

5.1 SURVEYING

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2 - 3

RATIONALE

The important functions of a diploma holder in Architecture 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 chain surveying, compass surveying and levelling that the diploma holder in Architectural Assistantship will normally be called upon to perform. Plane table surveying, contouring, theodolite surveying, curves and use of minor instruments have also been included in this subject.

Field work should be a selected one so that student can check his work and have an idea of the extent of error in the work done by him. As far as possible, the surveys done should be got plotted, as this will also reveal errors in the work and develop skill in plotting.

DETAILED CONTENTS THEORY

Part – A:

1. Introduction: (03 hrs)
 - 1.1 Basic principles and types of surveying and types of surveying
 - 1.2 Concept of surveying, purpose of surveying, measurements-linear and angular, units of measurements
 - 1.3 Instruments used for taking these measurement, classification of survey based on instruments
 - 1.4 System of conversion of land measurements from traditional revenue maps/records to MKS.

2. Chain surveying: (03 hrs)
 - 2.1 Purpose of chain surveying, principles of chain surveying
 - 2.2. Errors in chain surveying
 - 2.3 Corrections to chain length, simple related problems.

3. Compass surveying: (06 hrs.)
 - 3.1 Purpose of compass surveying. Construction and working of prismatic compass, use of prismatic compass: Setting and taking observations
 - 3.2 Concept of:
 - a) Meridian - Magnetic and true
 - b) Bearing - Magnetic, True and Arbitrary

- c) Whole circle bearing and reduced bearing
- d) Fore and back bearing

3.3 Local Attraction-causes, Detection & precautions against local attraction

4. Levelling: (06 hrs)

- 4.1 Purpose and concept of levelling, reduced level and bench marks
- 4.2 Construction of Dumpy level
- 4.3 Concepts of line of collimation, axis of the bubble tube, axis of the telescope and vertical axis
- 4.4 Temporary adjustment: setting up and leveling
- 4.5 Concept of back sight, foresight, intermediate sight, station change point, to determine reduced levels
- 4.7. Level book and reduction of levels by
 - 4.7.1 Height of instrument method and
 - 4.7.2 Rise and fall method,
 - 4.7.3 Arithmetic checks, problems on reduction of levels,
- 4.8 Computations of Areas of regular figure and irregular figure. Simpson rule

Part – B

5. Plane Table Surveying: (06 hrs)

- 5.1 Purpose of plane table surveying, equipment used in plane table survey:
 - (a) Plane table and its accessories
- 5.2 Setting of a plane table:
 - (a) Centering
 - (b) Leveling
 - (c) Orientation
- 5.3 Methods of plane table surveying
 - (a) Radiation,
 - (b) Intersection
 - (c) Traversing
- 5.4. Two Point Problem

6. Contouring: (02 hrs)

Concept of contours, contour interval and horizontal equivalent.

7. Instruments: (02 hrs)

- Demo and uses of:
- a) Theodolite
 - b) Planimeter

8. Use of Modern Surveying equipment (Auto Level, Micro-optic Total station, EDM instruments) (03 hrs)

NOTE:

- a) For various surveying equipment relevant Indian Standards should be followed
- b) No sketch of the instruments may be asked in the examination

PRACTICAL EXERCISES**I. Chain surveying:**

- i)
 - a) Ranging a line
 - b) Chaining a line and recording in the field work
 - c) Testing and adjustment of chain
 - d) Taking offsets - perpendicular and oblique (with a tape only)
 - e) Setting out right angle with a tape
- ii)
 - a) Chaining of a line involving reciprocal ranging
 - b) Taking off sets and setting out right angles, with cross staff and Indian optical square
- iii)
 - a) Demarcation of land at site and cross checking the dimension/diagrams/levels/set-backs etc of a building lay out.

II. Compass Surveying:

- i)
 - a) Study of prismatic compass
 - b) Setting the compass and taking observations
 - c) Measuring angles between the lines meeting at a point
 - d) Plotting of readings and applying corrections.

III. Leveling:

- i)
 - a) Study of dumpy level and levelling staff (single piece and folding)
 - b) Temporary adjustments of a Dumpy level
 - e) Taking staff readings on different stations from the single setting and finding differences of level between them
- ii)
 - a) Study of Tilting Level (IOP) level
 - b) Its temporary adjustments
 - f) Taking staff readings on different stations from the single setting and finding differences of level between them
- iii) Exercise of finding R.L's of different components of an existing building e.g. Plinth, chhajja, ceiling, approach road, boundary wall etc w.r.t a given bench mark.

IV. Plane Table Surveying:

- i)
 - a) Setting the plane table
 - b) Plotting a few points by radiation method

- c) Orientation by
 - Trough compass
 - Back sighting
 - d) Plotting a few points by intersection method
- (ii) Two point problem
 - (iii) Computing of areas by planimeter
- V. Demonstration of digital instruments like Autolevel, digital Planimeter, micro-optic theodolite, total station, EDM instruments.

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

RECOMMENDED BOOKS

1. Narinder Singh; "Surveying"; New Delhi, Tata McGraw Hill Publishing Co Ltd.
2. Hussain, SK and Nagraj, MS; "Text Book of Surveying"; New Delhi, S Chand and Co Ltd.
3. Deshpande, RS; "A Text Book Surveying and Levelling"; Poona, United Book Corporation
4. Kocher, CL; "A Text Book of Surveying"; Ludhiana, Katson Publishing House
5. Kanetkar, TP and Kulkarni, SV., "Surveying and Leveling", Poona, AVG Parkashan
6. Kanetkar, TP; and Kulkarni, SV; "Surveying and Leveling-Vol.2" Poona, AVG Prakashan
7. Punima, BC; "Surveying and Leveling - Vol. 2", Delhi Standard Publishers Distributors, Delhi
8. Shahai, PB; "A Text Book of Surveying Vol. 2", Oxford and IBH Publishing Co.
9. Fundamentals of Surveying by Roy SK; Prentice Hall of India (P) Ltd., New Delhi

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	03	10
2	04	12
3	06	18
4	06	18
5	06	18
6	02	8
7	02	8
8	03	8
Total	32	100

5.2 BUILDING CONSTRUCTION - III

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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 building. For this purpose, it is essential that students are taught various components of building construction comprising of foundation, super structure, openings, roofs, staircases, flooring 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 proportioning, dimensioning, specification writing and printing and composition of drawing work.

Students should be asked to maintain a sketchbook for recording mistakes done by students in the preparation of drawings.

DETAILED CONTENTS

- | | |
|--|--|
| <p>1. Steel Sections</p> <ul style="list-style-type: none"> ➤ Steel doors and windows using standard rolled sections ➤ Rolling and collapsible shutter | <p>Drawing different types of steel doors and windows using different sections (2 sheet) with details</p> <p>Drawing of rolling and collapsible shutters with details (2 sheets)</p> |
| <p>2. Steel Roofs</p> <ul style="list-style-type: none"> ➤ Line diagram of steel roofs for various spans ➤ Constructional details of steel roofs ➤ Roof covering: AC, GI sheets | <p>Drawing a north light truss with joints details (1 sheet)</p> |
| <p>3. Finishes</p> <ul style="list-style-type: none"> ➤ Plastering and pointing ➤ Stone cladding and tile lining ➤ Gravel and wash marble finish ➤ Panellings and fibrous board finishes | <p>Paneling details (1 sheet)</p> |
| <p>4. Doors and Windows</p> <ul style="list-style-type: none"> ➤ Using different aluminum sections ➤ Anodizing of aluminum sections | <p>Drawing of aluminum door and window showing fixing, beading, hardware's</p> |

- | | | |
|----|--|--|
| ➤ | Beadings in conjunction with aluminum section | etc. Drawing of sliding, folding and sliding and revolving doors
(2 sheets) |
| 5. | Earthquake resistant building configuration (Principles of earthquake resistance, effect of building form on seismic behaviour, building configuration for improved earthquake resistance) | (2 sheets showing Architecture and Structural details/sketches) |

Total Number of Drawings: 10

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 unlying concepts, principles, and procedures.

RECOMMENDED BOOKS

1. Building Construction by WB Mackay
2. Building Construction by SP Bindra and SP Arora
3. Building Construction by BC Punmia
4. Building Construction by Sushil Kumar
5. Construction of Buildings (Vol I and II) by Barry
6. Building Construction by VB Sikka
7. Building Construction by Rangwala

5.3 COMPUTER APPLICATIONS IN ARCHITECTURE - II

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RATIONALE

To enable the student to develop the confidence to prepare the drawings of a given project through knowledge acquired in previous semester by preparing a set of drawings for any one project. To enable the student to create three dimensional objects in space with special emphasis on presentation and visualization of interiors and exteriors of building using different rendering techniques using auto CAD 2002 or the latest programme.

DETAILED CONTENTS

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

1. Project (Rendering of CAD drawing) (20 hrs)

The design problem done in 4th semester as main project shall be taken up for preparing a complete set of drawings. These include all plans, elevations (minimum 2) and sections (2 minimum), showing all interior layouts, joinery schedule, tree plantations, parking layout etc.
2. Fundamentals of 3-D Drafting (08 hrs)
 - 2.1 Basic Features
 - 2.2 Coordinate system
 - 2.3 3-D entities and surfaces

Exercises – 1: Converting simple geometric shapes into 3-D Objects
3. Making an existing 2-D plan drawing compatible to 3-D drafting (12 hrs)
 - 3.1 Commands and modifications to 2-D drawings
 - 3.2 B. Poly, rectangle, elevation, extrude – requirements and applications
 - 3.3 3-D of exterior of blocks – preparation, modification of 2-D drawing
 - 3.4 3-D of interiors of block – preparation, modification of 2-D drawings
4. 3-D Modeling (20 hrs)
 - 4.1 Wire frame, surface and 3-D solid modelling
 - 4.2 Viewing 3-D models
 - 4.3 Rendering, shading, hide commands, lights and Camera
 - 4.4 Material representation
 - 4.5 Importing, exporting library and printing 3-D

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

5. Demonstration of 3D max, Corel Draw, Adobe Photoshop as rendering tool for 3D blocks/ walk through etc. (4 hrs)

Exercises

1. Converting simple geometrical shapes into 3-D objects
2. Students will take their second year design proposals and convert them in 3-dimensional presentation models

INSTRUCTIONAL STRATEGY

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

5.4. TOWN PLANNING

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RATIONALE

To develop an understanding about the components of town planning and to equip the student with requisite knowledge to assist in the preparation of master plans, layout of housing/urban development schemes.

DETAILED CONTENTS

1. Overview of town planning: Principal elements and the location of public functions with reference to (12 hrs)
 - a) Greek towns
 - b) Roman Military Towns
 - c) Italian Hill Towns
 - d) Medieval Fortified Towns
 - e) Renaissance Ideal Towns

2. Growth of the Industrial Town (12 hrs)
 - a) Need & Purpose
 - b) Characteristics of the Factory Town
 - c) Trends in Modern town Planning:
 - Linear city- Soria Y Mata
 - Garden city- Ebenezer Howard
 - Vertical garden city- Le Corbusier

3. Planning Process: Site Selection, Land uses in a town, their hierarchy and location. Types of town shapes with reference to circulation (Linear, Star, grid, Satellite). (08 hrs)

4. Introduction to Urban land uses & their management. (20 hrs)
 - a) Zoning: Need and purpose in a master plan. Density-net and gross, bulk & height. FAR, FSI
 - b) Neighbourhood- The neighbourhood concept by Clarence Stein. Functions of a neighbourhood, population size and layout, with respect to the Chandigarh sector. Distributions of facilities within a neighbourhood (shopping, health, education and recreation).

- c) Circulation System- Hierarchy of road network in a town. Modes of transport and modal split in a town. Familiarization with terms: Traffic flow, peak hour volume, traffic distribution.
- d) Commercial Areas: Hierarchy of Commercial Area in a Town/City and their foundation (Vis-à-vis the population they serve)
- e) Open Spaces: Their location, distribution and hierarchy within a town.

Note: For each of the above land uses a suitable town plan is to be studied, analysed to be submitted as a report

- 5. Legislation and Urban Controls (12 hrs)
 - a) Need and purpose of development controls in towns.
 - b) Obligatory and discretionary functions of Urban Local Bodies and Development Authorities.

INSTRUCTIONAL STRATEGY

Town planning and human settlements are important aspects of architectural design and development. The teacher should procure relevant audio-visual material for presentation to the students. Some leading architects working in the area may be invited to present case studies to the students. Students may be encouraged to take some Jive or hypothetical cases for designing human settlements. Field visits to the cities, towns and villages may be arranged to explain the important features of the subject. Relevant BIS codes and standards may be referred by the teacher, while imparting instructions in the classroom

RECOMMENDED BOOKS

1. Urban Design of Towns & Cities – Paul D. Spreiregen
2. Urban Pattern- Esallion B Fischer
3. Town Planning made Plain-Lewis Keeble
4. From Pre History to Post Modernism-Isabelle Hyman
5. Town Planning in Ancient India-
6. World Architecture-Patrick Nutgens
7. Fundamentals of Town Planning- Hiraskar
8. The Making of Cities- Walter Bor
9. Town and Country Planning-John Ratcliffe
10. Towns cape-Gordon Cullen
11. Town Planning – SC Rangwala
12. Ancient and Medieval Town Planning in India-Prabhakar V. Begde
13. Text Book of Town Planning-Abir Bandyo Padhyay

14. Space, Tune & Architecture-Sigfrfried giedeon
15. Text Book of Town Planning – Abir Bandyopadhyay Publisher – Arunabha Sen Books and Allied (P) Ltd. 8/1 Chintamani Das Lane, Calcutta 700 009
16. Urban Pattern – Gallion & Eisner, Publisher – Van Nostrand Reinhold, USA (1984)
17. Architecture of Towns & Cities – Paul D.Spreiregen, Publisher- Mc Graw Hill Book Company, New York (1969)
18. Town Design – Frederick Gibberd , Publisher – Architectural Press, Great Britain (1967)
19. Town Planning – Hiraskar, Publisher
20. Town and Country Planning & Housing – VN Modak, Publisher
21. Town Planning made Plain – Lewis Keeble, 1983,Publisher Longman Group Ltd.
22. Matrix of Man – Moholy Sibyl Nagy, Publisher – Pall Mall Press, London (1968)

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	12	18
2	12	18
3	08	14
4	20	30
5	12	20
Total	64	100

5.5 WORKING DRAWING - II

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RATIONALE

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

DETAILED CONTENTS

1. Preparation of working drawings in ink of a two or three storeyed building already dealt within the design project:
 - 1.1 Site Plan (01 sheet)
 - 1.2 Foundation layout plan & sectional details (02 sheets)
 - 1.3 Ground Floor Plan (01 sheet)
 - 1.4 Upper Floor Plans (one for each floor) (03 sheets)
 - 1.5 Terrace Plan with rainwater drainage and disposal details (01 sheet)
2. Built-in furniture e.g. side boards, wardrobes, cupboards, niches etc (03 sheets)
(Plan, elevation, section of various fitting details)
3. Entrance gate, boundary wall and railing details (01 sheet)
4. Electrical layout plan of an already handled design project (01 sheet)
5. Water, supply, sewage & drainage layout plan & fire fighting layout of an already dealt design project. (01 sheet)
6. Specifications

General and detailed specifications of :

 - Single storey buildings
 - Double storey buildings
 - General specification 1st, 2nd, 3rd and 4th class buildings

- Exercises on writing detailed specifications of different types of building works from excavation to foundations, superstructure and finishing operation (Minimum 14 sheets)

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 ,)f 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. Instruction Details by OK Ching
2. Building Drawing by MG Shah, CM Kale, SY Patki

5.6 BUILDING BYE-LAWS

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RATIONALE

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

Teachers should refer to local bye-laws/building bye-laws while teaching this subject.

DETAILED CONTENTS

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|----|--|----------|
| 1. | Need of building byelaws for urban development. | (02 hrs) |
| 2. | Basic Terminology | (04 hrs) |
| 3. | Factors affecting planning of byelaws: | (06 hrs) |
| | - Light and ventilation | |
| | - Mass | |
| | - Volume | |
| | - Open space | |
| | - Skyline | |
| | - Aesthetics | |
| | - Setbacks. | |
| | - Parking and Fire Safety | |
| 4. | Bye laws | (06 hrs) |
| | - Study Building Bye-laws of local development authorities | |
| | - Introduction to National Building Code. | |
| 5. | Zoning | (04 hrs) |
| | - Concept of zoning | |
| | - Objectives of zoning | |
| | - Types of zoning | |

6. Case Study of existing residential and commercial building with respect to implementation of local Bye laws (03 hrs)
7. Study of various Performas to be used (01 hr)
8. BIS and CPWD By-laws/standards for removing Architectural barriers for persons with disabilities (PWDs) (02 hrs)
9. Introduction to earthquake resistant regulations, Code provisions (IS-1893), seismic zoning (04 hrs)

INSTRUCTIONAL STRATEGY

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

RECOMMENDED BOOKS

1. Architect's Hand Book by Charanjit Shah
2. PUDA Bye Laws
3. N.B.C.
4. Local Bodies Legislation.
5. Chandigarh Bye laws

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	02	06
2	04	12
3	06	18
4	06	18
5	04	12
6	03	10
7	01	04
8	02	08
9	04	12
Total	32	100

5.7 ARCHITECTURAL DESIGN – IV

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RATIONALE

Intent: To appreciate the complexities and constraints in the design of a simple building complex comprising two or more individual buildings.

DETAILED CONTENTS

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

- a) Small housing complex.
 - b) Crafts museum, exhibition centre.
 - c) Service station for cars/light vehicles
 - d) Motel
 - e) Shopping centre
 - f) E-Sampark Centre (public building)
- Special Emphasis to be laid on site planning. Services, Parking.

Note: 1. Case study and library study must be done for each exercise.

Note: 2 Site Visits and related case studies to be carried out

INSTRUCTIONAL STRATEGY

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

RECOMMENDED BOOKS

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

PERSONALITY DEVELOPMENT CAMP

This is to be organized at a stretch for two to three days during fifth or sixth semester. Extension Lectures by experts or teachers from the polytechnic will be delivered on the following broad topics. There will be no examination for this subject.

1. Communication Skills
2. Correspondence and job finding/applying/thanks and follow-up
3. Resume Writing
4. Interview Techniques: In-Person Interviews; Telephonic Interview' Panel interviews; Group interviews and Video Conferencing etc.
5. Presentation Techniques
6. Group Discussions Techniques
7. Aspects of Personality Development
8. Motivation
9. Leadership
10. Stress Management
11. Time Management
12. Interpersonal Relationship
13. Health and Hygiene