanshu, "Engineering Chemistry", Goel Publishing House, Meerut, India.

SUGGESTED DISTRIBUTION OF MARKS

Topics	Time Allotted (hrs)	Marks Allotted (Out of 50)
1.	02	03
2.	08	08
3.	05	06
4.	10	12
5.	06	06
6.	12	12
7.	02	03
Total	45	50

1.5 ARCHITECTURAL DRAWING –I

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- 8

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.

LEARNING OUTCOMES

After completion of the course, the students shall be able to:

- Recognize / name and use almost all type of commonly used equipment for making any drawings. Draw horizontal, vertical and inclined lines at any angle using set squares and parallel bars etc.
- Differentiate lines like object lines, guide lines, hidden lines section lines and elevation lines etc.
- Choose scale as per drawing area /sheet both in metric and F.P.S. systems.
- Calculate areas of different surfaces of buildings like walls, floors and roofs etc.
- Draw any regular shape or any irregular shapes on drawing sheet.
- Recognize and draw plan elevation and side elevations of different type of solids like cube, cone, pyramids, cuboids and prisms etc.

DETAILED CONTENTS CUM PRACTICAL EXERCISES

1. Introduction and relevance (need and importance) of the architectural drawing
2. Introduction to the Studio Environment
 - 2.1 Basics of drafting board, instruments, starting off
 - 2.2 Basics of stationery (Pencils, sharpening, types of sheets, erasers, cutter etc)
 - 2.3 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 absorbing)

3. Line Work, Lettering and Dimensioning(03 Sheets)
 - 3.1 Basic line work, with different intensities H, F, HB, 2B, 4B,6B
 - * Horizontal lines
 - * Vertical lines
 - * Grid
 - * Diagonal lines
 - * Composition, pattern making in line work
 - * Dimensioning

(Using different grades of pencils to understand the tonal variation)
 - 3.2 Single stroke Gothic style and stenciling

4. Introduction to Scale (02 Sheets)
 - 4.1 Use of the modular scale - both metric system and FPS

5. Geometric Shapes (Plan, elevation, side elevation, section) (03 Sheets)
 - 5.1 Simple geometric (cubes, cylinder, cones etc)

6. Orthographic Projections (Introduction to Planes) (08 Sheets)
 - 6.1 Projections of points
 - 6.2 Projections of lines
 - 6.3 Projection of solids (Only simple positions of cubes, cylinders, cone and pyramids)

- 7 Development of Surface (04 Sheets)

- 7.1 Development of surface such as prism, pyramid cone, cylinder, cube etc
- 7.2 Development of surface with an aim to calculate areas

Total number of sheets = 20

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 may be conducted by the teacher on completion of each assignment

RECOMMENDED BOOKS

1. Bhatt, N.D.,“Engineering Drawing”, Charotar Books Distributors.
2. Singh, Surjit,“Engineering Drawing”,Dhanpat Rai Publishers.
3. Dhawan, RK,“Engineering Drawing”, S Chand Publishers.

WEBSITES FOR REFERENCE

1. <https://www.digimat.in/> (search for Architecture)
2. <https://www.digimat.in/124.html>
3. <https://www.digimat.in/nptel/courses/video/124107157/L01.html>

1.6 FREE HAND SKETCHING

L P

- 4

RATIONALE

Free hand sketching plays a 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 drawing and design. Considerable emphasis on outdoor sketching should be given to attain the required skills in the subject. Freehand drawing enables visualization of an idea in the form of sketch. It is also a universal language designers use to communicate with other participants of a project. That is why freehand drawing ought to be an inherent element of a design process, especially in the first conceptual phase.

LEARNING OUTCOMES

After undergoing the subject, students shall be able to:

- Draw free hand sketches of various 2D and 3D geometrical forms and of simple buildings, trees, human figures and vehicles etc. in different mediums and using different techniques.
- Draw the 3D sketches by imagination and live sketching by visualizing actual objects using different color medium.
- Draw shade and shadow of 2D and 3D objects and their use in murals and 3D compositions.
- Draw free hand pattern of lines using various grades of pencils.
- Draw outdoor live sketching.
- Measure and draw various objects using human proportions and dimensions.

DETAILED CONTENTS CUM PRACTICAL EXERCISES

1. Introduction to FHS tools i.e. drawing board, colors, types of sheets, erasers, sharpeners etc., and different grades of pencils to understand the tonal variation, technique of sharpening of pencils with cutters etc.

2. Line exercises with different types of lines (exercises on making patterns and composition with lines). (2 Sheets)
3. Draw the two dimensional geometric figures (square, triangle, circle, ellipse, rectangle etc.) in free hand describing proportions and fill it with shading or colors with any of the color medium. (2 Sheets)
4. Draw the three dimensional geometric figures i.e. cube, cuboids, cone, sphere, pyramids, prism etc. and shade or color with any medium. (1 Sheet)
5. Free hand sketching of human figures (standing, sitting, walking, working on counters etc.), trees, furniture, vehicles etc. (indoor and outdoor live sketching). (2 Sheets)
6. Sketching of a surrounding small building in perspective giving its shade and shadow (exercises in pencil and colors). (2 Sheets)
7. Live sketching and then imaginary free hand sketching of various scenes such as village scene, bus stop, vehicle parking scene, market scene, public park scene, etc. (2 Sheets)
8. Brief introduction to 3D Shade & Shadow and do exercise in 3D composition. (1 Sheet)
9. A brief introduction to body proportions and measure the things with own body dimensions.

Total Number of Sheets: 12

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, coloring and rendering like sketching, shades and shadows, lettering, and other important components of architecture. Teachers should lay stress upon perfect line work, properties, proportions and lettering by the students in the classroom. Students should maintain portfolio of the work done by them throughout the session. Viva voce examination may be conducted by the teacher on completion of each assignment.

RECOMMENDED BOOKS

1. Chiara, Joseph De, and John Callendera, "Time Saver Standards for Building Types", McGraw-Hill Education.
2. Neufert, "Architects Data", Bauwelt-Verlag.
3. Ching, DK, "Space, Time and Order", John Wiley NP (Exclusive).
4. Meyer, Susan, "Rendering with Pencil and Ink", Watson Guphill, Broadway, New York City.
5. Gill, Robert W., "Manual of Rendering with Pen and Ink (The Thames and Hudson Manual)", Publisher: Thames & Hudson.

WEBSITES FOR REFERENCE

1. https://youtu.be/_w9ivFPBB2s
2. <https://youtu.be/Ess0dmJB2lo>
3. <https://youtu.be/boK6gmo9fXs>
4. <https://youtu.be/GFs0-mRWUyA>
5. <https://youtu.be/24rnfO8s0hU>
6. <https://youtu.be/eNNAnSCrrBI>

1.7 MODEL MAKING

L P

- 2

RATIONALE

Architectural models serve many purposes, from conception to the finished product. Models can sell a project. Architects use models for project visualization between the architect and client. 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. This subject aims at developing model making skills in the students.

LEARNING OUTCOMES

After undergoing the subject, students shall be able to:

- Prepare 3D models with different types of materials i.e. models of buildings and other landscape elements
- Prepare brick models and its laying pattern
- Do exercises on joints in carpentry
- Visualize the relationship among concepts and real structures

DETAILED CONTENTS CUM PRACTICAL EXERCISES

1. Introduction to different materials used for model making such as handmade or ivory/ card sheet/ photographic mount board, thermocol, balsa wood etc. Also introduce the tools used in drawing/ cutting or pasting the models.
2. Models and Composition
 - 2.1 Prepare three dimensional geometrical shapes i.e. cube, cuboids, cylinder, sphere, cone, prisms etc. in different materials like:
 - i) Ivory / Handmade Sheet (1 exercise)

- ii) Thermo Coal (1 exercise)
 - iii) Mount board/Sun board/Balsa Wood Strips, etc. (1 exercise)
 - 2.2 Make a composition of the all types of prepared blocks. (1 exercise)
- 3. Sculpture Making
 - 3.1 Make sculptures using moulds (either in wood or any other kind of material) to prepare sculptures of P.O.P, clay, ply board or other waste material viz. plastic/ ceramic/leather/fabric etc., rubbers, copper/steel wires, thermo coal sculptures etc. (2 exercises)
 - 3.2 Creative sculptures or models can also be prepared using daily used materials like nut and bolt, stones, any decorative material, broken tools, newspaper, plastic bottle etc. (1 exercise)
- 4. Prepare models of human figures, trees, shrubs, street furniture, and other landscape elements using different materials. (1 exercise)
- 5. Brick Masonry
 - 5.1 Introduction to brick and its size. Also make models of bricks in different materials such as Sheets / thermo coal or clay / POP and arrangement of these in different brick bonds. (1 exercise)
 - 5.2 Introduction to brick jallis / flooring patterns and arrangement of those brick models in different patterns. The students may also color those blocks by placing in beautiful brick composition. (1 exercise)
- 6. Carpentry
 - 6.1 Introduction to different types of wood (hard and soft), ply, board etc.
 - 6.2 Introduction to carpentry tools, machines and materials used that is sawing, chiseling, planing etc.
 - 6.3 Demonstration and exercises on timber joints such as lap joint, tongue and groove joint, done tail joint, mortise and tenon joint etc. (1 exercise)

Total Number of Exercises: 11

INSTRUCTIONAL STRATEGY

This is a practical oriented subject. Teacher should arrange visits to the model room of own college or other colleges/approachable important buildings. Instructors can use student-generated models to document students' content knowledge, skills, and possibly incorrect, missing, or incomplete conceptual understanding. Instructors must first articulate the learning objectives and goals they wish to achieve through modeling and then identify appropriate student activities, assessments, and instructional approaches that incorporate modeling. Each student should be given independent exercises to make models. The teacher will introduce models (as per the contents given) made from different materials and demonstrate the students.

Note:Institute must develop a construction yard and a carpentry workshop where students can use the building materials and make the various sculptures/brick bonds and timber joints under the supervision of a teacher/demonstrator. The construction yard can also be used during free hand sketching, building materials and construction classes.

RECOMMENDED BOOKS

1. “Model Making, Including Workshop Practice, Design and Construction of Models (English, Paperback, Yates Raymond Francis)”,Forgotten Books, London, UK.
2. Werner, Megan, “Model Making (The Architecture Brief Series)”,Princeton ArchitecturalPress, Hudson, NY.
3. Dunn, Nick,“Architectural Model Making”,Thames & Hudson, London.
4. Driscoll, Matt,“Model Making for Architects”, Crowood, The Stable Block, Crowood Ln, Ramsbury, Marlborough SN8 2HR, UK.
5. Congdon, Roark T.,“ Architectural Model Building (Tools, Techniques & Materials)”,Fairchild Publications, New York.

WEBSITES FOR REFERENCE

- 1 https://youtu.be/itD5U_WIqao
- 2 <https://youtu.be/VsJrDScS5ZI>
- 3 <https://youtu.be/8grrO01Eaq8>

- 4 <https://youtu.be/kMil6ETrmj0>
- 5 <https://youtu.be/rGRIIVEMzs>
- 6 <https://youtu.be/Kfj2-A5rJoQ>
- 7 <https://youtu.be/CUhYV8gUjDs>
- 8 <https://youtu.be/sMR2pVU5C4o>

TRAFFIC AWARENESS & ROAD SAFETY CAMP (I)

A diploma holder must have knowledge of various types of traffic rules and regulations. Road safety education is vital for people of all ages. As a responsible citizen, you should be aware of each and every road safety rules. Observation is the key skill you need in ensuring road safety. By obeying safety rules and regulations, you can save yourself and others on the road. This camp covers the basic concepts of traffic rules and safety. Lectures will be delivered on following broad topics with the coordination of Distt. Traffic police. There will be no exam for this camp.

1. Road safety Scenario
2. School bus and traffic management
3. Awareness of Traffic Signs
4. Speeding Limit
5. Always Wear your Shields
6. Overtaking
7. Awareness through Hoardings
8. Walking & Safe cycling

2.1 ENGLISH AND COMMUNICATION SKILLS - II

L	P
3	2

RATIONALE

Communication skills play an important role in career development. This subject aims at introducing basic concepts of communication besides laying emphasis on developing listening, speaking, reading and writing skills.

LEARNING OUTCOMES

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

- Make proper oral presentations.
- Speak confidently.
- Debate properly.
- Write accurate official/business letters.
- Respond to telephone calls effectively.
- Overcome communication barriers.

DETAILED CONTENTS

1. Functional Grammar and Vocabulary (12 hrs)

Theory and Practical exercises on following:

- 1.1 One word substitution
- 1.2 Functional Grammar and Vocabulary
- 1.3 Prefixes and Suffixes
- 1.4 Punctuation
- 1.5 Narration
- 1.6 Idioms and Phrases

2. Reading (9 hrs)

Comprehension, Vocabulary enrichment and grammar exercises based on the following readings:

Section-I

- The Last Leaf - O' Henry
- Sparrows - K A Abbas
- The Postmaster - Rabindra Nath Tagore

Section-II

- Night of the Scorpion - Nissim Ezekiel
- All the World is a Stage - William Shakespeare
- Success – Emily Dickenson
- Daffodils – William Wordsworth

3. Writing (24 hrs)

- 3.1 Writing Resume and Cover letter
- 3.2 Correspondence: Business and Official
- 3.3 Report Writing – Introduction and features of good report.
- 3.4 Press Release
- 3.5 Memos and Circulars
- 3.6 Notices (lost, found, and auction)
- 3.7 Agenda and Minutes of Meetings
- 3.8 Filling-up different forms such as bank form and on-line form for placement etc.
- 3.9 Precis Writing
- 3.10 E mail writing

LIST OF PRACTICALS

1. Group discussion on some current topic of interest.
2. Small speech using voice modulation.
3. Debate
4. Manners and Etiquette
5. Power point presentation
6. Telephonic conversation: General etiquette for making and receiving calls.
7. Mock interviews

INSTRUCTIONAL STRATEGY

Open source software should be used to help the students in developing listening skills. Student centred activities such as group discussions, role play should be used to ensure active participation of students in the classroom.

RECOMMENDED BOOKS

1. Revathi, Srinivas, “Communicating Effectively in English, Book-I”, Abhishek Publications, Chandigarh.
2. Mohan, Krishna & Meera Banerji, “Developing Communication Skills (2nd Edition)”, Published by Macmillan Publishers India Ltd; New Delhi.
3. Eastwood, John, “Oxford Practice Grammar”, Oxford University Press, London

4. Chadha, R. K., “Communication Techniques and Skills”, Dhanpat Rai Publications, New Delhi.
5. Wren & Martin, “High School English Grammar and Composition”, S. Chand & Company Ltd., Delhi.
6. Kumar, Sanjay & Pushp Lata, “Communication Skills”, Oxford University Press, New Delhi

WEBSITES FOR REFERENCE

1. [http://www.mindtools.com/ page 8.html](http://www.mindtools.com/page 8.html)
2. <http://www.letstalk.com.in>
3. <http://www.englishlearning.com>
4. <http://learnenglish.britishcouncil.org/en/>

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1	12	12
2	9	12
3	24	26
Total	45	50

2.2 ENVIRONMENTAL STUDIES

L	P
2	-

RATIONALE

Engineering activities require the use of natural resources which results in wide-ranging adverse effects on the environment. Natural replenishment of these resources is practically impossible. These necessities that all technicians should know about the basics of ecology, environment and its functions, environmental pollution and management and environmental legislation which will enable them to accomplish their professional work with environmental compatibility. Hence this subject.

LEARNING OUTCOMES

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

- Comprehend the importance of ecosystem and environment.
- Demonstrate interdisciplinary nature of environmental issues.
- Identify different types of environmental pollution and control measures.
- Take corrective measures for the abatement of environmental pollutions.
- Compute the impact of human activities on the environment.
- Understand purpose of environmental legislation acts.
- Define energy management, energy conservation and energy efficiency
- Demonstrate positive attitude towards judicious use of energy and environmental protection
- Practice energy efficient techniques in day-to-day life and industrial processes.
- Adopt cleaner productive technologies
- Identify the role of non-conventional energy resources in environmental protection.

DETAILED CONTENTS

1. Introduction: (4 hrs)
Basics of ecology, eco system and environment. Review of carbon, nitrogen, sulphur and water cycle)
2. Conservation of land reforms: (3 hrs)
Desertification, Causes, effects and prevention. rain water harvesting, maintenance of ground water, deforestation – its effects and control measures
3. Environmental Pollution: (10 hrs)
Sources of pollution - natural and manmade, causes, effects and control measures of pollution (air, water, noise, soil and radioactive). Concept of BOD, COD and AQI, Prevention of Pollution- Introduction to Cleaner Production Technologies, Waste Minimization Techniques, Concept of Zero Discharge, Impact of Energy

Usage on Environment: Global Warming, Green House Effect, Depletion of Ozone Layer, Acid Rain.

4. Solid Waste management (3 hrs)
Classification of refuse material, sources, effects and control measures.
Introduction to E-waste Management
5. Environmental Legislation (4 hrs)
Introduction to Water (prevention and control of pollution) Act, Air (Prevention and Control of Pollution) Act and Environmental Protection Act, Role and Function of State Pollution Control Board, Introduction to Energy Conservation Act & its importance, Concept of Environmental Impact Assessment (EIA)
6. Energy Conservation and Sustainable Development (6 hrs)
Introduction to Energy Management, Energy Conservation, Energy efficiency and its need. Role of Non-conventional Energy Resources (Solar Energy, Wind Energy, Bio mass energy, hydro energy) in environmental protection. Sustainable development, Concept of Green building and eco friendly materials.

INSTRUCTIONAL STRATEGY

In addition to theoretical instructions, different activities pertaining to Environmental Studies like expert lectures, seminars, visits etc. may also be organized.

RECOMMENDED BOOKS

1. Sharma, BR, "Environmental and Pollution Awareness", Satya Prakashan, New Delhi.
2. Khitoliya, Dr. RK, "Environmental Pollution", S Chand Publishing, New Delhi.
3. Deswal and Deswal, "Environmental Science", Dhanpat Rai and Co. (P) Ltd. Delhi.
4. Bharucha, Erach, "Environmental Studies", University Press (India) Private Ltd., Hyderabad.
5. Dhamija, Suresh K, "Environmental Engineering and Management", SK Kataria and Sons, New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1	4	06
2	3	05
3	10	16
4	3	05
5	4	06
6	6	12
Total	30	50

2.3 BASICS OF INFORMATION TECHNOLOGY

L	P
-	2

RATIONALE

Information technology has great influence on all aspects of life. Almost all work places and living environment are being computerized. The subject introduces the fundamentals of computer system for using various hardware and software components. 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 concept of information technology and its scope; operating a computer; use of various office automation tools using MS Office/Open Office/Libre Office, and internet concepts. This exposure will enable the students to enter their professions with confidence.

LEARNING OUTCOMES

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

- Identify computer hardware components, network components and peripherals.
- Install application and utility software.
- Use word processing software to prepare document.
- Use spreadsheet software to create workbook and automate calculation.
- Use presentation software to create interactive presentation.
- Browse information on the Web.

Note: Explanation of Introductory part should be demonstrated with practical work. Following topics may be explained in the laboratory along with the practical exercises. There will not be any theory examination.

TOPICS TO BE EXPLAINED THROUGH DEMONSTRATION

1. Basic Concepts of IT and Its Application

Information Technology concept and scope, applications of IT.

2. Computer Hardware:

Block diagram of a computer, components of computer system, CPU, Memory, Input devices; keyboard, Scanner, mouse etc; Output devices; VDU, LCD, Printers etc. Primary and Secondary Memory: RAM, ROM, tracks and sectors, optical disk (CD , DVD & Blue Ray Disk.), USB/Flash Drive, HDD, SSD

3. Software Concepts and Programming:

System software, Application software, Virtualization software and Utility software, Introduction of Operating System, Installation of Application software, Features of OPEN OFFICE/MS OFFICE(MS word, Excel, PowerPoint).
Flow chart using algorithm development, Input Output statement, Control structures

4. Internet Concepts:

Basics of Networking – LAN, WAN, PAN, MAN, and sharing of printers and other resources, Concept of IP addresses, introduction of internet, applications of internet like: e-mail and browsing, concept of search engine and safe searching. Various browsers like Internet explorer/Microsoft Edge, Mozilla Firefox, WWW (World Wide Web), hyperlinks, introduction to Anti-virus.

LIST OF PRACTICAL EXERCISES

1. Given a PC, identify its basic hardware components, network components and peripherals. List their functions .
2. Installation of various application software and utility software.
3. Installation of I/O devices like scanner, printer and plotter.
4. Practice on various features/functions of Windows Operating System..

Word Processing (MS Word/Open Office Writer/Libre Office Writer)

5. Creating/opening, saving and printing a document
6. Editing and formatting a document
7. Setting paragraph and page margins.
8. Adding header, footer and page numbering
9. Creating, inserting and formatting a table.
10. Spell checker, inserting date, time, special symbols, importing graphic images, drawing tools.

Spread Sheet Processing (MS Excel/Open Office Calc/Libre Office Calc)

11. Creating/opening, saving and printing a worksheet.
12. Editing and formatting of worksheets including changing colour, size, font, alignment of text and cell formatting.
13. Using statistical functions like sum, avg, min, max, if, count and count if, lookup.
14. Creating and formatting a chart, Using charts to analyse data. Use of filters.

Presentation Software (MS Power Point/Open Office Impress/Libre Office Impress)

15. Creating, saving, opening and printing a presentation.
16. Different views of a slide.
17. Using slide layout and template.
18. Editing and formatting slides by adding titles, subtitles, text, background, watermark, table, charts, images and sound.
19. Viewing the slide show with slide transition, animation effect, timing and order.

Programming

20. Printing of name 100 times using loop statement.

Internet and its Applications

21. Creating an e mail account. Sending and receiving e-mail.
22. Browsing and down loading of information from internet.
23. Surfing different websites like institute website, State Board PSBTE website, DTE website, NITTR, Chandigarh website, AICTE website, various search engines like google, bing etc.

INSTRUCTIONAL STRATEGY

Since this subject is practice oriented, the teacher should demonstrate the capabilities of computers to students while doing practical exercises. The students should be made familiar with computer parts, peripherals, connections and proficient in making use of MS Office/Open Office in addition to working on internet. The student should be made capable of working on computers independently.

RECOMMENDED BOOKS

1. Arora, Vipin, “Computer Fundamentals and Information Technology”, Eagle Parkashan, Jalandhar
2. Sinha, PK, “Computer Fundamentals”, BPB Publication, New Delhi
3. Rajaraman V, “Fundamentals of Computer”, Prentice Hall of India Pvt. Ltd., New Delhi
4. Saxena, Sanjay, “MS Office for Everyone”, Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
5. Leon and Leon, “Fundamentals of Information Technology”, Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi

2.4 BUILDING MATERIALS - I

L P/S
4 -

RATIONALE

Students are supposed to prepare working drawings of buildings and detailed drawings of various components of buildings. Knowledge of building materials is a very essential point from the point of construction material as well as providing detail specifications in the detailed drawings. Therefore the course in building material includes imparting basic knowledge of properties and use of important materials like stones, bricks etc. Teachers are 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 material museum.

LEARNING OUTCOMES

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

- Explain about the common building stones and their properties
- Describe about the various types of bricks
- Discuss different types of cements
- Discuss about the various types of plastics, sanitary fixtures, adhesive and their uses

DETAILED CONTENTS

- | | | |
|----|---|----------|
| 1. | Building Stones | (10 hrs) |
| | 1.1 Classification of rocks | |
| | 1.2 Characteristics of good building stones | |
| | 1.3 Utility of stones | |
| | 1.4 Common building stones | |
| | 1.5 Prevailing market rates and sizes | |
| | 1.6 Transportation costs | |

- 1.7 Standard measurements in the carriage transport
- 1.8 Storage systems/stacking system

- 2. Bricks (10 hrs)
 - 2.1 Classification of bricks – properties and uses of first class, second-class, third class; over burnt bricks and under burnt brick – their field tests.
 - 2.2 Characteristics of a good brick
 - 2.3 Size and weight of a standard brick and commonly available brick
 - 2.4 Fire bricks, its properties, uses and availability
 - 2.5 Availability of various types of bricks in the market e.g. machine made bricks, handmade bricks.
 - 2.6 Transportation cost with different modes of transportation and stacking of bricks on the site.
 - 2.7 Introduction to Brick Tiles

- 3. Lime (5 hrs)
 - 3.1 Classification and uses of lime.
 - 3.2 Setting action of fat lime and hydraulic lime
 - 3.3 Storing of lime

- 4. Cement (10 hrs)
 - 4.1 Uses of cement
 - 4.2 Composition of Portland cement
 - 4.3 Setting and hardening of cement
 - 4.4 Types of cement, their properties and uses, with specific reference to pozzolona and OPC, grades of OPC
 - 4.5 Transportation and storage of cement.

- 5. Mortar (5 hrs)
 - 5.1 Functions of Mortar
 - 5.2 Preparation of cement mortar, lime mortar, lime cement mortar and their

uses.

- 5.3 Proportion of mortar for different building works
6. Kitchen and Toilet Fixtures- Specifications of kitchen and toilet fittings and fixtures, their popular brand names, shapes and sizes. (10 hrs)
 7. Plastics (5 hrs)
- Thermosetting and thermoplastics and their uses as materials in building, industry e.g. flooring, roofing, wall panelling, pipes, doors etc.
8. Adhesive – Introduction, type and application (5 hrs)

INSTRUCTIONAL STRATEGY

This is one of the fundamental subject covering basic building materials 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 shop, glass houses etc.

RECOMMENDED BOOKS

1. Sikka, V.B, “Civil Engineering Drawing”, Katson Books,
2. Kumar, Sushil, “Building Construction”, Standard publishers Distributor.
3. Sharma SK, and Mathur, GC, “Engineering Material”, S.Chand and Co., Delhi – Jalandhar.
4. Surendra Singh, “Engineering Material”, Vikas Publishing House Pvt. Ltd., New Delhi.
5. Choudhary N., “Engineering Material”, Technical Publishers of India, Calcutta.

WEBSITES FOR REFERENCES

1. www.youtube.com
2. <https://youtube.com/watch?v=IpzkAwWMkkY>(For bricks)
3. Slidesshare.net

4. https://youtube.com/watch?v=EIDXE28_8eQlist=PL8BA09E69BF01BC2(for building construction and material)
5. <https://youtube.com/watch?v=R2dNp5tLni0>(Building material and construction)
6. <https://youtube.com/watch?v=raeXjtLPS7k>(various(levels in buildings)
7. <https://youtube.com/watch?v=5zOOm2fhhwA>(for stones)
8. <https://youtube.com/watch?v=oWYSLxVJAR8>(DPC)
9. <https://youtube.com/watch?v=vN8smpxhL9c>(FOOTING)
10. <https://youtube.com/watch?v=oXtUtANZ3WQ>(Foundation)
11. https://youtube.com/watch?v=z_jieunkTtw&list=RDCMUCNCaoN3_OYmMC-rXeoCt4YA&index=3(bonds)

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks allotted (Out of 50)
1.	10	09
2.	10	09
3.	5	04
4.	10	09
5.	5	04
6.	10	09
7.	5	03
8.	5	03
Total	60	50

2.5 BUILDING CONSTRUCTION - I

L	P/S
-	6

RATIONALE

Students are supposed to prepare working drawings of buildings and detailed drawings of various components of buildings. Knowledge of building construction is a very essential point from the point of construction material as well as providing detail specifications in the detailed drawings. Therefore the course in building material and construction 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 material museum. Also faculty is expected to show various components building under construction, make use of audios and other media mediums to clarify the components.

LEARNING OUTCOMES

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

- Prepare drawings of the common building stones masonry.
- Draw various types of brick masonry and their bonding.
- Draw different types of carpentry joints.
- Draw lintels, arches and brick jallies.
- Draw different types of flooring.

DETAILED CONTENTS CUM PRACTICALS

Note: Following topics may be explained along with the drawing exercises. There will not be any theory examination.

1. Introduction to Parts of a Building
 - Sub structure and Super structure
 - Defining various components of a building like foundation, plinth, walls, column, floors
 - Sill, lintel, arches
 - Doors, windows and ventilators
 - Roofs, stairs, building finishes

2. Stone Masonry
 - Technical terms used in stone masonry
 - Use of stone masonry
 - Types of stone masonry ; Rubble and Ashlar

3. Brick Masonry
 - Technical terms used in brick masonry
 - Different sizes and types of bricks used in construction
 - Brick jail

4. Carpentry joints and construction tools
 - Types of construction tools for Brickwork and stonework
 - Types of Carpentry joints and tools

5. Flooring
 - Technical terms related to floors
 - Components of a ground floor
 - Types of floors

PRACTICAL EXERCISES (6 sheets)

1. Drawing of section of building with all the parts.
2. Drawing of various types of stone masonry

3. Drawing of brick with all its part and different forms of bricks, coping bricks.
4. Drawing of different types brick jalties.
5. Drawing of types of carpentry joints.
6. Drawing of different types of flooring.

INSTRUCTIONAL STRATEGY

This is one of the fundamental subject covering basic building 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 shop, glass houses etc.

RECOMMENDED BOOKS

1. Bindra, SP, and SP, Arora, “Building Construction”, Dhanpat Rai Publishing Co., New Delhi.
2. Punmia, BC, “Building Construction”, Laxmi Publications, New Delhi.
3. Kumar, Sushil, “Building Construction”, Standard Publishers, New Delhi.
4. Sikka, VB, “Building Construction”, S.K. Kataria & Sons, New Delhi.
5. Rangwala, “Building Construction”, Charotar Publishing House Pvt. Ltd., Anand.

WEBSITES FOR REFERENCES

1. www.youtube.com
2. <https://youtube.com/watch?v=IpzkAwWMkkY>(For bricks)
3. Slidesshare.net
4. https://youtube.com/watch?v=EIDX28_8eQlist=PL8BA09E69BF01BC2(for building construction and material)
5. <https://youtube.com/watch?v=R2dNp5tLni0>(Building material and construction)
6. <https://youtube.com/watch?v=raeXjtLPS7k>(various(levels in buildings)
7. <https://youtube.com/watch?v=5zOOm2fhhwA>(for stones)
8. <https://youtube.com/watch?v=oWYSLxVJAR8>(DPC)
9. <https://youtube.com/watch?v=vN8smpxhL9c>(FOOTING)
10. <https://youtube.com/watch?v=oXtUtANZ3WQ>(Foundation)

2.6 ARCHITECTURAL DESIGN -I

L	P/S
2	6

RATIONALE

The students of diploma in architectural assistantship are expected to develop aptitude/skills to design small buildings. The student is also supposed to know about various elements and principles of design to understand the physical aspects of architecture. Teachers while imparting instructions are expected to teach about various elements used in designing buildings. Teacher is expected to make them understand the concept of a building along with organization of form and space. Teachers may use various audio-visual aids to clarify the concepts. Group discussions and seminars may be organised to discuss various concepts and principles involved in design. Students shall be motivated to maintain sketch book/ portfolio of all the assignments given to students.

LEARNING OUTCOMES

After completion of the course, the students shall be able to:

- Explain architecture as a discipline and to develop sensitivity towards aesthetic and functional aspects.
- State visual and emotional effects of geometrical forms and their derivatives.
- Describe components of design and principles of composition to understand the vocabulary of architectural language.
- Use spatial relationship and circulation as an organizing element.

DETAILED CONTENTS

- | | | |
|-----|--|---------|
| 1. | Introduction and Elements of Architecture | (6 Hrs) |
| 1.1 | Definition of architecture and architecture design | |
| 1.2 | Integration of aesthetic and function | |
| 1.3 | Elements of architecture: Point, Line, Plane and Volume. | |

2. Architectural Forms and Space (9 Hrs)
 - 2.1 Form and Space : Unity of opposites, Shapes, visual and emotional effects of geometric forms – The sphere, the cube ,the pyramid, the cylinder and cone and their derivatives, Subtractive and Additive forms-linear, radial, centralized, clustered, grid.
 - 2.2 Form defining space : horizontal and vertical elements
 - 2.3 Space defining elements, openings in space defining elements

3. Components of Design and Principles of composition (10 Hrs)
 - 3.1 Components – Proportion, Scale, Order, Rhythm, Symmetry, Hierarchy, Pattern, Axis, Datum with building examples.
 - 3.2 Principles of composition – Unity, Harmony, Texture, Contrast and Color with suitable examples of buildings

4. Organization of Forms and Spaces (5 Hrs)
 - 4.1 Spatial relationships -space within space, interlocking spaces, adjacent spaces, spaces linked by a common space
 - 4.2 Spatial organization – influencing factors and their types – centralized ,linear, radial, clustered and grid

PRACTICAL EXCERCISES / STUDIO

- 1 Study of Anthropometrics w.r.t Human dimensions and functions /various activities in different postures. (3 sheets)
- 2 Furniture and fitting standards (2 sheets)
- 3 Vehicles (sizes, turning angles and parking etc.) (1 sheet)
- 4 Street furniture (1 Sheet)
- 5 Understanding of different kind of spaces through measured drawings of a class room, hostel room (Basic activity only) (2 sheets)
- 6 Toilet and Kitchen equipment sizes and standards , location of doors and windows along with sizes and standards (2 sheets)

- | | |
|---|---|
| 7 | Furniture layout within a given area like Bed room, Living room, child's room
(2 sheets) |
| 8 | Furniture layout in a small residential unit like a Bachelor's apartment
(1 sheet) |
| 9 | Furniture layout in a small office with pantry and toilet.
(1 sheet) |

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.

RECOMMENDED BOOKS

1. Chiara, Joseph De, and John Callendera, "Time Saver Standards for Building Types".
2. Neufert, "Architects Data".
3. Ching, DK, "Space, Time and Order".

WEBSITES FOR REFERENCE

1. <https://youtu.be/knUerjiLmNw> (For Elements and principles of design)
2. <https://youtu.be/ZK86XQ1iFVs> (For principles of design)
3. <https://youtu.be/uQk29ehVzNo> (For drawing trees foliage)
4. https://youtu.be/1csAYcu0_u8 (For drawing trees)
5. <https://youtu.be/jgeE5l2cRAk> (For Drawing Furniture)
6. https://youtu.be/_jiQNGc50LU (For lamp posts)
7. https://youtu.be/uJdo4AiM_dg (For dustbin)
8. https://youtu.be/y3da4_lsLwA (For Colorwheel)

SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Hours)	Marks Allotted (Out of 50)
1	6	8
2	9	17
3	10	18
4	5	7
Total	30	50

2.7 ARCHITECTURAL DRAWING–II

L	P/S
-	6

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.

LEARNING OUTCOMES

After completing this course, students will be able to:

- Draw sections through simple and complex solids and understanding of this should lead them to draw sections through simple buildings and ultimately students will be able to draw complex sections of any buildings.
- Draw one point and two point perspectives of both interiors and exteriors.
- Render perspectives in different colour mediums.
- Add shades and sciography to basic orthographic drawing as well as perspectives.

DETAILED CONTENTS CUM PRACTICAL EXERCISES

- | | | |
|-----|--|-------------|
| 1. | Section of Solids and Developments | (04 Sheets) |
| 1.1 | Simple geometrical shapes e.g. cube, Prism, Pyramid, cylinder, Cone etc | |
| 1.2 | Elementary building sections Highlighting line intensities for sectional and elevation components. (example: parapet, chajjas in section and elevation behind) | |

2. Isometric Views (03 Sheets)
 - 2.1 Conversion of 2D geometrical shapes into 3D isometric views (30° – 60°) to realize the potential of each from simple to complex solid to basic building forms
- 3 One Point and Two Point Prospective along with Rendering (06 Sheets)
 - 3.1 Perspective of solids incorporating all views: cone, cubes, cylinders etc.
 - 3.2 Bird's eye view
 - 3.3 Normal eye view
 - 3.4 Worms eye view to clarify concepts
 - 3.5 2 point perspective of a given plan (vanishing point method)
 - 3.6 1 point perspective of a given plan (drawing room and kitchen)
4. Introduction to Sciography (in Plans and Elevations) (03 Sheets)
 - 4.1 Basic Geometrical shapes (cube, cylinder, cone, etc).
 - 4.2 Difference between shade and shadow on basic geometrical shapes)
 - 4.3 Shade and shadow of a basic building
 - a) Drawing (Plan and elevation) supplied by teacher
 - b) Drawing of student's choice(s) (Residential building)

(Total No. of Sheets 16)

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. Vivavoce examination may be conducted by the teacher on completion of each assignment.

RECOMMENDED BOOKS

1. Bhatt, N. D., “Engineering Drawing”, Charotar Publishing House.
2. Dhawan, RK, “Engineering Drawing”, S. Chand Publishers.
3. Gill, Robert W., “Perspective from Basic to Creative”, Thames and Hudson.
4. Gill, Robert W., “Rendering with Pen and Ink”, Thames and Hudson.

WEBSITES FOR REFERENCE

1. <https://www.digimat.in/> (search for Architecture)
2. <https://www.digimat.in/124.html>
3. <https://www.digimat.in/nptel/courses/video/124107159/L01.html>

TRAFFIC AWARENESS & ROAD SAFETY CAMP (II)

A diploma holder must have knowledge of various types of traffic rules and regulations. Road safety education is vital for people of all ages. As a responsible citizen, you should be aware of each and every road safety rules. Observation is the key skill you need in ensuring road safety. By obeying safety rules and regulations, you can save yourself and others on the road. This camp covers the basic concepts of traffic rules and safety. Lectures will be delivered on following broad topics with the coordination of Distt. Traffic police. There will be no exam for this camp.

1. Time management
2. Traffic light signals
3. Speed limits of vehicles
4. Schedule of offences
5. Dividing lines
6. Proper road Maintenance and Warnings
7. Test yourself

3.1 ARCHITECTURAL DESIGN II

L P
- **8**

RATIONALE

This subject is to be seen as an extension of Architecture Design- I, with students strengthening their skills of designing a single storey mono functional and residential building. The relationship between indoor and outdoor spaces, site planning, function, structure system and use of building material shall be understood in architecture design.

LEARNING OUTCOMES

After successful completion of this course, the student shall be able to:

- Conceptualise form and space through thinking process
- Evolve a design project that contains space planning
- Design a small scale dwelling project
- Understand the process of architectural design through various stages and procedure involved in design
- Acquire knowledge through exposure to field/site visit

DETAILED CONTENTS CUM PRACTICALS

1. Study of spaces and furniture for various activities in small structures like Guard House, Milk Booth, Bus Stop and Florist kiosk. Study shall be presented through Plans, Elevations and sketches.
2. Plan showing furniture layout and Section through a given mono-functional space like a Café, classroom in a nursery school, dining hall in a hostel etc.
3. Design of a simple single storey residential building like a weekend cottage, two bed room house for a small family etc. The drawings to be prepared are: site plan, plans, elevations and view or block model.

INSTRUCTIONAL STRATEGY

Since this is a practical oriented subject, special visits shall be made to understand various architectural features of existing buildings. Expert lectures of practicing architects may be arranged. Audio visual aids may be used. Students shall be encouraged to visit relevant websites. Teachers must encourage the students to work independently as well as in groups.

Note

Students shall maintain a sketch book.

Students are require to maintain a portfolio of work done in semester.

Viva voce must be conducted on completion of each assignment.

RECOMMENDED BOOKS

1. Ching, Francis D.K., “Architectural Graphics”, John Wiley and Sons, INC.
2. Ching, Francis D.K., “Architecture Form”, Space and order, ITP.
3. Ching, Francis D.K., “A visual dictionary of Architecture”.
4. Ernest Newfort, “Architectural Data, Blackwell Science”.

WEBSITES FOR REFERENCES

1. archdaily.com
2. architizer.com
3. designbasic.com
4. nptel.ac.in

3.2 BUILDING MATERIALS - II

L P/S
4 -

RATIONALE

Diploma holders in Architectural Assistantship are supposed to prepare working drawings of buildings. Knowledge of building materials and their behavior under varied climatic conditions is very essential from the point of construction for providing detailed specifications in the working drawings. Therefore the course in building material includes imparting basic knowledge of properties and use of important materials like concrete, timber, paints etc. Teachers are 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 material museum.

LEARNING OUTCOMES

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

- Explain about the concrete and their properties
- Describe about the various types of paints
- Discuss different types of timbers, glass etc and their uses
- Describe various types of ceiling materials, roofing materials, wall finishes, floor finishes

DETAILED CONTENTS

- | | | |
|-----|--|---------|
| 1. | Timber | (5 hrs) |
| 1.1 | Characteristics and uses of common Indian timbers i.e Sal, Deodar, Kail, Tali, Chir, Teak and introduction to some locally available timber. | |
| 1.2 | Need for seasoning of timber, solar seasoning method of timber. | |
| 1.3 | Common method of Preservation of timber. | |

1.4 Availability of different types of timber, measurement system and their comparative market prices.

2. Concrete (7 hrs)

- 2.1 Definition and grading of concrete
- 2.2 Workability of concrete
- 2.3 Water - Cement Ratio
- 2.4 Compaction of concrete
- 2.5 Curing of concrete
- 2.6 Mixing, placing and uses of cement concrete.
- 2.7 Use of Flyash in concrete.
- 2.8 Concept of Reinforced cement concrete (RCC) and its grading
- 2.9 Necessity of providing reinforcement
- 2.10 Handling of RCC on site, quality and quantity (field checking) and taking measurement
- 2.11 Introduction to Ready-mix, self-compacting and light-weight concrete

3. Paints (6 hrs)

Types, uses, coverage area: brand names and cost

- 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

4. Glass (5 hrs)

4.1 Types, sizes, usage, measurement systems and market prices of commonly used glasses in building construction:

- Sheet glass
- Wired glass
- Laminated safety glass
- Plate glass
- Insulating glass
- Obscured glass
- Coloured glass
- Tinted glass
- Heat absorbing glass
- Glass blocks
- Float glass
- Toughened glass
- Structural glazing

5. Introduction to Floor Finishes (uses, availability, market rates) (7 hrs)

- 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

6. Introduction to Wall Finishes (7 hrs)

- Wall board homogeneous
- Laminated fiber boards – types
- Plastic wall tiles – their availability
- Wall papers
- Cork sheets and tiles
- Thermocol

- Foam rubber tiles and rolls
- Textured paint finishes
- Gypsum Boards – factory made and made in-situ

7. Ceiling Materials (Size, quality, their availability, types of finishes, uses, trade names, market rate) (07 hrs)

- Hessian cloth
- Gypsum plaster boards plaster of Paris board
- Plain AC sheets
- Plywood
- Hard Board
- Cellotex
- Fibre Boards
- Fibre glass
- Asbestos tiles
- Thermocol
- Medium density fibre board (MDF)

8. Building hardware (sizes, applications) (7 hrs)

Note: Teacher may show these items to the students in material museum maintained by the department/market survey.

- 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

9. Introduction to roofing Materials (their standard sizes, uses, availability, prices) (7 hrs)

- Asbestos sheets
- GI sheets
- Shingles
- Ferro-cement sheets
- Fibre sheets
- Slates
- Mangalore tiles
- Pan tiles
- Corrugated PVC sheets

INSTRUCTIONAL STRATEGY

This is one of the fundamental subject covering basic building materials 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 shop, glass houses etc.

RECOMMENDED BOOKS

1. Sharma, SK, and GC Mathur, “Engineering Material”, S. Chand and Co., Delhi–Jalandhar.
2. Singh, Surendra, “Engineering Material”, New Delhi, Vikas Publishing House Pvt Ltd.
3. N. Choudhary, “Engineering Material”, Calcutta, Technical Publishers of India.
4. TTTI, Chandigarh, “Civil Engineering Materials”, Tata McGraw Hill Publication, New Delhi.
5. Kulkarni, GJ, “Engineering Materials”, Ahmedabad Book Depot, Ahmedabad.
6. Gurcharan Singh, “Engineering materials”, Standard Publishers Distributors, Delhi.
7. SC Rangawala, “Construction Materials”, Charotar Publishers Pvt Co Ltd, Anand.

WEBSITES FOR REFERENCES

1. www.youtube.com
2. <https://youtube.com/watch?v=IpzkAwWMkkY>(For bricks)
3. Slidesshare.net

4. https://youtube.com/watch?v=EIDXE28_8eQlist=PL8BA09E69BF01BC2(for building construction and material)
5. <https://youtube.com/watch?v=R2dNp5tLni0>(Building material and construction)
6. <https://youtube.com/watch?v=raeXjtLPS7k>(various(levels in buildings))
7. <https://youtube.com/watch?v=5zOOm2fhhwA>(for stones)
8. <https://youtube.com/watch?v=oWYSLxVJAR8>(DPC)
9. <https://youtube.com/watch?v=vN8smpxhL9c>(FOOTING)
10. <https://youtube.com/watch?v=oXtUtANZ3WQ>(Foundation)
11. https://youtube.com/watch?v=z_jieunkTtw&list=RDCMUCNCaoN3_OYmMC-rXeoCt4YA&index=3(bonds)

SUGGESTED MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks allotted (Out of 50)
1.	5	03
2.	7	06
3.	6	05
4.	7	06
5.	7	06
6.	7	06
7.	7	06
8.	7	06
9.	7	06
Total	60	50

3.3 BUILDING CONSTRUCTION - II

L P/S
- 6

RATIONALE

Students of Architectural Assistantship at diploma level are supposed to prepare structural drawings, working drawings and detailed drawings of various components of buildings. Also students are expected to design small residential buildings, for this purpose, it is essential that students are taught various components of building construction comprising of foundations, super structure, openings, roofs, staircases, floorings and finishing and other allied building components. Therefore, the subject of building construction is very important for students undergoing diploma course in Architectural Assistantship. Teachers while imparting instructions are expected to show various components of buildings under construction. Make use of models or other audio-visual media to clarify the concepts. While preparing drawings, teachers should lay considerable stress on proper dimensioning, specification writing and printing and composition of drawing work. Students should be asked to maintain a sketch book for recording the observations from site visit. While conducting viva, teachers should ask specific questions on various topics.

COURSE OUTCOMES

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

- Draw various types of brick bonds.
- Draw different types of arches and lintels in construction.
- Draw spread foundation.
- Draw various types of doors and windows.
- Draw horizontal and vertical DPC with specifications.

DETAILED CONTENTS CUM PRACTICALS

Note: Following topics may be explained along with the drawing exercises. There will not be any theory examination.

1. Brick Work

- Terminology used in brick masonry
- Wall thickness, T-junctions, cross junction in English Bond and Flemish bond

2. Openings in Walls

- Classification of arches as per shape and material
- Classification of lintels of different materials, precast and cast-in-situ

3. Damp Proof Course (DPC)

- Sources of dampness and effects dampness
- Classification as per hardness or rigidity material
- BIS stipulation of damp proofing
- Treatment of building components for effective damp proof

4. Foundations

- Different types of foundations with reference of advantage of one over the other
- Foundations of different types with reference to method of construction

5. Doors and Windows

- Definitions, functions, sizes, location and classification
- Joints used in doors and windows
- Fly Proof stroller

6. Flooring

- Constituents and types of floorings for ground and upper floors
- Floor finishes

PRACTICAL EXERCISES (8 sheets)

1. Drawing of brick bonds (English and Flemish bond)
2. Drawing of different types of arches and lintels
3. Drawing of section through a single storey showing horizontal and vertical DPC with specifications.
4. Drawing of spread Foundation and application of DPC on spread foundation and basement
5. Drawing of door frame including fixing
6. Drawing of different types of doors (panelled/flyproof flush) showing joints and fixtures in detail.
7. Drawing of different types wooden windows.
8. Drawing of single wooden floor and double wooden floor

INSTRUCTIONAL STRATEGY

This subject is of practical in nature. While imparting instruction for preparation of various drawings of different types of buildings and their components, the teacher should organize demonstration and field/site visits to show various stages, sizes and scales of operations involved in building construction. The teacher should involve the theoretical aspects of the instructions to the students before drawings are attempted by the students. Students may prepare the port-folio of the work done by them throughout the session. Teacher may also organize viva-voce after each drawing assignment so as to test the level of understanding of the students about underlying concepts, principles, and procedures.

RECOMMENDED BOOKS

1. Bindra, SP, and SP, Arora, "Building Construction", Dhanpat Rai Publishing Co., New Delhi.
2. Punmia, BC, "Building Construction", Laxmi Publications, New Delhi.
3. Kumar, Sushil, "Building Construction", Standard Publishers, New Delhi.
4. Sikka, VB, "Building Construction", S.K. Kataria & Sons, New Delhi.
5. Rangwala, "Building Construction", Charotar Publishing House Pvt. Ltd., Anand.

WEBSITES REFERENCES

1. www.youtube.com

2. <https://youtube.com/watch?v=IpzkAwWMkkY>(For bricks)
3. Slidesshare.net
4. https://youtube.com/watch?v=EIDXE28_8eQlist=PL8BA09E69BF01BC2(for building construction and material)
5. <https://youtube.com/watch?v=R2dNp5tLni0>(Building material and construction)
6. <https://youtube.com/watch?v=raeXjtLPS7k>(various(levels in buildings))
7. <https://youtube.com/watch?v=5zOOm2fhhwA>(for stones)
8. <https://youtube.com/watch?v=oWYSLxVJAR8>(DPC)
9. <https://youtube.com/watch?v=vN8smpxhL9c>(FOOTING)
10. <https://youtube.com/watch?v=oXtUtANZ3WQ>(Foundation)
11. https://youtube.com/watch?v=z_jieunkTtw&list=RDCMUCNCaoN3_OYmMC-rXeoCt4YA&index=3(bonds)

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 helps the student understand how political, physical, social, economical and technological changes affect the architecture material and construction techniques. The teacher should try to create interest among the students for this course by organizing site visits to the local old monuments. The teacher should also motivate the students to take general reference for form, drawing structural solutions and materials from history while designing their project.

LEARNING OUTCOMES

After completion of this course, the student shall be able to:

- Explain the architecture character of River valley civilization.
- Describe about different styles in Greek and Roman architecture.
- Explain evolution of Christian architecture in Byzantine period.
- Describe various types of planning style in Christian architecture of Romanesque and Gothic style.

DETAILED CONTENTS

1. Introduction to History of Architecture (10 hrs)
 - 1.1 Importance of history to understand architecture
 - 1.2 Examples of early shelters, stone heinge, tumili etc.
 - 1.3 Determinants of built form- geo physical, societal, technological

2. Introduction to River valley civilization (15 hrs)
 - 2.1 Egyptian civilization- locational context and architectural characteristics of public buildings e.g. Mastabas (Mastaba of Sakara), pyramids (pyramids of Giza) and temples.

- 2.2 Mesopotamian Civilization the urban context and architecture of public buildings. (Ziggurats and palaces)- one example each.
- 2.3 Indus valley civilization: Grid iron system
- 2.4 Public buildings: Granary and bath Form of the Vedic village

- 3. Greece and Rome (12 hours)
 - 3.1 Greek architecture with examples of Greek orders, agora, acropolis, theatres etc. Greek temples- Parthenon at Athens.
 - 3.2 Roman architectural character with examples of Roman basilica, aqueducts, Pantheon Rome.

- 4. Early Christian and Byzantine (6 hrs)
 - 4.1 Evolution of church form with example of St. Sophia, Constantinople

- 5. Romanesque and Gothic (8 hrs)
 - 5.1 General architectural characteristics of Romanesque architecture with example of Pisa group of buildings.
 - 5.2 Architectural character of Notre Dam, Paris

- 6. Renaissance Architecture (9 hrs)
 - 6.1 Early Renaissance architecture with example of Florence cathedral
 - 6.2 Late Renaissance architecture with examples of St. Peters Rome and St. Pauls London

INSTRUCTIONAL STRATEGY

The subject may be taught through audio visual aids, slides, power point presentations so as to explain salient architectural features and techniques. The site visits shall be organized to the old monuments and historic buildings. Emphasis must be laid on free hand drawing and maintaining a sketchbook.

RECOMMENDED BOOKS

1. Fletcher, Sir Banister, "History of Architecture", CBS Publishers.
2. Lang, Jon, "A Concise History of Modern Architecture in India", Permanent Black.
3. Bhatt, Vikram, "After the Masters (Contemporary Indian Architecture)", Grantha Corporation.

WEBSITES FOR REFERENCES

1. Open sources
2. archdaily.com
3. nptel.ac.in

SUGGESTED DISTRIBUTION OF MARKS

Topic	Time allotted (hrs)	Marks Allotted (Out of 50)
1	10	08
2	15	14
3	12	11
4	6	04
5	8	06
6	9	07
Total	60	50

3.5 CLIMATOLOGY

L P
3 -

RATIONALE

All over the world buildings are designed keeping in mind many factors and more important single factor amongst them is climate of the project site. So as an architect we should be aware of different type of climates and suitably choose materials and design buildings which consume less energy and take maximum benefits of available natural climate.

LEARNING OUTCOMES

After successful completion of this course, the student shall be able to:

- Explain everything about all the elements of climate.
- State different climatic zone.
- Describe suitable materials and type of designs for all climatic zone.
- Apply various techniques, method and concepts to effectively control Micro Climates of any project.

DETAILED CONTENTS

- | | | |
|-----|--|----------|
| 1. | General Introduction | (11 hrs) |
| 1.1 | Introduction to Climatology, weather & climate | |
| 1.2 | Movement of earth on its own axis and around Sun and variation in weather conditions and seasons according to it. | |
| 1.3 | Elements of climate like: Wind, temperature, humidity, precipitation and pressure. | |
| 1.4 | Different climatic zones like: Hot & Arid, Hot & Humid, Cold, Composite. (Characteristics, Problem areas, Design Thrust areas and Architectural features and design concepts). | |

2. Relation of Climate and comfort (08 hrs)
 - 2.1 Concept of comfort zone and bio-climatic charts and Comfort zones.
 - 2.2 Macro and micro climate concepts along with controlling micro climate of site by using various techniques.
3. Orientations (04 hrs)
 - 3.1 Definitions and Concepts of Orientations.
 - 3.2 Different orientation for various types of climate Zones and architects etc.
4. Natural lighting and Ventilation (08 hrs)
 - 4.1 Necessity and importance of natural lighting and ventilation.
 - 4.2 Methods and ways to provide natural lighting and Ventilation in buildings.
 - 4.3 Concepts of solar passive designs.
 - 4.4 Passive Solar heating and Cooling.
5. Sun Control and Shading Devices (08 hrs)
 - 5.1 Internal Sun Protection devices.
 - 5.2 External Sun Protection devices.
 - 5.3 Thermal insulation materials, techniques and devices.
6. Wind Control (03 hrs)
 - 6.1 Various methods, techniques and ways to control wind
 - 6.2 Venturi effect
 - 6.3 Use of Landscape element to Control wind and its different Characteristics
7. Use of Building Materials with Respect to Climate (03 hrs)
 - 7.1 Concrete
 - 7.2 Brick
 - 7.3 Glass
 - 7.4 Plastics
 - 7.5 Stone

7.6 Insulating material

INSTRUCTIONAL STRATEGY

Audio video should be used for explaining various components of climatology and environment. Teachers are expected to impart instructions of the above course keeping in view the effects of above course in the design of buildings. The course contents should be taught with reference to tropical climates.

RECOMMENDED BOOKS

1. Koeingsberger, “Tropical Architecture”.
2. Kukreja C.P., “Tropical Architecture”.
3. EPOdem, “Ecology”.
4. Krishna, Arvind, and others, “Design with Climate”.

WEBSITES FOR REFERENCES

1. <https://youtu.be/33kwOZ9MffE>
2. https://youtu.be/3_td71QsuKY
3. <https://youtu.be/Qe2bJXkZn4U>
4. <https://youtu.be/JOcSELy9mHB>

SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1	11	12
2	8	08
3	4	05
4	8	09
5	8	09
6	3	04
7	3	03
Total	45	50

3.6 SURVEYING

L	P
2	4

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, levelling, that the diploma holder will normally be called upon to perform.

LEARNING OUTCOMES

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

- Measure a long line with chain or tape
- Prepare maps for closed traverse and open traverse with survey instruments
- Perform levelling with digital level
- Measure level between two points with dumpy level, auto level and digital level

DETAILED CONTENTS

- | | | |
|----|---|---------|
| 1. | Introduction | (3 hrs) |
| | 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 | |
| 2. | Chain surveying | (3 hrs) |
| | 2.1 Introduction, advantages and disadvantages | |
| | 2.2 Direct and indirect ranging offsets and recording of field notes | |
| 3. | Compass surveying | (5 hrs) |

- 3.1 Purpose of compass surveying. Use of prismatic compass: Setting and taking observations
 - 3.2 Concept of following:
 - 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
 - 3.3 Local attraction - causes, detection, errors and corrections, magnetic declination.
4. Levelling (9 hrs)
- 4.1 Purpose of levelling, concept of a level surface, horizontal surface, vertical surface, datum, reduced level and bench marks
 - 4.2 Identification of various parts of Dumpy level and use of Dumpy level, Engineer' level, Auto level: advantages and disadvantages, use of auto level.
 - 4.3 Concepts of line of collimation, axis of the bubble tube, axis of the telescope and vertical axis
 - 4.4 Levelling staff: single piece, folding, invar precision staff, telescopic
 - 4.5 Temporary adjustment and permanent adjustment of dumpy level by two peg method.
 - 4.6 Concept of back sight, foresight, intermediate sight, change point, to determine reduce levels
 - 4.7 Level book and reduction of levels by
 - 4.7.1 Height of collimation method and
 - 4.7.2 Rise and fall method
5. Plane Table Surveying (5 hrs)
- 5.1 Purpose of plane table surveying, equipment used in plane table survey:
 - 5.2 Setting of a plane table:
 - (a) Centering
 - (b) Levelling
 - (c) Orientation
 - 5.3 Methods of plane table surveying

- (a) Radiation,
 - (b) Intersection
 - (c) Traversing
 - (d) Resection
- 5.4 Concept of Two point and Three point problems (Concept only)
- 5.5 Errors in plane table survey and precautions to control them. Testing and adjustment of plane table and alidade
6. Contouring (3 hrs)
- 6.1 Concept of Contours
 - 6.2 Contour Interval
 - 6.3 Horizontal Equivalent
 - 6.4 Gradient
 - 6.5 Contour Map
7. Introduction to Digital instruments (Auto level, Theodolite, Total Station, EDM instruments etc.), GPS and GI Systems (2 hrs)

PRACTICAL EXERCISES

- 1 Chaining of Line and recording in field book
- 2 Chaining of Line involving reciprocal ranging.
- 3 Chain survey of small area.
- 4 To study the Prismatic Compass and measuring angles between lines meeting at a point.
- 5 Study of Dumpy Level with setting and levelling of staff.
- 6 To find out difference of level between two distant points.
- 7 To study Plane Table survey equipment.
- 8 Survey of a small area Plan Table

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.

RECOMMENDED BOOKS

1. SK, Hussain, 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.

SUGGESTED DISTRIUBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1	3	5
2	3	5
3	5	8
4	9	13
5	5	8
6	3	6
7	2	5
Total	30	50

3.7 OPEN ELECTIVE

L	P
2	-

RATIONALE

Open Elective refers to a course that students can opt for in addition to their primary area of study. The open elective is from an unrelated discipline with the intention to provide exposure in that discipline. It provides the students the opportunity to select and learn a subject related to his/her interest, thus allowing them to explore their passion..

LIST OF SUGGESTED OPEN ELECTIVES

The student can opt one course out of the following:

- 1 Foreign Language
- 2 NCC
- 3 Yoga
- 4 First Aid
- 5 Creative Writing
- 6 Sketching, Drawing and Colour Studies
- 7 Gardening
- 8 Photography
- 9 Legal Studies
- 10 Event Management
- 11 Diet and Nutrition

Open elective can be offered online or offline.

3.7.1 FOREIGN LANGUAGE (French, Japanese, German, Spanish)

L P
2 -

RATIONALE

This course is an introduction to the specific language. Learning to understand and articulate oneself in day to day real life situations, and to begin to make sense of the language as a cultural space are the overall objectives of the course. The student should be able to grasp the basic sentence structure and build a good foundational vocabulary through this course.

LEARNING OUTCOMES

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

- Enhance the level of vocabulary in specific language.
- Manage situational communication in specific language.

DETAILED CONTENTS

- | | | |
|----|--|----------|
| 1. | Introduction | (06 hrs) |
| | Self introduction, Numbers, Days, Months, Date, Time, and Counting | |
| 2. | Vocabulary | (06 hrs) |
| | My home, My family, My friend, Daily routine, Hobbies, Food, Greeting and Thanking | |
| 3. | Grammar | (12 hrs) |
| | Verb and Verb forms, Articles, Possessive pronouns, Auxiliary verbs, Questions, Present and Past tense | |

4. Theme (06 hrs)

Means of transport, Basic directions, Food, Drink, Family, Groceries and Meals

RECOMMENDED BOOKS

1. Annie Berthet, Hugot et al, “Alter Ego - Méthode de Français”, Hachette.
2. 3 A Corporation, “Minna no Nihongo”, Goyal Publishers, New Delhi.
3. Stefanie Dengler, “NETZWERK Deutsch als Fremdsprache A1”, Goyal Publishers, New Delhi.
4. Jaime Corpas et.al, “Aula International 1”, Difusión, Madrid.

INSTRUCTIONAL STRATEGY

Teachers are expected to develop necessary knowledge in the students for comprehending basic concepts and principles of the subject so that they may pursue their passion. As far as possible, the teaching of subject shall be supplemented by demonstration and practices to enhance the relevant skills.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1	06	10
2	06	10
3	12	20
4	06	10
Total	30	50

3.7.2 NATIONAL CADET CORPS (NCC)

L P
2 -

RATIONALE

This course is structured to instil in the students qualities like nationalism, patriotism, discipline, team spirit, esprit-de-corps, leadership, self-confidence, national integration and improve their personality. The objective of the course is to expose the students to a regimental way of life, which is essential to inculcate in them the values of discipline, duty, punctuality, orderliness, smartness, and respect for authority, correct work ethos and self-confidence. In addition, it will inculcate defence services work ethos, which is characterized by hard work, sincerity of purpose, honesty, ideals of selfless service, dignity of labour, secular outlook, comradeship, spirit of adventure and sportsmanship.

LEARNING OUTCOMES

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

- Explain aims and objectives of NCC.
- Understand the importance of national integration.
- Assist Civil Administration in performance of selective duties during disasters.
- Perform drill without arms.
- Contribute towards nation building.
- Provide voluntary social service.

DETAILED CONTENTS

1. Introduction (08 hrs)

Aims and objectives of NCC, Organisation structure and training, NCC Song, National Integration and awareness, Religions, Culture, Traditions and Customs of India, National Integration: Importance and Necessity. Freedom Struggle and Nationalist Movement in India, Problems/ Challenges of national integration, Unity in diversity, Famous leaders of India, Images/ Slogans for national integration, Contribution of youth to nation building

2. Civil Affairs (04 hrs)

Civil Defence Organization and its duties/ NDMA, Types of emergencies/ Natural Hazards, Role of NCC during Natural Hazards/ Calamities

3. Drill Without Arms (08 hrs)

General and Words of Command, Attention, Stand at Ease and Stand Easy, turning and inclining at the halt, Sizing, forming up in three ranks and numbering, open and close order march and Dressing, Saluting at the halt, Getting on parade, dismissing and falling out, Marching, length of pace and time of marching in quick time and halt, slow march and halt, Turning on the march and wheeling, Saluting on the March Individual word of command

4. Personality Development and Leadership (04 hrs)

Personality development, self-awareness, Leadership, life/soft skills, time management and character building.

5. Social Service (06 hrs)

Basics of Social service, and its needs, Social/ Rural Development Projects: MNREGA, SGSY, NSAP; Literacy enhancement and poverty alleviation, Social evils, Contribution of youth towards social welfare.

RECOMMENDED BOOKS

- 1 “Cadet Hand Book (Common Subjects)”, published by DG, NCC.
- 2 “Grooming Tomorrow’s Leaders”, published by DG, NCC.
- 3 “Youth in Action”, published by DG, NCC.

INSTRUCTIONAL STRATEGY

Teachers are expected to develop necessary knowledge in the students for comprehending basic concepts and principles of the subject so that they may pursue their passion. As far as possible, the teaching of subject shall be supplemented by demonstration and practices to enhance the relevant skills.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1	08	14
2	04	06
3	08	14
4	04	06
5	06	10
Total	30	50

3.7.3 YOGA

L	P
2	-

RATIONALE

Yoga is a practice that connects the body, breath, and mind. It uses physical postures, breathing exercises, and meditation to improve overall health. It not only improves physical health but also mental and spiritual well-being, which are the foundations of life. The course is aimed at developing skills in yoga for strength, flexibility and relaxation.

LEARNING OUTCOMES

At the end of the course, the students will be able to:

- Explain the importance of yoga and its effect on health
- Perform yoga in various forms and combinations
- Understand the philosophy of heartfulness meditation.
- Promote positive health and holistic wellness through yoga and meditation.

DETAILED CONTENTS

1. Yoga (4 hrs)

Concept, need and importance, Yogic principles, Rules and precautions to be followed by yoga practitioners, Introduction to Ashtanga yoga and Yoga sutra

2. Asanas and Mudras (14 hrs)

Basic asanas, Asanas in different postures - Sukshma Vayayam, Pawan Muktasana, Surya Namaskar, Hasta Utthanasana, Padahasthasana, Tadasana, Vrikshasana, Tirayak Tadasana, Natarajasana, Vajrasana, Padmasana, Bhujangasana.

Mudras - Concept, Important mudras - Prana Mudra, Varuna Mudra, Prithvi Mudra, Aakash Mudra, Gyana Mudra.

3. Pranayama (6 hrs)

Kapalbhati Pranayama, Nadi Shodhan Pranayama (Anulom Vilom), Bhastrika Pranayama, Ujjayi Pranayama.

4. Meditation (3 hrs)

Heartfulness meditation, Practice on meditation

5. Health Benefits of Yoga and Meditation (3 hrs)

Benefits and effect of Asanas, Mudras and Pranayama on various systems and organs of human body. Relaxation and wellness through meditation

RECOMMENDED BOOKS

1. Saraswati, Swami Satyananda, "Asana, Pranayama, Mudra and Bandha", Yoga Publication Trust, Bihar.
2. BKS Iyengar, "Light on Yoga", George Allen and Unwin.
3. Mudras by Heartfulness; Heartfulness Education Trust.
4. Kamlesh D Patel, "The Way of the Heart", Spiritual Hierarchy Publication Trust
5. Goel, Aruna, "Yoga Education: Philosophy and Practice", Deep & Deep Publications, New Delhi.
6. Nagendra, H R, and R Nagarathna, "Yoga for Promotion of Positive Health". Swami Vivekananda Yoga Prakashan.

INSTRUCTIONAL STRATEGY

Teachers are expected to develop necessary knowledge in the students for comprehending basic concepts and principles of the subject so that they may pursue their passion. As far as possible, the teaching of subject shall be supplemented by demonstration and practices to enhance the relevant skills.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1	04	06
2	14	24
3	06	10
4	03	05
5	03	05
Total	30	50

3.7.4 FIRST AID

L P
2 -

RATIONALE

First aid is a valuable and life-saving course. The objective of this course is to impart knowledge and skills to the students necessary in an emergency to help sustain life, reduce pain, and minimize the consequences of injury or sudden illness until professional medical help arrives.

LEARNING OUTCOMES

At the end of the course, the students will be able to:

- Administer basic life support skills including cardiopulmonary resuscitation
- Provide first aid of simple and multiple system trauma.

DETAILED CONTENTS

1. Basics of First Aid (4 hrs)

First aid, importance of first aid, first aider, laws of first aid, contents of an ideal first aid kit, dealing with an emergency.

2. Emergency Response (10 hrs)

CPR, steps for performing CPR, CPR for newborns and infants, recovery position, first aid in drowning, fractures of bones, causes and types of fractures, dislocation.

3. First Aid in Burns (4 hrs)

Types of burns, danger of burns, first aid in dry burns and scalds, electrical burns, chemical burns, sunburn, heatstroke.

4. First Aid in Wounds and Injuries (6 hrs)

Types of wounds- small cuts and abrasions, Head injury- nose bleed, bleeding gums, bleeding from varicose veins, Shocks- causes of shock and its first aid.

5. First Aid in Poisoning (3 hrs)

Poisoning by swallowing, gases, injections, skin absorption, Animal bites, snake bites and insect stings.

6. First Aid in Foreign Objects Entering the Sense Organs: (3 hrs)

Foreign body in the eye, ear, nose, skin, swallowing of foreign objects.

Note : Persons from Civil Defence/ National Disaster Response Force (NDRF) etc. can be invited for conduct of first aid classes and demonstration of first aid practices.

RECOMMENDED BOOKS

1. Gauri Goyal, Dr. Kumkum Rajput, Dr. Manjul Mungali,, “First Aid and Health”, SBPD Publishing House
2. Williamson, Swapna Naskar and Goswami Mala, “First Aid and Emergency Care”, Kumar Publishing House, New Delhi.
3. Mahopatra, R., “First Aid for You and Me”, Academic Publishers, New Delhi.

INSTRUCTIONAL STRATEGY

Teachers are expected to develop necessary knowledge in the students for comprehending basic concepts and principles of the subject so that they may pursue their passion. As far as possible, the teaching of subject shall be supplemented by demonstration and practices to enhance the relevant skills.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1	04	06
2	10	18
3	04	06
4	06	10
5	03	05
6	03	05
Total	30	50

3.7.5 CREATIVE WRITING

L P
2 -

RATIONALE

Creative writing is a written art form that uses the imagination to tell stories and compose essays, poetry, screenplays, novels, lyrics, and more. The objective of this course is to acquaint the students with ideas related to creative writing including art, craft and basic skills required for a creative writer.

LEARNING OUTCOMES

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

- Distinguish between literary genres.
- Practice various forms of creative writing.
- Write for various media.

DETAILED CONTENTS

1. Fundamentals of Creative Writing (06 hrs)

Meaning and significance of creative writing, Genres of creative writing: poetry, fiction, Non-fiction, Drama and other forms, Research for creative writing
2. Elements of Creative Writing (10 hrs)

Plot, Setting, Character, Dialogue, Point of view, Literary devices and figurative language, Elements of style, Grammar and the structure of language, Proof reading and editing
3. Traditional Forms of Creative Writing (10 hrs)

Fiction: short story, novella and novel, Poetry, Drama, Essay, Fable, Biography, Memoire and autobiography, Travelogues, Diaries, Self-narrative writing

4. Writing for Media (04 hrs)

Print media, Broadcast media, Internet - Web content writing and blog writing, Advertising

RECOMMENDED BOOKS

1. Anjana Neira Dev. Anuradha Marwah, Swati Pal, “Creative Writing: A Beginner’s Manual”, Pearson Longman, Delhi.
2. Robert Scholes, Nancy R. Comley, Carl H. Klaus, Michael Silverman, “Elements of Literature: Essay, Fiction, Poetry, Drama, Film”, Delhi.
3. Bell, Julia and Magrs, Paul, “The Creative Writing Course-Book”, Macmillan, London.
4. Gardner, John, “The Art of Fiction”, Vintage, New York.

INSTRUCTIONAL STRATEGY

Teachers are expected to develop necessary knowledge in the students for comprehending basic concepts and principles of the subject so that they may pursue their passion. As far as possible, the teaching of subject shall be supplemented by demonstration and practices to enhance the relevant skills.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1	6	10
2	10	16
3	10	16
4	4	08
Total	30	50

3.7.6 SKETCHING, DRAWING AND COLOUR STUDIES

L	P
2	-

RATIONALE

This course is aimed to develop aesthetic sense of students. It also encompasses training in sketching, drawing and colouring to develop their mental faculties of observation, imagination and creation.

LEARNING OUTCOMES

At the end of the course, the students will be able to:

- Sketch common objects and various geometrical and non-geometrical forms found in life and nature.
- Use different medium and materials.
- Use colour judiciously in creation of visual work.
- Prepare collage using various paper and materials.

DETAILED CONTENTS

1. Sketching of Objects and Nature (8 hrs)

Sketching of objects at home like cup, plate, glass, book, pencil box etc.
Sketching of tree, mountain, hills, vegetables flower etc. for Nature study using Pencil, colour Pencil
2. Drawing of Human and Animal Figures (10 hrs)

Drawing of Human and animal form with the help of Basic Geometrical shapes
3. Collage Making (4 hrs)

Creating Collage with the help of coloured cut out papers, picture from a magazine or any easily available materials

4. Colours (8 hrs)

Water colour, Poster colour, Colour theory – Colour system, Colour wheel, Colour dimensions, Drawing with oil pastel colour and dry pastel.

RECOMMENDED BOOKS

1. Betty Edwards, “Color: A Course In Mastering The Art Of Mixing Colors”, Penguin Group Inc., New York.
2. Feisner, E., “Colour Studies”, Fairchild Publications, USA.

INSTRUCTIONAL STRATEGY

Teachers are expected to develop necessary knowledge in the students for comprehending basic concepts and principles of the subject so that they may pursue their passion. As far as possible, the teaching of subject shall be supplemented by demonstration and practices to enhance the relevant skills.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1	08	14
2	10	16
3	04	06
4	08	14
Total	30	50

3.7.7 GARDENING

L	P
2	-

RATIONALE

Gardening activities are fantastic for helping students engage in a way that is more difficult in the classroom. Watching plants grow is a fun and educational experience for them. Their enormous curiosity and excitement over anything new makes them natural for gardening. Growing plant seeds teaches them how nature works and adds to their interest in environmental sustainability.

LEARNING OUTCOMES

At the end of the course, the students will be able to :

- Explain various techniques of gardening, cultivation, multiplication, raising of seedlings of garden
- Discuss new and modern techniques of plant propagation.
- Develop interest in nature and plant life.

DETAILED CONTENTS

1. Gardening (6 hrs)
 Definition, objectives and scope. Different types of gardening - landscape and home/terrace gardening, parks and its components. Plant materials and design.
2. Gardening Operations (14 hrs)
 Soil laying, manuring, watering, management of pests and diseases and harvesting.
3. Sowing/Raising of Seeds and Seedlings (10 hrs)
 Structure and types - Seed dormancy; causes and methods of breaking dormancy. Seed storage: Seed banks, factors affecting seed viability, genetic erosion Seed production technology. Seed testing and certification. Transplanting of seedlings.

RECOMMENDED BOOKS

1. Bose T.K., Mukherjee, D., “Gardening in India”, Oxford & IBH Publishing Co. New Delhi.
2. Kumar, N., “Introduction to Horticulture”, Rajalakshmi Publications. Nagercoil, Tamil Nadu.
3. Sandhu, M.K., “Plant Propagation”, New Age International Publishers.

INSTRUCTIONAL STRATEGY

Teachers are expected to develop necessary knowledge in the students for comprehending basic concepts and principles of the subject so that they may pursue their passion. As far as possible, the teaching of subject shall be supplemented by demonstration and practices to enhance the relevant skills.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1	06	10
2	14	24
3	10	16
Total	30	50

3.7.8 PHOTOGRAPHY

L	P
2	-

RATIONALE

Photography is a unique and creative medium of self-expression that requires aesthetic sense as well as technical expertise. Students who are highly passionate about learning the workings of cameras and different technologies based on them can pursue this course. The objective of this course is to enable the candidates to understand the utility of different camera parts and the art of taking candid shots.

LEARNING OUTCOMES

At the end of the course, the students will be able to:

- Explain the principles of photography.
- Handle various cameras for taking photographs.
- Apply aesthetics of photography.

DETAILED CONTENTS

1. Basic Photography (04 hrs)

Meaning and definition of photography, Basic principle in the film and digital photography, History of photography.

2. Camera Function and Accessories (04 hrs)

Basic camera, Different parts of camera and their basic functions, Camera Accessories

3. Main Controls of Camera (10 hrs)

Parts of Camera, Types of lenses, Shutter, Diaphragm, Exposure, Film and digital image sensor, Depth of field, Lighting, Photography with flash, Filters in

photography.

4. Digital Camera (05 hrs)

Process of digital imaging, Types of digital cameras, Menu operations of digital cameras, Introduction to colors.

5. Aesthetics of Photography (07 hrs)

Definition of lighting, Principles of lighting, Reflection, Light characteristics, Color, Direct light and indirect light, Light and subject, Light as subject, Shadow as subject, Light sources, Natural light and artificial light, Principles of visualization, Composition guidelines

RECOMMENDED BOOKS

1. Dilwali, Ashok, "All about Photography", National Book Trust, New Delhi.
2. Sharma, O.P., "Practical Photography", Hind Pocket Books.
3. Freeman, "The Photographer's Guide to Light", John Collins & Brown

INSTRUCTIONAL STRATEGY

Teachers are expected to develop necessary knowledge in the students for comprehending basic concepts and principles of the subject so that they may pursue their passion. As far as possible, the teaching of subject shall be supplemented by demonstration and practices to enhance the relevant skills.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1	04	06
2	04	08
3	10	16
4	05	08
5	07	12
Total	30	50

3.7.9 LEGAL STUDIES

L	P
2	-

RATIONALE

The course introduces the students to Indian legal system, contracts management, and legal documentation. Further, the course familiarizes students with basic knowledge of labour laws that would be useful.

LEARNING OUTCOMES

At the end of the course, the students will be able to:

- Understand the Indian Legal System.
- Discuss Indian Contract Act.
- Explore labour laws and laws related to women.

DETAIL CONTENTS

- | | | |
|----|---|----------|
| 1. | Introduction to Indian Legal System | (4 hrs) |
| | Constitution of India, Sources of Law and Judicial system. | |
| 2. | The Indian Contract Act | (6 hrs) |
| | Contract – meaning and kinds. Essentials of a valid contract, Discharge of a contract, Contract of Agency | |
| 3. | Legal Documentation | (10 hrs) |
| | Drafting of legal documents including Non-Disclosure Agreements (NDA), Request for Proposal (RFP), collaboration agreements, joint venture agreements, tendering and subcontracting | |

4. Labour Laws (6 hrs)

Provident Fund, ESIC, Gratuity and Bonus

5. Legislation Related to Women (4 hrs)

Sexual harassment at Work place (Prevention, Prohibition and Redressal), Protection of Women from Domestic Violence Act, Criminal Law (Amendment) Act, The Indecent Representation of Women (Prohibition) Act.

RECOMMENDED BOOKS

1. Joseph Minattur, "Indian Legal System", Indian Law Institute, New Delhi.
2. Srivastava, S.C., "Industrial Relations and Labour Laws", Vikas Publishing House Pvt. Ltd.
3. Aggarwal, S K, "Business Law", Galgotia Publishers, Delhi.

INSTRUCTIONAL STRATEGY

Teachers are expected to develop necessary knowledge in the students for comprehending basic concepts and principles of the subject so that they may pursue their passion. As far as possible, the teaching of subject shall be supplemented by demonstration and practices to enhance the relevant skills.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1	04	07
2	06	10
3	10	16
4	06	10
5	04	07
Total	30	50

3.7.10 EVENT MANAGEMENT

L P
2 -

RATIONALE

Event Management is a course which deals with the planning, coordinating, and organising of events for people and communities. It is a part of the mass communication course which is offered by many prestigious colleges in India. Event management course aims to imbibe knowledge on analysing, marketing, planning and strategies in business administration to its students.

LEARNING OUTCOMES

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

- Explain the purpose of special events in an organization.
- Use techniques and strategies required to plan successful special events.
- Promote and conduct special events.
- Assess the quality and success of special events.

DETAILED CONTENTS

1. Principles of Event Management (04 hrs)

Introduction to event management, size & type of event, event team, code of ethics, principles of event management, role of event manager – planning, organising, leading and controlling an event
2. Event Planning (08 hrs)

Objective of event, use of planning tools, protocols, dress codes, staging, staffing.
3. Event Marketing (04 hrs)

Advertising, publicity, event marketing process, even hospitality

4. Event Leadership (06 hrs)

Teambuilding & work distribution, managing team, managing meetings, written & verbal communication.

5. Event Safety and Security (04 hrs)

Role of Security, Safety, Crowd management, Risk management.

6. Event Accounting (04 hrs)

Budget, Cash flow analysis, Profit & loss statement, Balance sheet.

RECOMMENDED BOOKS

1. Singla, Sita Ram, "Event Management", ATH Publishers, New Delhi.
2. Sharma, Divakar, "Event Planning and Management", Deep & Deep Publication.

INSTRUCTIONAL STRATEGY

Teachers are expected to develop necessary knowledge in the students for comprehending basic concepts and principles of the subject so that they may pursue their passion. As far as possible, the teaching of subject shall be supplemented by demonstration and practices to enhance the relevant skills.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1	4	06
2	8	12
3	4	08
4	6	10
5	4	08
6	4	06
Total	30	50

3.7.11 DIET AND NUTRITION

L P
2 -

RATIONALE

The objective of this course is to help the students to understand the concept of diet and nutrients and provide knowledge about causes and symptoms of Nutrition-related disorders.

LEARNING OUTCOMES

On completion of this course, the students will be able to:

- Comprehend the nutritional value of different food items.
- Explain the need of nutrition during the normal stages of life.
- Calculate normal dietary requirements and balanced diet.

DETAILED CONTENTS

1. Introduction (04 hrs)

Basic concepts of health, Nutrition, Nutrients, Nutrition requirement, Balanced diet. Relationship between health & nutrition, Assessment of nutritional status.

2. Nutrients (16 hrs)

Nutrients & their classification. Macro Nutrients –Sources, Functions and Effects on the Body; Micro nutrients - sources, Functions and effects on the Body; Fat soluble nutrients - sources, Functions and effects on the body, Water soluble nutrients - Sources, Functions and effects on the body, Digestion, Absorption of carbohydrates, Lipids, Proteins and energy.

3. Energy and Nutrition-related Disorders (06 hrs)

Basic concepts, Definition and components of energy requirement, Protein malnutrition, Iodine deficiency disorders, Disease and disorder caused by imbalance of nutrients, Food allergies.

4. Nutritional Needs (04 hrs)

Nutritional need during normal stages of life - Infancy, Childhood, Adolescence, Pregnancy, Lactation and Old age, Disease management with diet.

RECOMMENDED BOOKS

1. Antia, F.P., "Clinical Dietetics and Nutrition", Oxford University Press.
2. Swaminathan, "Essentials of Food and Nutrition", Ganesh and Co., Madras.
3. Subhangini Joshi, "Nutrition and Dietetics", McGraw Hill Publishers.
4. B.S. Narsinga Rao et al, "Nutritive Value of Indian Foods", National Institute of Nutrition, Hyderabad.

INSTRUCTIONAL STRATEGY

Teachers are expected to develop necessary knowledge in the students for comprehending basic concepts and principles of the subject so that they may pursue their passion. As far as possible, the teaching of subject shall be supplemented by demonstration and practices to enhance the relevant skills.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1	04	06
2	16	28
3	06	10
4	04	06
Total	30	50

ENERGY CONSERVATION AWARENESS CAMP

A diploma holder must have knowledge of various tips of energy conservation. Energy conservation has attained priority as it is regarded as additional energy resource. Energy saved is energy produced. This camp covers the basic concepts of energy management and its conservation. It gives the insight to energy conservation opportunities in household appliances and star rating. Lectures will be delivered on following broad topics. There will be no exam for this camp.

1. Classification of energy- primary and secondary energy, commercial and non-commercial energy, non-renewable and renewable energy with special reference to solar energy
2. Introduction to energy management, energy conservation, energy efficiency and its need
3. Salient features of Energy Conservation Act 2001 & The Energy Conservation (Amendment) Act, 2010 and its importance
4. Standards and Labeling
 - Concept of star rating and its importance
 - Types of product available for star rating
5. Salient Features of Punjab Energy Conservation Building Code (ECBC)
6. General Energy Saving Tips in:
 - Lighting System
 - Room Air Conditioners
 - Refrigerators
 - Water Heater
 - Computers
 - Fans, Heaters, Blowers and Washing Machines
 - Colour Television
 - Water Pumps
 - Kitchens
 - Transport

DRUGS USE AND ABUSE AWARENESS CAMP

This is to be organized at a stretch for two to three days during third semester. Lectures will be delivered on the following broad topics. There will be no examination for this subject.

1. Drugs Use and Abuse in Society
 - b. Concept and overview
 - c. Extent of the problem
 - d. Drug use as a social problem
 - e. Causes of Drug Use: Biological, Socio-cultural, psychological

2. Types of Dugs and identification of Abuse
 - a. Familiar drugs: Tabacco, Caffeine, over the counter drugs
 - b. Restricted Drugs: Opiates, Hallucinogens, Marijuana
 - c. Reformance enhancing drugs
 - d. Uppers and Downers: Stimulants and Depressants

3. Impact of Drug Abuse
 - a. Individual level biological and psychological
 - b. Family social, National

4. Management and Prevention of Drug Abuse
 - a. Medical and psychological
 - b. Role of family School , Media and Legislation

4.1 ARCHITECTURAL DESIGN III

L	P
-	6

RATIONALE

This subject is to be seen as an extension of Architecture Design- II, with students strengthening their skills of designing a double storey multi functional residential building. The relationship between indoor and outdoor spaces, site planning, function, structure system and use of building material shall be understood in architecture design.

LEARNING OUTCOMES

After successful completion of this course, the student shall be able to:

- Design double storey building.
- Evolve a design project that is multifunctional.
- Prepare presentation drawings.

DETAILED CONTENTS

1. Design of double storeyed residential building/doctor's clinic cum residence/an architect's office cum residence. Study shall be presented through literature study or case study. Presentation drawings shall include plans, elevations, sections, perspective etc.
2. Design of a nursery school/primary school. Study shall be presented through literature study or case study. Presentation drawings shall include plans, elevations, sections, perspective etc.
3. Design a small health centre/local neighbourhood market including case study, conceptual design scheme, detailed presentation drawings including plans, elevations, sections, perspective etc.

INSTRUCTIONAL STRATEGY

Since this is a practical oriented subject, special visits shall be made to understand various architectural features of existing buildings. Expert lectures of practicing architects may be arranged. Audio visual aids may be used. Students shall be encouraged to visit relevant websites. Teachers must encourage the students to work independently as well as in groups.

Note

Students shall maintain a sketch book.

Students are require to maintain a portfolio of work done in semester.

Viva voce must be conducted on completion of each assignment.

RECOMMENDED BOOKS

1. D.K.Ching, Francis, "Architectural Graphics", John Wiley and Sons, INC.
2. D.K.Ching, Francis, "Architecture Form, Space and Order", IT Publishers.
3. D.K.Ching, Francis, "A Visual Dictionary of Architecture".
4. Newfort, Ernest, "Architectural Data", Blackwell Science.

WEBSITES FOR REFERENCES

1. archdaily.com
2. architizer.com
3. designbasic.com
4. nptel.ac.in
5. youtube.com

4.2 BUILDING CONSTRUCTION - III

L	P/S
-	6

RATIONALE

Students of Architectural Assistantship at diploma level are supposed to prepare structural drawings, working drawings and detailed drawings of various components of buildings. Also students are expected to design small residential buildings, for this purpose, it is essential that students are taught various components of building construction comprising of foundations, super structure, openings, roofs, staircases, floorings and finishing and other allied building components. Therefore, the subject of building construction is very important for students undergoing diploma course in Architectural Assistantship. Teachers while imparting instructions are expected to show various components of buildings under construction. Make use of models or other audio-visual media to clarify the concepts. While preparing drawings, teachers should lay considerable stress on proper dimensioning, specification writing and printing and composition of drawing work. Students should be asked to maintain a sketch book for recording the observations form site visit. While conducting viva, teachers should ask specific questions on various topics.

LEARNING OUTCOMES

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

- Draw different types of roofs.
- Draw king post and queen post trusses.
- Draw dog legged stairs.
- Draw false ceiling, panelling and flooring.
- Draw expansion joints.

DETAILED CONTENTS CUM PRACTICALS

Note: Following topics may be explained along with the drawing exercises. There will not be any theory examination.

1. Roof and Roof Coverings
 - Pitched roof and terms related to roof
 - Types of timber roof
 - Lean to roof
 - Double collar roof
 - King post and queen post trusses

2. Staircase, Ramps and Basic Introduction to Escalators
 - Definition and types of staircase as per nomenclature
 - Staircases of different materials
 - Relation between different components
 - Definitions , purpose ,slopes types of ramps and moving walks
 - Basic introduction to escalators (definition and different parts)

3. Interiors of Buildings
 - False ceiling and partitions
 - Different counters as per usage

4. Expansion Joints
 - Viva-voce based upon theory syllabus
 - Preparation of drawing file

5. Form Work and Steel Work
 - Definitions of form work, shuttering and centring
 - Form work for different structural members
 - Bending of bars, formation of hooks and cranks

PRACTICAL EXERCISES (7 sheets)

1. Drawing of different types of roofs.
2. Drawing of king post and queen post trusses along with their constructional details.

3. Drawing of dog legged staircase in RCC.
4. Drawing of different types of staircases.
5. Drawing of false ceiling details
6. Drawing of counter as per usage
7. Drawing of expansion joint in walls and roof

INSTRUCTIONAL STRATEGY

This subject is of practical in nature. While imparting instruction for preparation of various drawings of different types of buildings and their components, the teacher should organize demonstration and field/site visits to show various stages, sizes and scales of operations involved in building construction. The teacher should involve the theoretical aspects of the instructions to the students before drawings are attempted by the students. Students may prepare the port-folio of the work done by them throughout the session. Teacher may also organize viva-voce after each drawing assignment so as to test the level of understanding of the students about underlying concepts, principles, and procedures.

RECOMMENDED BOOKS

1. Bindra, SP, and SP, Arora, “Building Construction”, Dhanpat Rai Publishing Co., New Delhi.
2. Punmia, BC, “Building Construction”, Laxmi Publications, New Delhi.
3. Kumar, Sushil, “Building Construction”, Standard Publishers, New Delhi.
4. Sikka, VB, “Building Construction”, S.K. Kataria & Sons, New Delhi.
5. Rangwala, “Building Construction”, Charotar Publishing House Pvt. Ltd., Anand.

WEBSITES FOR REFERENCES

1. www.youtube.com
2. <https://youtube.com/watch?v=IpzkAwWMkkY>(For bricks)
3. Slidesshare.net
4. https://youtube.com/watch?v=EIDXE28_8eQlist=PL8BA09E69BF01BC2(for building construction and material)
5. <https://youtube.com/watch?v=R2dNp5tLni0>(Building material and construction)
6. <https://youtube.com/watch?v=raeXjtLPS7k>(various(levels in buildings)
7. <https://youtube.com/watch?v=5zOOm2fhhwA>(for stones)
8. <https://youtube.com/watch?v=oWYSLxVJAR8>(DPC)

4.3 WORKING DRAWING – I

L P
- 6

RATIONALE

Working drawings are used by architects and others for a number of purposes: to develop a design idea into a coherent proposal, to communicate ideas and concepts, to convince clients of the merits of a design, to assist a building contractor to construct it based on design intent, as a record of the design and planned development, or to make a record of a building that already exists.

Working drawings are made according to a set of conventions which include particular views (floor plan, elevations and sections etc.), sheet sizes, units of measurement, scales and symbols etc.

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 working drawings of different building components and their detailing.

Teachers while imparting instructions are expected to show various components of buildings 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 teaching preparation of working drawings.

LEARNING OUTCOMES

By the end of this course, students will be able to:

- Select suitable scale and unit of dimensions
- Use correct symbols to represent proper drawing
- Prepare all types of working drawings
- Read the drawings for construction on site

DETAILED CONTENTS CUM PRACTICAL EXERCISES

1. Introduction and description of selection of a suitable scale to be chosen while preparing working drawings of some design project, fundamentals of lettering/labelling/dimensioning and area calculations in working drawings.
2. Preparation of working drawings for a simple single storied residential building (Preferably students should prepare working details on already dealt with-in the previous semester design project or teacher may provided complete design sheets at her/his own).
 - 2.1 Site Plan
 - Preparing site plan on a suitable scale with complete dimensioning and labelling showing plot area, covered/built-up portion within the site, Landscape elements, Approach road, side roads, adjoining buildings/features, and boundary wall with gates. (01 sheet)
 - 2.2 Excavation and Foundation Plan
 - Preparation of Excavation/foundation layout plan giving sizes of trenches for walls and columns, different courses in brick foundations/footings and as well as of R.C.C. columns with proper dimensioning, labelling and specifications. (01 sheet)
 - Section details of foundations for brick external wall, brick internal wall, brick partition wall, brick toe wall, brick boundary wall and R.C.C Column with proper labelling and specifications. (01 sheet)
 - 2.3 Ground Floor Plan
 - Preparation of Ground Floor plan with dimensions and specifications of various building components. (01 sheet)
 - Schedule of joinery i.e. doors, windows and ventilators etc. (01 sheet)
 - Layout of sewage pipes, water supply pipes and Rain water disposal in ground floor plan and in site plan giving proper slope, diameter and required material of pipes. (01 sheet)

- 2.4 Terrace Plan
- Preparation of terrace plan with the placing of rain water disposal (Khura) and overhead water tank. (01 sheet)
- 2.5 Sections
- Cross and longitudinal sections with proper dimensioning and labelling. (01 sheet)
- 2.6 Elevations
- Front and rear elevations with proper dimensioning and labelling. (01 sheet)
- 2.7 Details of
- Toilet layout (Plan with fixtures layout, Elevations and Sections as required with proper labelling, specifications and dimensions) (01 sheet)
 - Kitchen layout (Plan with proper fixtures and furniture layout, Elevations and Sections as required with proper labelling, specifications and dimensions) (02 sheets)
 - Any one of the cup-board or kitchen cabinets/counters plans, elevations, sections and fixing details (02 sheets)

Note: The students are required to draw any one of the above exercises on working drawings of any of the plans/elevations/sections/details of kitchen or toilet etc. on AutoCAD.

Total No. of Sheets: 14

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.

RECOMMENDED BOOKS

1. D K Ching, Francis, "Construction Details", John Wiley and Sons, Inc., New Jersey.
2. Shah, MG, CM Kale, and SY Patki, "Building Drawing", McGraw Hill India.
3. Dochiara, Joseph, "Time Saver Standards for Interior Design and Space Planning", McGraw Hill Education, New York.

WEBSITES FOR REFERENCES

1. <https://www.youtube.com/watch?v=Pyaw8ivOz6Q>
2. <https://www.youtube.com/watch?v=VjMIYGMotzM>
3. https://www.youtube.com/watch?v=XvX_ZonsA90
4. <https://www.youtube.com/watch?v=Jn8Zz4ANGhM>

4.4 COMPUTER APPLICATIONS IN ARCHITECTURE-I

L P
- 4

RATIONALE

In the present times an architectural assistant should be capable of drafting drawings on the computer. Due to increasing need for computerized drawings by most architects for their ease of drafting, editing, managing and presentation at the end of the course, the students should be able to make 2-D and 3-D architectural drawings for presentation and construction purposes. The student should get familiar with the latest AutoCAD versions.

AutoCAD is a project-oriented course for computer-aided design and covers all the topics required in this software course. This course is mostly for Architecture students who want to pursue their careers in design and space management.

LEARNING OUTCOMES

By the end of this course, students will be able to:

- Use AutoCAD
- Prepare 2-D and 3-D architectural drawings
- Modify and existing drawing
- Plot drawings

DETAILED CONTENTS CUM PRACTICAL EXERCISES

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

1. Introduction to AutoCAD

It adds general features of CAD, CAD work station, Hardware and Software requirements, Advantages of using CAD and its application in Architectural Drafting.

This course covers software applications relevant to architectural design. Introduction should be given to use design software for the architects in bilateral or trilateral dimensions.

Learning basic drawing tools: The teacher is required to detail out:

- i. Input devices
- ii. Graphics
- iii. Starting AutoCAD

- iv. Inside the drawing editor
- v. Commands in the menus (Tool bars)
- vi. Accessing Commands
- vii. Entering coordinates: The students will learn about the types of coordinate systems.
- viii. Folders for organizing drawings and files

Exercise: Creating folders and sub folders

2. Creating and Saving a New Drawing

The commands and options to create new drawings require some graphic tools such as Units, limits, Draw tools of all geometrical forms, all Modify tools, Measuring tools and drafting settings, drawing organization i.e. (Layers, Line types, Line Weights, Colors, Hatch, Texts and Dimensions), Plotting and Presentation viz. (create and insert Blocks, Layouts and plotting / printing 2D drawings to scale).

The teacher is required to introduce:

- i. Units
- ii. Limits
- iii. Snap
- iv. Grid
- v. Ortho
- vi. Layer
- vii. Application of layers
- viii. Open a new, existing drawing
- ix. Save, save as, quit, close, exit (Method of developing title block)
- x. Customization of tool bars
- xi. Line weight and types

Exercise: Setting up a new drawing with units, limits etc.

3. Drawing Commands

In this, the students will learn about the objects used for drawing purposes such as lines, polylines, constructed lines, polygons, rectangles, circles, arcs, ellipses, etc. These toolbars are used to create 2-dimensional drawings.

Some other parts of the content are:

- Understanding the concept of drawing toolbars

- Understanding the concept of other commands
 - i. Line
 - ii. Poly line/Double line.
 - iii. Arc
 - iv. Ellipse
 - v. Polygon
 - vi. Rectangle
 - vii. SP line
 - viii. Circle
 - ix. Sketch
 - x. Hatch
 - xi. Donuts

Exercise: Making a composition of different geometrical shapes using various drawing commands

4. Viewing an Existing Drawing

- i. Zoom
- ii. Pan
- iii. Redraw and Regen all
- iv. Regen Auto
- v. View

Exercise: Viewing, zooming of existing drawing made in section 3.

5. Modifying an Existing Drawing

The commands are used for passing information to the initial point of the task; the information is only communicated between running programs. There are many restrictions attached to modifying commands.

Some other parts of the content are:

- Use of all modifying commands
- Selection of multiple objects
 - i. Undo, Redo / Oops
 - ii. Trim
 - iii. Move
 - iv. Offset

- v. Rotate
- vi. Array
- vii. Stretch
- viii. Divide
- ix. Chamfer
- x. Erase
- xi. Break
- xii. Copy, multiple copy
- xiii. Mirror (Mirror test)
- xiv. Change (change properties)
- xv. Extend
- xvi. Explode
- xvii. Blip mode
- xviii. Scale
- xix. Fillet

Exercise: a) Modifying composition made in section 3
b) Making plan, elevation and section of simple building

- 6. Making and Inserting Blocks
 - i. Blocks
 - ii. Insert block
 - iii. Base
 - iv. Using library for blocks
 - v. W-block
 - vi. X-ref
 - vii. Explode

Exercise: Inserting furniture, fixtures, trees etc. in the plans, sections and elevations made in previous semester.

Draw floor plan with furniture layout, elevation and section of a one room building or residence with single bed room and produce a print out for the same.

- 7. Dimensioning and Text
 - i. Dimension type, style, units
 - ii. Dimension utilities

- iii. Dimension variables
- iv. Dimensioning of different elements like (Horizontal, vertical, inclined). Arc, Circle, Radius, diameter, continuous dimensioning etc.
- v. Editing dimension text and updating (adding new text and editing existing text)
- vi. Text style – font types, height, width factor etc.

Exercise: Dimensioning and editing text in composition made in Sections 5 & 6.

8. Plotting Drawings

- i. Plot command
- ii. Selecting area for plotting
- iii. Scale of plot, scale to fit
- iv. Selecting plotting device
- v. Selecting paper size and type
- vi. Selecting black and white or colored plots
- vii. Selecting appropriate print speed, quality
- viii. Print preview
- ix. Working in Paper space and plotting

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. Towards the end of the session each student should be given independent computer based project assignment. Experts 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 on training the students through availing help from the user friendly architectural softwares so that they develop confidence and are able to work independently.

(Note:-This is a practical subject, so there will be no Board external examination)

RECOMMENDED BOOKS

As computer-aided designs are very common nowadays, students follow a wide range of books during their course in AutoCAD. Listed below are some books that are highly preferred by some authors.

1. Kent, Dorothy, “AutoCAD Reference Guide: Everything You Wanted to Know about AutoCAD–Fast!”, New Riders Pub, USA.
2. Siddique, Arshad N, Zahid Khab, and Mukhtar Ahmed, “Engineering Drawing with a primer on AutoCAD”, Prentice Hall of India, New Delhi.
3. Sarkar, Jayanta, “Sketch Entities & Sketch Tools: Computer-aided Design: a Conceptual Approach”, Taylor & Francis Group, Milton Park, Oxfordshire.
4. Ginidis, Elliot J., “Dimensions & Dimensions Styles: Up and Running with AutoCAD 2013: 2D and 3D Drawing and Modelling”, Academic Press.
5. Krishan, Hari, “Cartesian Coordinate System: Coordinate Geometry of Three Dimensions”, Atlantic, New Delhi.
6. Marks, Percy Leman, “Principles of planning of building: The Principles of Planning Buildings, an Analytical Treatise for the Use of Architects and Others”, Palala Press, UK.

WEBSITES FOR REFERENCES

1. <https://www.youtube.com/watch?v=BAiiV4PliZ0/>
2. <https://www.bing.com/videos/search?q=AutoCAD+2010+Architecture&&view=detail&mid=D3C2F41AD2173F3FBC1DD3C2F41AD2173F3FBC1D&FORM=VRDGAR/>
3. www.cadtutor.net/tutorials/autocad/drawing-objects.php/
4. <https://www.youtube.com/watch?v=tHrfxjgFQt8&vl=en>
5. <https://www.youtube.com/watch?v=pvKVy-eMDYc&vl=en>
6. <https://www.youtube.com/watch?v=cmR9cfWJRUU>
7. <https://www.youtube.com/watch?v=QuR-VKis3jU>
8. <https://www.youtube.com/watch?v=17vBdqQaqDA>
9. <https://www.youtube.com/watch?v=VtF3pA8Mvas>
10. https://www.youtube.com/watch?v=_EWqrgBRosk
11. <https://www.youtube.com/watch?v=1ybo7qt3478>

4.5 STRUCTURAL MECHANICS

L	P
3	-

RATIONALE

This is a fundamental course. The purpose of the subject is to impart basic knowledge and skill regarding properties of materials, concept of stresses and strains, bending moment and shear force diagrams, second moment of area, bending and shear stresses. After going through this course the student shall be able to appreciate the behavior of different structure systems.

LEARNING OUTCOMES

After undergoing the subject, students will be able to:

- Analyse and explain stress-strain diagram of mild and HYSD steel Calculate various forces used in design of structures.
- Calculate shear force, bending moment for simply supported, cantilever and overhanging beams with concentrated and uniformly distributed loads.
- Calculate moment of inertia, second moments of inertia, radius of gyration, section modulus for L, T, channel and I sections.
- Calculate the bending stresses, moment of resistance of simply supported beams Explain shear stress, stress distribution diagram for rectangular, circular, I, T and L sections.

DETAILED CONTENTS

- | | | |
|----|--|----------|
| 1. | Properties of Materials | (02 hrs) |
| | 1.1 Classification of materials, elastic materials, plastic materials, ductile materials, brittle materials. | |
| 2. | Force system and Equilibrium | (07 hrs) |
| | 2.1 Force: Definition, effect, characteristics, representation and types of forces | |
| | 2.2 Force Systems: Coplanar and Non coplanar force systems | |

- 2.3 Types of coplanar Forces: Collinear, Concurrent, Parallel, Non concurrent forces
 - 2.4 Resultant force and components of a force
 - 2.5 Laws of forces: Parallelogram, Triangle and polygon Laws of forces (No Proof)
 - 2.6 Free Body Diagram, Lami's theorem (No proof)
3. Centroid and Moment of Inertia (09 hrs)
- 3.1 Definition of centre of Gravity and Centroid
 - 3.2 Centroid by method of moments of areas for square, rectangular, triangular, L-shape, T-shape and I shape cross- sections.
 - 3.3 Moments of Inertia and Radius of Gyration.
 - 3.4 Parallel axis theorem (no derivation)
 - 3.5 Perpendicular Axis Theorem (no derivation)
 - 3.6 Moment of Inertia of rectangular, Triangular, Circular section. (no derivation)
 - 3.7 Numerical on moment of inertia of Rectangular, Triangular and Circular laminas only
4. Stress and Strain (05 hrs)
- 4.1 Elasticity, Elastic limit
 - 4.2 Concept of stress and strain
 - 4.3 Definitions of different types of Stress and Strains, Concept of strain and deformation, longitudinal and transverse strain, poisson's ratio, volumetric strain
 - 4.4 Stress strain curve for mild steel and HYSD Bars, mechanical properties, factor of safety
 - 4.5 Hooks Law
5. Shear Force and Bending Moment (16 hrs)
- 5.1 Concept of a beam), types of beams: simply supported, cantilever, over hang, and continuous beams (only concept)

- 5.2 Types of loads (dead load, live load, snow load, wind load seismic load as per IS Codes and types of loading (point, uniformly distributed and uniformly varying loads)
 - 5.3 Concept of bending moment and shear force, sign conventions
 - 5.4 Bending Moment and shear force diagrams for cantilever, simply supported and overhanging beams subjected to concentrated, uniformly distributed
 - 5.5 Point of contraflexure (only Definition)
- 6 Bending stresses in Beams (06 hrs)
- 6.1 Introduction: Tension, compression
 - 6.2 Theory of simple bending.
 - 6.3 Position of Neutral Axis.
 - 6.4 Section Modulus. Moment of Resistance. Application of flexure equation $M/I = f/y = E/R$ (no derivation)
 - 6.5 Maximum and permissible bending stresses

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.

RECOMMENDED BOOKS

1. Singh, Harbhajan, "Structure Mechanics for Architects", Abhishek Publications, Chandigarh.
2. Singh, DK, "Mechanics of Solids", Galgotia Publications Pvt. Ltd., New Delhi.
3. Sarao, AS, Victor Gambhir, & Gaurav Agrawal, "Fundamentals of Applied Mechanis", Satya Prakashan New Delhi.

4. Prasad, VS, “Structural Mechanics”, Gollgotia Publication Pvt. Ltd., New Delhi.
5. Smith, PS, “Introduction to Structural Mechanics”, Macmillan Press Ltd., (UK).
6. Kumar, Rajeev, “Theory of Structures”, Satya Prakashan, New Delhi.
7. Ramamrutham, S., “Strength of Materials”, Dhanpat Rai and Sons, New Delhi.
8. Ram Chandra, “Applied Mechanics and Strength of Materials”, Standard Publishers, Delhi.
9. Punmia, BC., “Strength of Materials”, Standard Publishers, Delhi.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1	2	01
2	7	07
3	9	11
4	5	05
5	16	19
6	6	07
Total	45	50

4.6 BUILDING SERVICES

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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.

LEARNING OUTCOMES

After undergoing this Subject, student will be able to:

- Draw Water Supply and sanitation Working Drawings & can understand practical execution of same in field.
- Explain different types of materials and their specifications used in building related to various services.
- Discuss and analyze present implementing systems along with the challenges faced in buildings, regarding services and can figure out.
- State the type of lights required to suit various working spaces in a building as well as get guidance to improve aesthetic aspects like interior designing.
- Determine Role & Importance of staircase and Ramps with dimensions specified under various building codes.

DETAILED CONTENTS

1. Water Supply (12 hrs)
 - 1.1 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.
 - 1.2 System of water storage & supply – timing based (continuous, intermittent), pipe layout based (grid iron, Ring, radial etc.), gravity & pressure based, and their advantages & disadvantages
 - 1.3 Service connections, types and sizes of pipes.

2. Drainage (14 hrs)
 - 2.1 Principles of drainage, Basic Terminology – Sewer, Sewage, Sewerage, Sullage, storm Sewer, STP etc., combined and separate system of drainage, Basic materials, shape and sizes of sewers. Types of Sewerage systems.
 - 2.2 Role of traps – shapes, sizes, types & function
 - 2.3 Role of Inspection chambers & Gully Traps
 - 2.4 Functions and working of sinks, baths, water closets, flushing cisterns, urinals – sizes and types
 - 2.5 Simple exercises on layout plans for toilet and kitchens for public and residential buildings including the placement, distances and fixing details.

3. Sound Insulation (05 hrs)
 - 3.1 Sound and its propagation.
 - 3.2 Acoustics in building, acoustical defects such as echo, reverberation, sound foci, methods of correction
 - 3.3 Acoustical material for Walls, Floor & Ceiling.

4. Lighting and Electrical Fittings (07 hrs)
 - 4.1 Electrical distribution- conducts for wiring, types of switches, role of MCB & ELCB

- 4.2 Types of Lamps (Mercury, Incandescent, Fluorescent tubes, CFL & other Lamps), Thumb rule for calculation of Lighting.
- 4.3 Symbolic representation of electrical fittings for different work areas in residential building (e.g. bed room, living room, kitchen, study and toilet)
- 4.4 Precautions to avoid electrical accidents

5. Vertical Transportation Systems (04 hrs)

Ramps, Classification and types of lifts, lift sizes, working of lift, escalators, sizes of their safety norms to be adopted

6. Fire Fighting Services (03 hrs)

Causes of fire in Buildings, classification of building materials according to fire rating, introduction to fire fighting system, precaution and controlling devices (Site Level & at Building Level)

INSTRUCTIONAL STRATEGY

Building services is an important subject in Understanding the Practical requirements in Buildings to perform, for which they are built. As this is directly linked to Working drawings, teacher must demonstrate the clear picture of terminology involved. Teacher can arrange market & site visits to practically represent the specifications, types and installation of different materials intended for services in construction industry. Social Media in form of Youtube and Slideshare can be referred frequently for thorough instructions.

RECOMMENDED BOOKS

1. Jain, VK, "Handbook of Designing and Installation of Services in Building Complex – High Rise Buildings", Khanna Publishers, New Delhi.
2. Hammer, Mark J., and Mark J. Hammer (Jr.), "Water and Waste Water Technology", Prentice Hall of India (P) Ltd., New Delhi – 110001.
3. Subramanian, V., "A Text Book of Environmental Science", Narosa Publications, New Delhi.
4. Rangwala, "Water Supply and Sanitary Engineering", Charotar Publishing House Pvt. Ltd.

WEBSITES FOR REFERENCES

1. www.youtube.com
2. www.slideshare.net
3. <https://www.civilengineeringterms.com/environmental-engineering-1/water-supply/>
4. <https://www.youtube.com/watch?v=5jRTkoxof90>
5. <https://www.youtube.com/watch?v=4grFd-chU5M>
6. <https://www.youtube.com/watch?v=k-VO9PJh8Pg>
7. <https://www.youtube.com/watch?v=sZr5ahBBF1c>
8. <https://www.youtube.com/watch?v=DgzCNJcl8vg>
9. https://www.youtube.com/watch?v=33dej_o_h6c
10. <https://www.youtube.com/watch?v=gjKuCUc6-yo>
11. <https://www.youtube.com/watch?v=mkl8-ibmKLLk>
12. <https://www.youtube.com/watch?v=cpN0r6MCGI4>
13. <https://www.youtube.com/watch?v=YzgOWu7JL4o>
14. <https://www.youtube.com/watch?v=XSZvfSOqPqw>
15. <https://www.youtube.com/watch?v=NSM4Plikj1A>
16. <https://www.youtube.com/watch?v=-T0jvsWNfI0>
17. <https://www.youtube.com/watch?v=6y2WrK-8UTY>
18. https://www.youtube.com/watch?v=_PoAwHJkS_8
19. <https://www.youtube.com/watch?v=1jfNIBtfWDY>
20. <https://www.youtube.com/watch?v=hjS1T-5IOPi>
21. <https://www.youtube.com/watch?v=aU1P7-Cn72s>
22. https://www.youtube.com/watch?v=UIKS_A7Xg1E
23. <https://www.youtube.com/watch?v=8DEap6exAB0>

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1	12	13
2	14	16
3	05	05
4	07	07
5	04	05
6	03	04
Total	45	50

4.7 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 helps the student understand how political, physical, social, economical and technological changes affect the architecture material and construction techniques. The teacher should try to create interest among the students for this course by organizing site visits to the local old monuments. The teacher should also motivate the students to take general reference for form, drawing structural solutions and materials from history while designing their project.

LEARNING OUTCOMES

After successful completion of this course, the student shall be able to:

- Explain the architectural character of Buddhist and Hindu architecture.
- Describe different styles in Islamic architecture in India.
- State the philosophy of great masters of architecture.
- Describe the architectural character of contemporary buildings by Indian architects.

DETAILED CONTENTS

1. Introduction to Buddhist Architecture in India (8 hours)
 - 1.1 Building typology: Stupa, Chaityas and viharas Examples of Ajanta and Ellora, Stupa at Sanchi

2. Temple architecture in India (12 hours)
 - 2.1 Dravidian style- Evolution of temple, General characteristics and planning of Shore Temple at Mahabalipuram and Temple at Madurai
 - 2.2 Indo Aryan Temples -Architectural form and planning of Lingaraja Temple at Bhubaneshwar, kandhariya Mahadeo at Khajuraho and Sun Temple at Modhera

- 2.3 Jain Temples – General architectural characteristics of Dilwara Temple at Mount Abu
3. Islamic Architecture in India (12 hours)
- 3.1 Introduction of islam in India – new building types, structural system and ornamentation. Example of Qutab Complex
- 3.2 Development of indo Islamic architectural style .Example of Tomb of Ghiyas ud din Tughlaq
- 3.3 Provincial Style-Architectural style of Gol Gumbaj , Bijapur and Jami Masjid ,Jaunpur
- 3.4 Mughal architecture-General characteristics and planning of Humayun Tomb, Fatehpur Sikri, Red Fort Delhi, Taj Mahal Agra and Jama Masjid at Delhi
4. Industrial revolution and its impact on architecture (4 hours)
- 4.1 Influence of new construction material on buildings
5. Modern architecture (12 hours)
- 5.1 Philosophy and key works of Frank Lloyd Wright and Le Corbusier
6. Contemporary architecture in India (12 hours)
- 6.1 Works of Le Corbusier in India
- 6.2 Any two building of each of Charles Correa, B.V Doshi and Raj Rewal.

INSTRUCTIONAL STRATEGY

The subject may be taught through audio-visual aids, slides, power point presentations so as to explain salient architectural features and techniques. The site visits shall be organized to the old monuments and historic buildings. Emphasis must be laid on free hand drawing and maintaining a sketchbook.

RECOMMENDED BOOKS

1. Lang, Jon, "A concise History of Modern Architecture in India", Permanent Black.
2. Bhatt, Vikram, "After the masters (Contemporary Indian Architecture)", Grantha Corporation.
3. Brown, Percy, "Indian Architecture (Buddhist and Hindu Period)", Readbooks.
4. Brown, Percy, "Indian Architecture (Islamic Period)", Readbooks.

WEBSITES FOR REFERENCES

1. archdaily.com
2. nptel.ac.in

SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Hrs)	Marks Allotted (Out of 50)
1	8	06
2	12	10
3	12	10
4	4	04
5	12	10
6	12	10
Total	60	50

ENTREPRENEURIAL AWARENESS CAMP

This is to be organized at a stretch for two to three days during fourth semester. Lectures will be delivered on the following broad topics. There will be no examination for this subject.

1. Who is an entrepreneur?
2. Need for entrepreneurship, entrepreneurial career and wage employment
3. Scenario of development of small scale industries in India
4. Entrepreneurial history in India, Indian values and entrepreneurship
5. Assistance from District Industries Centres, Commercial Banks, State Financial Corporations, Small industries Service Institutes, Research and Development Laboratories and other financial and development corporations
6. Considerations for product selection
7. Opportunities for business, service and industrial ventures
8. Learning from Indian experiences in entrepreneurship (Interaction with successful entrepreneurs)
9. Legal aspects of small business
10. Managerial aspects of small business
11. Preparation of Project Report

INDUSTRIAL TRAINING OF STUDENTS

It is needless to emphasize further the importance of Industrial Training of students during their 3 years of studies at Polytechnics. It is industrial training, which provides an opportunity to students to experience the environment and culture of industrial production units and commercial activities undertaken in field organizations. It prepares student for their future role as diploma engineers in the world of work and enables them to integrate theory with practice. Polytechnics have been arranging industrial training of students of various durations to meet the above objectives.

This document includes guided and supervised industrial training of a minimum of 6 weeks duration to be organised during the semester break starting after second year i.e. after 4th semester examinations. The concerned HODs along with other teachers will guide and help students in arranging appropriate training places relevant to their specific branch. It is suggested that a training schedule may be drawn for each student before starting of the training in consultation with the training providers. Students should also be briefed in advance about the organizational setup, product range, manufacturing process, important machines and materials used in the training organization.

Equally important with the guidance is supervision of students training in the industry/organization by the teachers. A minimum of one visit per week by the teacher is recommended. Students should be encouraged to write daily report in their diary to enable them to write final report and its presentation later on.

An internal assessment of 50 and external assessment of 50 marks have been provided in the study and evaluation scheme of 5th Semester. Evaluation of professional industrial training report through viva-voce/presentation aims at assessing students understanding of materials, industrial process, practices in industry/field organization and their ability to engage in activities related to problem solving in industrial setup as well as understanding of application of knowledge and skills learnt in real life situations.

Teachers and students are requested to see the footnote below the study and evaluation scheme of 4th semester for further details.

The teacher along with field supervisors will conduct performance assessment of students. The components of evaluation will include the following:

- | | | |
|----|-----------------------------------|-----|
| a) | Punctuality and regularity | 15% |
| b) | Initiative in learning new things | 15% |
| c) | Relationship with workers | 15% |
| d) | Industrial training report | 55% |