CURRICULUM

FOR

SECOND SEMESTER

OF

THREE-YEAR

DIPLOMA COURSES

IN

POLYTECHNICS

OF

UNION TERRITORY

OF

JAMMU AND KASHMIR

CONTENT TABLE

CURRICULUM

FOR

SECOND SEMESTER

DIPLOMA

IN

ARCHITECTURAL

ASSISTANTSHIP

SUBJECT STUDY SCHEME (2nd Semester: Architectural Assistantship)

Course Code	Subjects	Time in Hours				CREDITS		
		Theory	Tutorial	Practical	Total	Theory	Practical	Total
BS201	Applied Mathematics-II	3	1	--------	4	4	--------	4
ES202	Introduction to Computers and Information Technology	---	---	4	4	----	2	2
AAPC201	Architectural Design-I	---	1	4	5	--	3	3
AAPC202	Computer Aided Drawing (CAD) for Architecture	--------	--------	4	4	--------	2	2
AAPC203	Construction Materials	4	--------	------	4	4	-----	4
AAPC204	Architectural Drawing -I	--------	1	4	5	--------	3	3
AAPC205	Structures-I	3	1	------	4	4	----	4
	Total	**10**	**4**	**16**	**30**	**12**	**10**	**22**

PROGRAM: THREE YEAR DIPLOMA IN ENGINEERING AND TECHNOLOGY *	
Course Code: **BS201**	Course Title: **Applied Mathematics-II**
Semester: **2nd**	Credit: **4**
Periods Per Week: **4 (L: 03, T: 01, P: 0)**	

(* Common to Architecture Assistantship, Automobile, Civil, Civil(PHE), QSCM, Computer , Electrical , E&C, Medical Electronics, Food Technology, I&C, Leather Technology, Mechanical, Textile Technology, Wood Technology and IT)

COURSE OBJECTIVE:

This course is designed to develop an understanding of basic mathematical and statistical tools which include matrices, determinants, integral calculus and coordinate geometry and the applications of such tools in the field of engineering and technology

COURSE CONTENT

1. Integral Calculus

1.1 Integration as inverse operation of differentiation

1.2 Simple integration by substitution, by parts and by partial fractions (for Linear factors only)

1.3 Evaluation of definite integrals (simple problems)-

Evaluation of $\int_0^{\pi/2} \text{Sin}^n x.\, dx$, $\int_0^{\pi/2} \text{Cos}^n x\, dx$, $\int_0^{\pi/2} \text{Sin}^m x\ \text{Cos}^n x\, dx$

Using formulae without proof (m and n being positive integers only)

2. Coordinate Geometry

2.1 Equation of straight line in various standard forms (without proof), intersection of two straight lines, angle between two lines. Parallel and perpendicular lines, perpendicular distance formula.

2.2 General equation of a circle and its characteristics. To find the equation of a circle, given: Centre and radius, three points lying on it and coordinates of end points of a diameter.

2.3 Definition of conics (Parabola, Ellipse, Hyperbola) their standard equations without proof. Basic problems on conics when their foci, directrices or vertices are given

3 Matrices and Determinants

3.1 Definition of matrix and its types.

3.2 Addition, subtraction and multiplication of matrices.

3.3 Expansion of Determinants.

4 Statistics

4.1 Measures of Central Tendency: Mean, Median, Mode

4.2 Measures of Dispersion: Mean deviation, Standard deviation

4.3 Basic Concepts of Probability.

COURSE OUTCOME

After the completion of the course the student will be able to:

- evaluate both indefinite and definite integrals by various methods
- identify various points in a 2-D space along with formulation of equations and graphs for different types of lines, circles, ellipses, parabolas etc.
- find the sum, difference and product of two or more matrices,
- evaluate determinants and their relations to matrices
- find the mean, median, mode and other measures of central tendency.
- solve basic problems on probability.

RECOMMENDED BOOKS:

1. R.D Sharma, Applied Mathematics-II.
2. H.K Das, Applied Mathematics.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 40th Edition, 2007.
4. S.S. Sabharwal, Sunita Jain, Eagle Parkashan, Applied Mathematics, Vol. I & II, Jalandhar.
5. Comprehensive Mathematics, Vol. I & II by Laxmi Publications, Delhi.
6. Reena Garg & Chandrika Prasad, Advanced Engineering Mathematics, Khanna Publishing House, New Delhi
7. Applied Mathematics-II, Eagle Publications.

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	16	35
2	10	20
3	12	25
4	10	20
Total	**48**	**100**

PROGRAM THREE YEAR DIPLOMA IN ENGINEERING AND TECHNOLOGY	
Course Code: **ES202**	Course Title: **Introduction to Computers and Information Technology**
Semester:**2nd**	Credit: **2**
Periods Per Week: **4 (L: 0 T: 0 P: 4)**	

(* Common to Architecture Assistantship, Automobile, Civil, Civil(PHE), QSCM, Computer , Electrical , E&C, Medical Electronics, Food Technology, Garment Technology, I&C, Leather Technology, Mechanical, Textile Design, Textile Technology, Travel and Tourism, MLT, Wood Technology and IT)

COURSE OBJECTIVE

Information technology has great influence on all aspects of our life. Primary purpose of using computer is to make the life easier. 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 tools of MS Office/Open Office using internet etc. form the broad competency profile of diploma holders. This exposure will enable the students to enter their professions with confidence, live in a harmonious way and contribute to the productivity.

COURSE CONTENT

1. **Basics of Information Technology**
   - 1.1. Its concept and scope, applications of IT, ethics and future with information technology.
   - 1.2. Impact of computer and IT in society.
   - 1.3. Computer application in office, book publishing, data analysis, accounting, investment, inventory control, graphics, air and railway ticket reservation, robotics, military, banks, Insurance financial transactions and many more.

2. **Basic Components of Computer System**
   - 2.1. Block diagram of a computer System and Processing of Data.
   - 2.2. Demonstration of computer system viz., Hardware, Software
   - 2.3. Concept of Memory and its various types, Primary and secondary memories (RAM, ROM, Storage Devices etc).

3. **Internet and its Applications**
   - 3.1. Introduction to Internet, its basic working.
   - 3.2. Concept of Email, Social Media, Cloud Computing.
   - 3.3. Basic ideas about IP Address, DNS, URL, Server, Web Browser, LAN etc.

4. Use of Various Basic Data Processing Softwares

4.1. Word Processing (Microsoft Word & Google Docs.)

4.1.1. File Management:

4.1.1.1. Opening, creating and saving a document, locating files, copying contents in some different file(s)

4.1.2. Editing a document:

4.1.2.1. Entering text, Cut, copy, paste using tool- bars

4.1.3. Formatting a document:

4.1.3.1. Using different fonts, changing font size and colour, changing the appearance through bold/ italic/ underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods

4.1.3.2. Aligning of text in a document, justification of document, Inserting bullets and numbering

4.1.3.3. Formatting paragraph, inserting page breaks and column breaks, line spacing

4.1.3.4. Use of headers, footers: Inserting footnote, end note, use of comments

4.1.3.5. Inserting date, time, special symbols, importing graphic images, drawing tools

4.1.4. Tables and Borders:

4.1.4.1. Creating a table,

4.1.4.2. Formatting cells,

4.1.4.3. Use of different border styles, shading in tables,

4.1.4.4. Merging of cells, partition of cells, inserting and deleting a row in a table

4.1.5. Print preview, zoom, page set up, printing options

4.1.6. Using Find, Replace options

4.2. Microsoft-Excel and Google Sheets

4.2.1. Introduction to Spreadsheet Application-Workbook and Worksheets

4.2.2. Working with data and formulas:

4.2.2.1. Addition, subtraction, division, multiplication, percentage and auto sum.

4.2.2.2. Format data, create chart, printing chart, save worksheet, creating and formatting of charts and graphs

4.3. Presentation (Microsoft-PowerPoint and Google Slides)

4.3.1. Introduction to PowerPoint - How to start PowerPoint - Working environment: concept of toolbars, slide layout, templates etc. - Opening a new/existing presentation - Different views for viewing slides in a presentation: normal, slide sorter etc.

4.3.2. Addition, deletion and saving of slides.

4.3.3. Insertion of multimedia elements - Adding text boxes, importing

pictures, movies and sound, tables and charts etc.

4.3.4. Formatting slides - Text formatting, changing slide layout, changing slide color scheme - Changing background, Applying design template.

4.3.5. Viewing the presentation using slide navigator

COURSE OUTCOME

After the completion of the course the student will be able to:

- Identify the different hardware components and functional units of a Computer system.
- Explain basic concepts and working of internet.
- Create and format word documents by using different word processing software.
- Prepare the spread sheets and the presentation of data in different ways.
- Prepare power point presentations.

RECOMMENDED BOOKS:

1. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd-Jungpura, New Delhi
2. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
3. Fundamentals of Information Technology by Leon and Leon;Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
4. Basics of Information Technology, by Ishan Publications, Ambala
5. Information Technology for Management by Henery Lucas, 7th edition, Tata McGraw Hill Education Pvt Ltd, New Delhi

UNIT WISE TIME AND MARKSDISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	06	10
2	13	20
3	13	20
4	32	50
Total	**64**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAM IN ARCHITECTURAL ASSISTANTSHIP	
Course Code: AAPC201	**Course Title: Architectural Design- I**
Semester: 2nd	**Credits: 3**
Hours per week: 5 (L:0 T:1 P:4)	

COURSE OBJECTIVE: The objective of the course is to understand the various elements of design like line, shapes, form, space and how to have a balance between them and to develop skills to visualize the different building design and its functionality and to develop an understanding of right utilization of area and optimize use of natural resources in the design.

COURSE CONTENT

1. **Introduction to Architectural Design.**

1.1. Introduction to Architecture. Roles and responsibilities of this profession and how it is different from the other related professions.
1.2. Introduction to the various elements of design, principles of design and their application.
1.3. Relationship between basic design and architectural design. Understanding of space and form.

2. Basic Design Aspect.

2.1. Introduction to basic anthropometrics, human functions and their implications for space requirement.
2.2. Introduction to standards/minimum dimensions for habitable area and other activities.
2.3. Introduction to the concept of moment and circulation diagram for a design.

3. Design Layout

3.1. Introduction to furniture standards (sizes of furniture in domestic and public spaces); Toilet and Kitchen equipment- sizes and standards.
3.2. Door and windows – size, standards and locations. Introduction to sill level and lintel level.
3.3. Furniture layout within a given space such as children bedroom, hostel room.

4. Architectural Design

4.1. Creating Architectural spaces and forms and understanding the importance of light and circulations.
4.2. Introduction of NBC guidelines.

4.3. Small scale design exercises to be introduced on topic like Residences, Guest house, College canteen, cafeteria, etc.

RECOMMENDED BOOKS

1. 'Principles of Three-Dimensional Design' by Wucius Wong.
2. "Time Saver Standards for Architectural Design Data" by John Hanock.
3. "Architectural Graphic Standards" by Ramsay and Sleeper.
4. "Space, Time and Architecture" by Gideon.
5. "Elements of Architecture from Form to place" by Von Meiss, Pierre.
6. Architecture: Form, Space and Order by Francis D. K. Ching, John Wiley & Sons, 2007.

UNIT WISE TIME AND MARKS DISTRIBUTION

Unit	**Time (Hours)**	**Marks(%age)**
1	14	15
2	20	20
3	24	25
4	38	40
Total	**96**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAM IN ARCHITECTURAL ASSISTANTSHIP	
Course Code: **AAPC202**	Course Title: **Computer Aided Drawing (CAD) for Architecture**
Semester:**2nd**	Credits:2
Hours per week:**4(L:0 T:0 P:4)**	

COURSE OBJECTIVE:

This course aims to develop and upgrade an understanding about AUTO CAD, as an important tool for drafting and designing. Besides the objective of the course is to enable the candidate to do analysis and representation of the drawings in a desired manner.

LIST OF PRACTICALS

1. Introduction & Uses of Auto CAD, Benefits of Learning AutoCAD.
2. Learning basic commands for 2-D AutoCAD their functions and application.
3. Preparation of simple Geometric Shapes (Plan, Elevation, Side elevation, Sections).
4. Preparing a complete set of drawings done in Architectural Drawing-I.
5. Preparing a complete set of design problems done in Architectural Design-I.
6. Learning basic commands for 3-D AutoCAD their functions and application.
7. Converting simple geometric shapes into 3-D Objects.
8. Converting at least two drawings done in Architectural Drawing-I into 3-D presentation models.
9. Converting at least two design problems done in Architectural Design-I into 3-D presentation models
10. Plotting and Printing of drawings.

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PROGRAM : THREE YEARS DIPLOMA PROGRAM IN ARCHITECTURAL ASSISTANTSHIP	
Course Code: **AAPC203**	Course Title: **Construction Materials**
Semester:**2nd**	Credits:**4**
Hours per week:**4(L:4 T:0 P:0)**	

COURSE OBJECTIVE: The objective of the course is to incorporate the basic knowledge of materials like bricks, stones, timbers etc., their properties and their uses in buildings. Teachers are expected to help students enriching their understanding of modern building materials and their use in modern architecture.

COURSE CONTENT

1. BUILDING STONES, BRICKS AND TIMBERS.

1.1 Building Stones:

1.1.1 Classification of rocks.
1.1.2 Characteristics of good building stones.
1.1.3 Utility of stones.
1.1.4 Common building stone.
1.1.5 Prevailing market rates and sizes.
1.1.6 Standard measurements in the carriage transport.

1.2 Bricks:

1.2.1 Classification of bricks.
1.2.2 Properties and uses of first-class bricks, second-class bricks, third class bricks.
1.2.3 Characteristics of a good brick.
1.2.4 Size and weight of a standard brick and commonly available brick.
1.2.5 Fire bricks, its properties.
1.2.6 uses and availability.
1.2.7 Availability of various types of bricks in the market e.g. machine-made bricks, handmade bricks, Introduction to Brick Tiles.

1.3 Timber:

1.3.1 Defects and decay of timber.
1.3.2 Seasoning of timber.
1.3.3 Preservation of timber.
1.3.4 Different varieties of Timber.

2. LIME, AGGREGATES, MORTAR, CEMENT AND CONCRETE

2.1 Lime

2.1.1 Uses of lime.

2.1.2 Setting and hardening action of lime.

2.2 Aggregates

2.2.1 Definition of Coarse Aggregates and Fine Aggregates
2.2.2 Types and uses of Coarse Aggregates and Fine Aggregates.

2.3 Mortar

2.3.1 Functions of Mortar.
2.3.2 Preparation of cement mortar, lime mortar, lime cement mortar and their uses.
2.3.3 Proportion of mortar for different building works.

2.4 Cement

2.4.1 Properties and uses of cement, chemical constituents of cement.
2.4.2 Functions of ingredients of cement.
2.4.3 Setting and hardening of cement.
2.4.4 Types of cement.
2.4.5 Grading of cement.

2.5 Concrete

2.5.1 Definition and grading of concrete.
2.5.2 Workability of concrete.
2.5.3 Water - Cement Ratio.
2.5.4 Compaction of concrete.
2.5.5 Curing of concrete.
2.5.6 Characteristics of good concrete.
2.5.7 Classification of concrete, plain cement concrete, pre-cast concrete.

3. PAINTS, VARNISHES, DISTEMPERS AND GYPSUM.

3.1 Paints

3.1.1 Definition of paints.
3.1.2 Function of paints.
3.1.3 Constituents of an oil paint and their functions.
3.1.4 Characteristics of good paint.
3.1.5 Types of paints, failure of paint.
3.1.6 Defects in painting.

3.2 Varnishes

3.2.1 Definition of varnish.
3.2.2 Functions of varnish.
3.2.3 Ingredients of varnish.

3.2.4 Characteristics of good varnish.
3.2.5 Types of Varnish.

3.3 Distempers and Gypsum

3.3.1 Distempering process.
3.3.2 Properties of distempers, white washing, Color washing.
3.3.3 Gypsum plaster.

4. GLASS, INSULATING MATERIAL AND PLASTICS

4.1 Glass

4.1.1 Properties of glass, Sheet glass, float glass, plate glass, bullet proof glass, Fiber glass.

4.2 Insulating Material

4.2.1 Heat and sound insulating materials.
4.2.2 Uses of cork, slag wool, light weight concrete, Aluminum foil.

4.3 Plastics

4.3.1 Classification of plastics, properties of plastics.
4.3.2 Uses of plastics.
4.3.3 Trade names and Typical Applications of some important plastics.
4.3.4 Commercial forms of plastics.

Note: The study should be supported by market survey of materials with brands, sizes, rates and availability. An exercise should be conducted to take the students to building material exhibitions and make them aware of new materials being launched in market and let them prepare a brief report on the application of new materials and understand how to choose a material for a specific purpose after evaluating its availability, cost, performance and elegance etc.
Teachers should demonstrate samples of various materials while imparting classroom instruction. Teachers may also arrange some field visits to manufacturing production units and retailer shops like cement, kilns, timber saw mills and seasoning plants, hardware shops, glass houses etc. Students should be encouraged to collect samples of various materials and catalogues of manufacturer. The students may maintain a scrapbook for this purpose. A museum of building construction, materials may be developed where samples of latest materials their specifications, characteristics, rates availability (supplier and relevant codes may be kept) to enhance the level of understanding of the students. The application of various materials should be shown to students in various buildings of importance, as reference.

COURSE OUTCOME

After completion of the course the student will be able to:

- enumerate the properties, classification and type of primary building materials (Brick, Stone, Timber, Cement, Lime etc.) used in building construction
- apply building materials as per procedures recommended by IS Codes.
- work out and apply appropriate details for building construction.

RECOMMENDED BOOKS

1. Sharma, SK; & Mathur, GC;" Engineering Materials;" Delhi-Jalandhar, R.Chand & Co.
2. Surendra Singh; "Engineering Materials;" New Delhi, Vikas Publishing House Pvt. Ltd
3. Chowdhury, N; "Engineering Materials;" Calcutta, Technical Publishers of India.
4. Bahl, SK; "Engineering Materials;" Delhi, Rainbow Book Co.
5. Bahl, SK; "Engineering Materials;" Delhi, Rainbow Book Co.
6. Rangwal "Building Materials", Standard Publishers.
7. Civil Engineering Materials by PD Kulkarni et. al.; Tata McGraw Hill Publishing Co. Ltd., New Delhi – 110 002
8. TTTI, Chandigarh "Civil Engineering Materials:" New Delhi Tata McGraw Hill Publication
9. Kulkarni, GJ; "Engineering Materials;" Ahmedabad, Ahmedabad Book Depot.
10. Shahane; "Engineering Materials"; Poona, Allied Book Stall.
11. Building Materials & Construction, Shushil Kumar.

UNIT WISE TIME AND MARKS DISTRIBUTION

Unit	**Time (Hours)**	**Marks (%age)**
1	22	35
2	18	30
3	14	20
4	10	15
Total	**64**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAM IN ARCHITECTURAL ASSISTANTSHIP	
Course Code**: AAPC204**	Course Title**: Architectural Drawing-I**
Semester**: 2nd**	Credits**: 3**
Hours per week**: 5(L:0 T:1 P:4)**	

COURSE OBJECTIVE:

The aim of this course is to provide the students' knowledge about the conventions and Architectural symbols and signs used in drawings. It also gives the understanding about the line intensities, also make students to know about the development of surfaces of different shapes, drawing of different view of a building in 2 dimensions and 3 dimensions. This course also provides students the basic idea of Sciography.

COURSE CONTENT

1. Symbols, Conventions and Line Work (4 Sheets)

1.1. Architectural symbols and signs used in drawings
1.2. Electrical fitting symbols
1.3. Convention of Materials
1.4. Basic Line work with different intensities H, HG, B, 2B, 4B, 6B etc. Horizontal lines, Vertical lines, Grid, Diagonal Lines.

2. **Development of surface (5 Sheets)**

2.1. Development of Surface such as prism, Pyramid, Cone, Cylinder, cube etc.
2.2. Development of surface with an aim to calculate areas

3. **Isometric views& Axonometric Views (5 Sheets)**

3.1. Conversions of 2D geometrical shapes into 3D isometric and Axonometric.
3.2. Draw a single line plan of one room and two room building.
3.3. Conversion of 2D room/kitchen/lounge into 3d perspective

4. **Sciography (3 Sheets)**

4.1. Introduction of Sciography, shadows of geometrical shapes
4.2. Sciography of furniture, building tress, hedges, letters
4.3. Shade and Shadows of architectural elements

Note: Faculty shall impart teaching by lecture/demonstrations; students shall undertake exercises and prepare sheets in studio

RECOMMENDED BOOKS

1. Boaz Joseph , Architectural Graphic standards editor.
2. Bhatt, N.D., "Engineering Drawing: Plane & Solid Geometry", Charotar Publishing House.
3. Ching, Francis D. K., "Architectural Graphics", Van Nostrand Reinhold.
4. Leslie, Martin C., "Architectural Graphics", Macmillan Pub Co,.
5. Parkinson, A.C., "A First Year Engg. Drawing", Sir Issac Pitman and Sons.
6. Black, Earl D., "Engineering and Technical Drawing", Van Nostrand Reinhold Co.

PROGRAM : THREE YEARS DIPLOMA PROGRAM IN ARCHITECTURAL ASSISTANTSHIP	
Course Code: **AAPC205**	Course Title: **STRUCTURES-I**
Semester:**2nd**	Credits:**4**
Hours per week: **4(L:3 T:1 P:0)**	

COURSE OBJECTIVE:

The objective of the subject is to impart basic knowledge and skill regarding properties of materials, Force system, concept of stresses and strains, bending moment and shear force calculations/diagrams, Centroid, moment of Inertia, bending stresses in beams and analysis of perfect frames. The above knowledge will be useful for designing simple structural components. It also gives students the skills to analyze structures as a foundation skill to the design, construction and supervision of structural projects.

COURSE CONTENT

1. Force System and Equilibrium.

1.1. Force: Definition, effect, characteristics, representation and types of forces.
1.2. Force Systems: Coplanar and Non coplanar force systems, Types of coplanar.
1.3. Forces: Collinear, Concurrent, Parallel, Non concurrent and Non parallel.
1.4. Resultant force and components of a force.
1.5. Laws of forces: Parallelogram, Triangle and polygon Laws of forces.
1.6. Free Body Diagram, Lamis theorem (No proof)
1.7. Concept of Moment, Characteristics of moment, resultant moment, Concept of couple, moment of a couple, Equilibrium of rigid bodies.

2. Centroid, Moment of Inertia, Stress and Strain

2.1. **Centroid**
2.1.1. Definition of centre of Gravity and Centroid,
2.1.2. Centroid by method of moments of areas for square, rectangular, triangular, L-shape, T-shape and I shape cross- sections.

2.2. **Moments of Inertia**
2.2.1. Moments of Inertia by methods of moments and Radius of Gyration,
2.2.2. Parallel axis theorem (no derivation),
2.2.3. Moment of Inertia of rectangular section,

2.2.4. Moment of inertia of a Triangular section (no derivation), Moment of Inertia of a Circular section, Perpendicular Axis Theorem (no derivation)

2.2.5. Numerical on moment of inertia of Rectangular, Triangular and Circular laminas only.

2.3. **Stress and Strain**

2.3.1. Definition Elasticity, Elastic limit, stress, strain and Hooks Law

2.3.2. Types of stress and strain, Stress strain curve for mild steel,

2.3.3. Hooks Law (Numerical)

3. Shear Force and Bending Moment

3.1. Types of loads- Dead load, Live load, snow, wind and seismic loads as per IS: 875, Types of loading: Point load, Uniformly distributed load and uniformly varying load.

3.2. Types of Supports: Hinge, Roller and fixed supports, Types of reactions provided by each type of support.

3.3. Types of Beams: Simply supported, cantilever, overhanging and continuous beams (description only).

3.4. Concept of bending moment and shear force, bending moment and shear force diagrams for simply supported, cantilever and over hanging beams subjected to point loads and uniformly distributed loads only.

3.5. Calculation of location and magnitude of Max Bending moment and point of contra flexure.

4. Bending stresses in Beams.

4.1. Introduction: Tension, compression and Simple Bending

4.2. Assumption of Simple Bending Theory.

4.3. Position of Neutral Axis, Section Modulus.

4.4. Moment of Resistance.

4.5. Application of flexure equation (M/I = f/y = E/R) (no derivation).

4.6. Maximum and permissible bending stresses.

5. Analysis of Perfect Frames.

5.1. Types of pin jointed frames.

5.2. Assumptions in computing the forces in members of a perfect frame.

5.3. Analysis of perfect frames by method of joints.

COURSE OUTCOMES

After the completion of this course the students will be able to:

- determine different types of stresses and strain in the member.
- calculate the shear force and bending moment of different types of beams.
- calculate the Centroid of square, rectangular, triangular, L-Shape, T-Shape and I-Shape cross sections
- calculate Moment of Inertia of Rectangular, Triangular and Circular laminas.

- calculate Maximum and permissible bending stresses in beams.
- determine the forces in the members of perfect frames.

RECOMMENDED BOOKS

1. Structure Mechanics for Architects – Prof. Harbhajan Singh, Pub. Abhishek Publications, Chandigarh
2. Mechanics of Solids- DK Singh-Galgotia Publications Pvt. Ltd., New Delhi.
3. Fundamentals of Applied Mechanics- AS Sarao Victor Gambhir Gaurav Agrawal. By Satya Prakashan New Delhi.
4. Structural Mechanics-VS Prasad-Golgotia Publication Pvt. Ltd., New Delhi.
5. Engineering Mechanics and strength of Materials-Dr RK Bansal –Laxmi Publications Pvt. Ltd., New Delhi.

UNIT WISE TIME AND MARKS DISTRIBUTION

Unit	Time (Hours)	Marks (%age)
1	10	20
2	12	25
3	14	30
4	07	15
5	05	10
Total	**48**	**100**

CURRICULUM

FOR

SECOND SEMESTER

DIPLOMA

IN

AUTOMOBILE ENGINEERING

SUBJECT STUDY SCHEME (2nd Semester: Automobile Engineering)

Course Code	Subjects	Study Scheme (Hours/week)				Credits		
		Th.	Tu.	Pr.	Total	Th.	Pr.	Total
BS201	Applied Mathematics-II	3	1	--------	4	4	--------	4
ES202	Introduction to Computers and Information Technology	---	---	4	4	----	2	2
ATPC201	Basics of Vehicle Maintenance	---	1	4	5	---	3	3
ATPC202	Basics of Machine Drawing	---	1	4	5	---	3	3
ES207	Applied Mechanics	4	1	--	5	5	--	5
ES208	Applied Mechanics Lab	---	---	2	2	---	1	1
ATPC203	Engineering Materials	3	0	---	3	3	--	3
ATPC204	Engineering Materials Lab	---	---	2	2	---	1	1
Total		10	4	16	30	12	10	22

PROGRAM: THREE YEAR DIPLOMA IN ENGINEERING AND TECHNOLOGY *	
Course Code: **BS201**	Course Title: **Applied Mathematics-II**
Semester: **2nd**	Credit: **4**
Periods Per Week: **4 (L: 03, T: 01, P: 0)**	

(* Common to Architecture Assistantship, Automobile, Civil, Civil(PHE), QSCM,Computer , Electrical , E&C,Medical Electronics, Food Technology, I&C,Leather Technology, Mechanical,Textile Technology, Wood Technology and IT)

COURSE OBJECTIVE:

This course is designed to develop an understanding of basic mathematical and statistical tools which include matrices, determinants, integral calculus and coordinate geometry and the applications of such tools in the field of engineering and technology

COURSE CONTENT

1. Integral Calculus

1.1 Integration as inverse operation of differentiation

1.2 Simple integration by substitution, by parts and by partial fractions (for Linear factors only)

1.3 Evaluation of definite integrals (simple problems)-

Evaluation of $\int_0^{\pi/2} \text{Sin}^n x.\, dx$, $\int_0^{\pi/2} \text{Cos}^n x\, dx$, $\int_0^{\pi/2} \text{Sin}^m x\ \text{Cos}^n x\, dx$

Using formulae without proof (m and n being positive integers only)

2. Coordinate Geometry

2.1. Equation of straight line in various standard forms (without proof), intersection of two straight lines, angle between two lines. Parallel and perpendicular lines, perpendicular distance formula.

2.2. General equation of a circle and its characteristics. To find the equation of a circle, given: Centre and radius, three points lying on it and coordinates of end points of a diameter.

2.3. Definition of conics (Parabola, Ellipse, Hyperbola) their standard equations without proof. Basic problems on conics when their foci, directrices or vertices are given

3. Matrices and Determinants

3.1 Definition of matrix and its types.

3.2 Addition, subtraction and multiplication of matrices.

3.3 Expansion of Determinants.

4. Statistics

4.1 Measures of Central Tendency: Mean, Median, Mode

4.2 Measures of Dispersion: Mean deviation, Standard deviation
4.3 Basic Concepts of Probability.

COURSE OUTCOME

After the completion of the course the student will be able to:

- evaluate both indefinite and definite integrals by various methods
- identify various points in a 2-D space along with formulation of equations and graphs for different types of lines, circles, ellipses, parabolas etc.
- find the sum, difference and product of two or more matrices,
- evaluate determinants and their relations to matrices
- find the mean, median, mode and other measures of central tendency.
- solve basic problems on probability.

RECOMMENDED BOOKS:

1. R.D Sharma, Applied Mathematics-II.
2. H.K Das, Applied Mathematics.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 40th Edition, 2007.
4. S.S. Sabharwal, Sunita Jain, Eagle Parkashan, Applied Mathematics, Vol. I & II, Jalandhar.
5. Comprehensive Mathematics, Vol. I & II by Laxmi Publications, Delhi.
6. Reena Garg & Chandrika Prasad, Advanced Engineering Mathematics, Khanna Publishing House, New Delhi
7. Applied Mathematics-II, Eagle Publications.

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	16	35
2	10	20
3	12	25
4	10	20
Total	**48**	**100**

PROGRAM THREE YEAR DIPLOMA IN ENGINEERING AND TECHNOLOGY	
Course Code: **ES202**	Course Title: **Introduction to Computers and Information Technology**
Semester:**2nd**	Credit: **2**
Periods Per Week: **4 (L: 0 T: 0 P: 4)**	

(* Common to Architecture Assistantship, Automobile, Civil, Civil(PHE), QSCM,Computer , Electrical , E&C,Medical Electronics, Food Technology, Garment Technology, I&C,Leather Technology, Mechanical, Textile Design, Textile Technology, Travel and Tourism, MLT, Wood Technology and IT)

COURSE OBJECTIVE

Information technology has great influence on all aspects of our life. Primary purpose of using computer is to make the life easier. 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 tools of MS Office/Open Office using internet etc. form the broad competency profile of diploma holders. This exposure will enable the students to enter their professions with confidence, live in a harmonious way and contribute to the productivity.

COURSE CONTENT

1. **Basics of Information Technology**
   - 1.1. Its concept and scope, applications of IT, ethics and future with information technology.
   - 1.2. Impact of computer and IT in society.
   - 1.3. Computer application in office, book publishing, data analysis, accounting, investment, inventory control, graphics, air and railway ticket reservation, robotics, military, banks, Insurance financial transactions and many more.

2. **Basic Components of Computer System**
   - 2.1. Block diagram of a computer System and Processing of Data.
   - 2.2. Demonstration of computer system viz., Hardware, Software
   - 2.3. Concept of Memory and its various types, Primary and secondary memories (RAM, ROM, Storage Devices etc).

3. **Internet and its Applications**
   - 3.1. Introduction to Internet, its basic working.
   - 3.2. Concept of Email, Social Media, Cloud Computing.
   - 3.3. Basic ideas about IP Address, DNS, URL, Server, Web Browser,LAN etc.

4. Use of Various Basic Data Processing Softwares

4.1. Word Processing (Microsoft Word & Google Docs.)

4.1.1. File Management:

4.1.1.1. Opening, creating and saving a document, locating files, copying contents in some different file(s).

4.1.2. Editing a document:

4.1.2.1. Entering text, Cut, copy, paste using tool- bars

4.1.3. Formatting a document:

4.1.3.1. Using different fonts, changing font size and colour, changing the appearance through bold/ italic/ underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods

4.1.3.2. Aligning of text in a document, justification of document, Inserting bullets and numbering

4.1.3.3. Formatting paragraph, inserting page breaks and column breaks, line spacing

4.1.3.4. Use of headers, footers: Inserting footnote, end note, use of comments

4.1.3.5. Inserting date, time, special symbols, importing graphic images, drawing tools

4.1.4. Tables and Borders:

4.1.4.1. Creating a table,

4.1.4.2. Formatting cells,

4.1.4.3. Use of different border styles, shading in tables,

4.1.4.4. Merging of cells, partition of cells, inserting and deleting a row in a table

4.1.5. Print preview, zoom, page set up, printing options

4.1.6. Using Find, Replace options

4.2. Microsoft-Excel and Google Sheets

4.2.1. Introduction to Spreadsheet Application-Workbook and Worksheets

4.2.2. Working with data and formulas:

4.2.2.1. Addition, subtraction, division, multiplication, percentage and autosum.

4.2.2.2. Format data, create chart, printing chart, save worksheet, creating and formatting of charts and graphs

4.3. Presentation (Microsoft-PowerPoint and Google Slides)

4.3.1. Introduction to PowerPoint - How to start PowerPoint - Working environment: concept of toolbars, slide layout, templates etc. - Opening a new/existing presentation - Different views for viewing slides in a presentation: normal, slide sorter etc.

4.3.2. Addition, deletion and saving of slides.

4.3.3. Insertion of multimedia elements - Adding text boxes, importing pictures, movies and sound, tables and charts etc.

4.3.4. Formatting slides - Text formatting, changing slide layout, changing slide color scheme - Changing background, Applying design

template.

4.3.5. Viewing the presentation using slide navigator

COURSE OUTCOME

After the completion of the course the student will be able to:

- Identify the different hardware components and functional units of a Computer system.
- Explain basic concepts and working of internet.
- Create and format word documents by using different word processing software.
- Prepare the spread sheets and the presentation of data in different ways.
- Prepare power point presentations.

RECOMMENDED BOOKS:

1. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd-Jungpura, New Delhi
2. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
3. Fundamentals of Information Technology by Leon and Leon;Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
4. Basics of Information Technology, by Ishan Publications, Ambala
5. Information Technology for Management by Henery Lucas, 7th edition, Tata McGraw Hill Education Pvt Ltd, New Delhi

UNIT WISE TIME AND MARKSDISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	06	10
2	13	20
3	13	20
4	32	50
Total	**64**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN AUTOMOBILE ENGINEERING	
Course Code: **ATPC201**	Course Title: **Basics of Vehicle Maintenance**
Semester: **2nd**	Credits: **03**
Periods Per Week: 5**(L: 0, T:1, P: 4)**	

COURSE OBJECTIVES

The aim of the subject is to study basic anatomy of motor vehicle, workshop skills, tools and equipment in Automobile Industry to help the candidate do the complete maintenance of any automobile vehicle.

LIST OF PRACTICALS

1. **Tools and Equipment**: Identification, understanding and proper use of the following:
   - 1.1. Hand tools: Wrenches; torque wrenches, sockets, ratchets, extensions, and breaker bars; hammers and mallets; screwdrivers; files; pliers; hacksaw; chisels and punches; removers and screw extractors; gear and bearing pullers; trouble light; creeper
   - 1.2. Shop equipment: bench grinders, bench vice, presses, grease gun
   - 1.3. Power tools: impact wrench; air drill; blow gun; air/electric ratchet; air powered grinder
   - 1.4. Jacks and lifts: floor jack; portable crane; lifts; engine stand/bench

2. **Basic Car Maintenance**
   - 2.1. Identification of chassis components of FWD, RWD and 4WD vehicles
   - 2.2. Types of cars; A look under the hood
   - 2.3. What every driver should know; What to Carry in a Car? Identifying a car's fluids
   - 2.4. Routine maintenance checks; basic tips for maintaining a car; Know what to do in an emergency
   - 2.5. Know how to fuel a car
   - 2.6. Carry owner's manual; own a shop manual; Decoding VIN, chassis and engine numbers
   - 2.7. How to change the fuel filter; how to inspect and replace the air filter; how to inspect and replace the PCV valve
   - 2.8. Locating leaks in cooling system; how to check and add coolant; how to flush and fill the cooling system; how to replace a hose

3. **Automobile electricals**
   - 3.1. How to check and change fuses and relays
   - 3.2. How to check specific gravity of battery with a hydrometer
   - 3.3. How to check and replace electric horns

3.4. How to replace car light bulbs
3.5. Testing battery voltage with a voltmeter
3.6. How to jump-start a battery
3.7. How to check and decode fault codes

4. Drivetrain
4.1. How the drivetrain works
4.2. Common drivetrain problems
4.3. How to check and fill a manual transmission
4.4. How to check and maintain CV Joints and U-Joints

5. Braking system
5.1. How the braking system works
5.2. Common braking system problems
5.3. How to inspect the brakes
5.4. How to change brake pads and rotors
5.5. How to check and fill brake fluid
5.6. How to bleed the brake system

6. Tyres and wheels
6.1. How to safely raise a car
6.2. Common tyre problems
6.3. How to check the tyre pressure
6.4. How to add air to a tyre
6.5. How to rotate car tyres
6.6. How to change a tyre
6.7. choosing a right tyre for a car

7. Car Detailing
7.1. Common exterior problems
7.2. How to wash a car
7.3. How to wax a car
7.4. Paint imperfections and rust problems
7.5. How to remove scuffs in paint
7.6. How to inspect and replace wiper blades
7.7. How to inspect and repair weather stripping

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN AUTOMOBILE ENGINEERING	
Course Code: ATPC202	Course Title: **Basics of Machine Drawing**
Semester: **2nd**	Credits: 03
Periods Per Week: 5 **(L: 0, T: 1, P: 04)**	

COURSE OBJECTIVE: Engineering graphics is the language of communication and documentation in engineering design. With the arrival of computers, the use of this language has advanced into the areas of manufacturing, assembly, inspection and maintenance since all these functions are well executed through CAD and thus the students should be well aware about the fundamentals of this language in their first year of engineering course.

COURSE CONTENT

Part -A: BASIC CONCEPTS

1. Basics of Machine elements

1.1. **Screw fasteners**

1.1.1. Screw thread terminology; Classification of screw thread on various bases
1.1.2. Common types of screw fastenings; Engineering applications of screw threads
1.1.3. Specification of bolts and nuts

1.2. **Belts and pulleys**

1.2.1. Types of belts
1.2.2. Types of pulleys

1.3. **Bearings**

1.3.1. Classification of bearings,
1.3.2. Types of bearing lubrication
1.3.3. Specification and selection criteria for bearings

1.4. **Keys and shaft couplings**

1.4.1. Classification of keys
1.4.2. Classification of shaft couplings

Part-B: ASSEMBLY DRAWING (COMPUTER AIDED DRAWING)

2. Screw fasteners

2.1. Broken sectional views of Square and Vee thread profiles
2.2. Detailed and assembly drawing of hexagonal bolt and hexagonal nut and plain washer
2.3. Orthographic views of locking devices used in automotive sector
2.4. Relation between bolt head (nut) size and wrench size.

3. Belts and Pulleys

3.1. Orthographic views of simple V-belt pulley
3.2. Orthographic views of Multi-groove V-belt pulley

4. Bearings

4.1. Orthographic views of ball, roller, and needle bearing
4.2. Orthographic views of plain journal and bushed journal bearings

5. Keys Shaft Couplings

5.1. Orthographic views of Hook's Joint and Slip joint
5.2. Sketches of various types of shaft keys

6. Development of surfaces

6.1. Classification of Surfaces, Methods for drawing the Development of surfaces
6.2. Development of polyhedral (Prisms, pyramids, cube)
6.3. Development of solids of revolution (Cylinders, cones, spheres)
6.4. Development of sheet metal tray

RECOMMENDED BOOKS

1. Machine drawing (includes AutoCAD) by Ajeet Singh, Tata McGraw-Hill Publishing Company Limited, New Delhi
2. A text book of machine drawing by RK Dhawan, S Chand Publication, New Delhi
3. Technical Drawing with Engineering Graphics by Frederick E. Giesecke and Co, Printice Hall
4. Machine Drawing by ND Junnarkar, Pearson, Delhi

5. Machine Drawing by Kl Narayana, New Age International Publisher
6. Machine Drawing by N.D. Bhatt, Charotar Publications

UNIT WISE TIME AND MARKS DISTRIBUTION

Unit	Unit Name	Time (Hours)	Marks(%age)
1.	Basic machine elements	10	16
2.	Screw fasteners	13	20
3.	Pulleys and belts	08	12
4.	Bearings	13	20
5.	Keys and Shaft Couplings	08	12
6.	Development of surfaces	12	20
	Total	**64**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN AUTOMOBILE ENGINEERING	
Course Code: **ES207***	Course Title: **APPLIED MECHANICS***
Semester: 2ND	Credits: **05**
Periods Per Week :5 **(L: 4, T: 1, P:0)**	

(* Common to Automobile, Civil, Civil(PHE), QSCM, Mechanical and Wood Technology,)

COURSE OBJECTIVE:

The objective of the course is to determine the resultant of various forces and to compute support reactions using equilibrium conditions for various structures and to understand the significance of friction in equilibrium problems, basic machine rules and their application in different engineering problems

COURSE CONTENT

1. Basics of mechanics and force system

1.1. Significance and relevance of Mechanics, Applied mechanics, Statics, Dynamics
1.2. Space, time, mass, particle, flexible body and rigid body. Scalar and vector quantity, Units of measurement (SI units) - Fundamental units and derived units.
1.3. Force – unit, representation as a vector and by Bow's notation, characteristics and effects of a force, Principle of transmissibility of force, Force system and its classification.
1.4. Resolution of a force - Orthogonal components of a force, moment of a force, Varignon's Theorem
1.5. Composition of forces – Resultant, analytical method for determination of resultant for concurrent, non-concurrent and parallel co-planar force systems – Law of triangle, parallelogram and polygon of forces

2. Equilibrium

2.1. Equilibrium and Equilibrant, Free body and Free body diagram, Analytical and graphical methods of analysing equilibrium
2.2. Lami's Theorem – statement and explanation, Application for various engineering problems.
2.3. Types of beam, supports (simple, hinged, roller and fixed) and loads acting on beam (vertical and inclined point load, uniformly distributed load, couple)
2.4. Beam reaction for cantilever, simply supported beam with or without overhang subjected to combination of Point load and uniformly distributed load.
2.5. Beam reaction graphically for a simply supported beam subjected to vertical point loads only.

3. Friction

3.1. Friction and its relevance in engineering, types and laws of friction, limiting equilibrium, limiting friction, co-efficient of friction, angle of friction, angle of repose, relation between co-efficient of friction and angle of friction.
3.2. Equilibrium of bodies on level surface subjected to force parallel and inclined to plane.
3.3. Equilibrium of bodies on inclined plane subjected to force parallel to the plane only.

4. Centroid and centre of gravity

4.1. Centroid of geometrical plane figures (square, rectangle, triangle, circle, semi-circle, quarter circle)
4.2. Centroid of composite figures composed of not more than three geometrical figures
4.3. Centre of Gravity of simple solids (Cube, cuboid, cone, cylinder, sphere, hemisphere)
4.4. Centre of Gravity of composite solids composed of not more than two simple solids

5. Simple lifting machine

5.1. Simple lifting machine, load, effort, mechanical advantage, applications and advantages.
5.2. Velocity ratio, efficiency of machines, law of machines.
5.3. Ideal machine, friction in machine, maximum Mechanical advantage and efficiency, reversible and non-reversible machines, conditions for reversibility
5.4. Velocity ratios of Simple axle and wheel, Differential axle and wheel, Worm and worm wheel, Single purchase and double purchase crab winch, Simple screw jack, Weston's differential pulley block, geared pulley block.

COURSE OUTCOME

After completing this course, the student will be able to:

- Identify the force systems for given conditions by applying the basics of mechanics.
- Determine unknown force(s) of different engineering systems.
- Apply the principles of friction in various conditions for useful purposes.
- Find the centroid and centre of gravity of various components in engineering systems.
- Calculate mechanical advantage, velocity ratio and efficiency of simple lifting machine

RECOMMENDED BOOKS

1. D.S. Bedi, Engineering Mechanics, Khanna Publications, New Delhi.

2. Khurmi, R.S., Applied Mechanics, S. Chand & Co. New Delhi.
3. Bansal R K, A text book of Engineering Mechanics, Laxmi Publications.
4. Ramamrutham, Engineering Mechanics, S. Chand & Co. New Delhi.
5. Dhade, Jamadar & Walawelkar, Fundamental of Applied Mechanics, Pune Vidhyarthi Gruh.
6. Ram, H. D.; Chauhan, A. K., Foundations and Applications of Applied Mechanics,
   Cambridge University Press.
7. Meriam, J. L., Kraige, L.G., Engineering Mechanics- Statics, Vol. I, Wiley Publication, New Delhi
8. Applied Mechanics by Er. Arun Bangotra, Eagle Prakashan

UNIT WISE TIME AND MARKS DISTRIBUTION

Unit	Time (Hours)	Marks(%age)
1	17	25
2	15	22
3	10	17
4	11	18
5	11	18
Total	**64**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN AUTOMOBILE ENGINEERING	
Course Code: **ES208***	Course Title: **APPLIED MECHANICS LAB***
Semester: 2ND	Credits: **01**
Periods Per Week :**2 (L: 0, T: 0, P:2)**	

(* Common to Automobile, Civil, Civil(PHE), QSCM, Mechanical and Wood Technology,)

COURSE OBJECTIVES:

The objectives of the course is to determine the resultant of various forces and to compute support reactions using equilibrium conditions for various structures and to understand the significance of friction in equilibrium problems, basic machine rules and their application in different engineering problems

LIST OF PRACTICAL TO BE PERFORMED:

1. To study various equipment related to Engineering Mechanics.
2. To find the M.A., V.R., Efficiency and law of machine for Differential Axle and Wheel.
3. To find the M.A., V.R., Efficiency and law of machine for Simple Screw Jack.
4. Derive Law of machine using Worm and worm wheel.
5. Derive Law of machine using Single purchase crab.
6. Derive Law of machine using double purchase crab.
7. Derive Law of machine using Weston's differential or wormed geared pulley block.
8. Verification of Polygon Law of Forces using gravesand apparatus
9. Determine resultant of concurrent force system graphically.
10. Determine resultant of parallel force system graphically.
11. Verify Lami's theorem.
12. Study forces in various members of Jib crane.
13. Determine support reactions for simply supported beam.
14. To obtain support reactions of beam using graphical method.
15. Determine coefficient of friction for motion on horizontal and inclined plane.
16. Determine centroid of geometrical plane figures.

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN AUTOMOBILE ENGINEERING	
Course Code**: ATPC203**	Course Title**: Engineering Materials**
Semester**: 2nd**	Credits**: 03**
Periods Per Week**: 3(L: 03, T: 0, P: 0)**	

COURSE OBJECTIVE: Durable, light weight and aesthetically appealing materials are the secret behind the efficiency of modern motor cars. The principal goal of this course is to impart in students the ability to make existing materials better and invent or discover new materials, phenomenon, devices, and applications.

COURSE CONTENT

1. Introduction to materials science

1.1. Difference between material science and material engineering
1.2. Classification of materials: metals and alloys; ceramics, glasses, and glass-ceramics; polymers (plastics); semiconductors; and composite materials

2. Crystallography

2.1. Space lattice and Unit cell; crystal structures, seven basic crystal systems
2.2. Principal metallic crystal structures: BCC, FCC and HCP
2.3. Coordination number for Simple Cubic, BCC, FCC and HCP
2.4. Atomic Packing Factor for Simple Cubic, BCC, FCC and HCP; Simple problems on finding number of atoms for a unit cell.
2.5. Amorphous materials
2.6. Imperfections in Latices structure: point line, surface and volume defects; importance of imperfections

3. Metallic materials:

3.1. **Ferrous metals and its Alloys**

3.1.1. Isomorphs, eutectic and eutectoid systems; Iron-Carbon binary diagram; Iron and Carbon Steels; flow sheet for production of iron and steel;
3.1.2. Iron ores – Pig iron:
3.1.3. classification, composition and effects of impurities on iron; Cast Iron: classification, composition, properties and uses;
3.1.4. Wrought Iron: properties, uses/applications of wrought Iron; comparison of cast iron, wrought iron and mild steel and high carbon steel; standard commercial grades of steel as per BIS and AISI;
3.1.5. Alloy Steels – purpose of alloying; effects of alloying elements

3.2. **Non-ferrous metals and its Alloys**

3.2.1. Composition, Properties and automotive applications of aluminum, copper, tin, lead, zinc, magnesium and nickel
3.2.2. Copper alloys: Brasses, bronzes – composition, properties and uses;
3.2.3. Aluminum alloys: Duralumin, hindalium, magnalium – composition, properties and uses;
3.2.4. Anti-friction/Bearing alloys: Various types of bearing bronzes - Standard commercial grades as per BIS/ASME.

4. Non-metallic Materials:

4.1. **Polymers and plastics**

4.1.1. Introduction, Molecular structure, Mechanics of flexible polymer chains
4.1.2. classification of polymers: thermoset and Thermoplastic polymers; Amorphous polymers and Crystalline polymers, Crosslinked polymers
4.1.3. Mechanical and Chemical properties of polymers
4.1.4. Summary of Polymers used in automotive industry

4.2. **Rubber:** natural and synthetic; important rubbers used in automotive industry

4.3. **Ceramics:** concept and properties of ceramic materials; ceramic materials used in automobiles

4.4. **Adhesives**

4.4.1. Metal cleaning: chemical and mechanical cleaning
4.4.2. Adhesive bonding, Characteristics of adhesives, advantages and limitations of adhesives
4.4.3. Types of engineering adhesives: non-structural and special adhesives
4.4.4. Automotive applications of adhesives

4.5. **Glasses**

4.5.1. Composition and structure of glass, Glass-transition temperature; properties of glass
4.5.2. Metallic glasses, properties and applications of tempered and laminated glass

4.6. **Composite Materials**

4.6.1. Introduction; General Characteristics of Composite Materials; Advantages and disadvantages of composite materials over conventional materials

4.6.2. Classification of Composite Materials; Fibre reinforced materials; Fibres; Matrix materials; Metal matrix composites (MMC)
4.6.3. Composite materials used in automotive industry

5. **Theory of Heat Treatment**

5.1. Purpose of heat treatment, concept of phase and phase transformations, cooling curves for pure iron, iron-iron carbide (Fe-Fe_3C) equilibrium diagram
5.2. Summary of heat treatment processes: hardening, tempering, annealing, normalizing, case hardening and surface hardening
5.3. Application of heat treatments in automobile industry

6. Automotive materials

6.1. An overview of materials in the automotive industry
6.2. Material selection and indices of automotive materials: Service requirements, Choice of shaping process

COURSE OUTCOME

After the completion of the course the student will be able to

- recognize and explain the various designations for different classes of steels, cast irons and non-ferrous metals.
- Understand the uses for common non-ferrous metals and alloys.
- enumerate material properties of common nonferrous metals and alloys used in Automobiles
- distinguish between the various types of glasses used in automobile industry
- summarize the various heat treatment processes
- select and identify the various automotive materials to be used in automotive industry.

RECOMMENDED BOOKS

1. Material science by SL Kakani, New Age International Limited Publisher
2. Materials Science and Engineering, A first course, V Raghavan, PHI publication
3. Material Science & Engineering – R.K. Rajput, S.K. Katarina& Sons, New Delhi, 2004.
4. Material Science – R.S. Khurmi, S. Chand & Co. Ltd., New Delhi, 2005.

UNIT WISE TIME AND MARKS DISTRIBUTION

Unit	Time (Hours)	Marks(%age)
1	05	10
2	07	15
3	12	25
4	12	25
5	07	15
6	05	10
Total	**48**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN AUTOMOBILE ENGINEERING	
Course Code**: ATPC204**	Course Title**: Engineering Materials Lab**
Semester: **2nd**	Credits**: 01**
Periods Per Week**: 2 (L: 0, T: 0, P:2)**	

COURSE OBJECTIVE: Durable, light weight and aesthetically appealing materials are the secret behind the efficiency of modern motor cars. The principal goals of this course are to impart in students the ability to make existing materials better and invent or discover new materials, phenomena, devices, and applications

LIST OF PRACTICALS:

1. To study crystal structure with the help of models
2. To study crystal imperfections with the help of models
3. To the study of Microstructure of Low, Medium & High carbon steels.
4. To the study of Microstructure Cast Irons. (Grey cast Iron & White cast Iron).
5. To the study of Microstructure Non – Ferrous pure metals. (Copper & Aluminum).
6. To the study of Microstructure Non-Ferrous alloys. (Brass & Bronze).
7. To anneal a given hardened steel specimen
8. To harden and temper a given steel specimen

CURRICULUM

FOR

SECOND SEMESTER

DIPLOMA

IN

1. CIVIL ENGINEERING
2. QUANTITY SURVEYING AND CONSTRUCTION MANAGEMENT
3. CIVIL ENGINEERING (PHE)

Subject Study Scheme (2nd Sem: Civil Engineering/Civil Engineering(PHE)/QSCM)

Course Code	Subjects	Time in Hours				CREDITS		
		Theory	Tutorial	Practical	Total	Theory	Practical	Total
BS201	Applied Mathematics-II	3	1	--------	4	4	--	4
ES202	Introduction to Computers and Information Technology	---	---	4	4	----	2	2
ES207	Applied Mechanics	4	1	----- ---	5	5	------ --	5
ES208	Applied Mechanics Lab	----- ---	------- -	2	2	------- -	1	1
CEPC202	Construction Materials	4	------- -	----- ---	4	4	------ --	4
CEPC204	Construction Material Lab	----- ---	------- -	2	2	------- -	1	1
CEPC205	Computer Aided Drawing – I for Civil Engineering	----- ---	------- -	4	4	------- -	2	2
CEPC206	Civil Engg. Workshop Practices	----- ---	1	4	5	------- -	3	3
	Total	**11**	**3**	**16**	**30**	**13**	**9**	**22**

PROGRAM: THREE YEAR DIPLOMA IN ENGINEERING AND TECHNOLOGY *	
Course Code: **BS201**	Course Title: **Applied Mathematics-II**
Semester: **2nd**	Credit: **4**
Periods Per Week: **4 (L: 03, T: 01, P: 0)**	

(* Common to Architecture Assistantship, Automobile, Civil, Civil(PHE), QSCM, Computer , Electrical , E&C, Medical Electronics, Food Technology, I&C, Leather Technology, Mechanical, Textile Technology, Wood Technology and IT)

COURSE OBJECTIVE:

This course is designed to develop an understanding of basic mathematical and statistical tools which include matrices, determinants, integral calculus and coordinate geometry and the applications of such tools in the field of engineering and technology

COURSE CONTENT

1. Integral Calculus

1.1 Integration as inverse operation of differentiation

1.2 Simple integration by substitution, by parts and by partial fractions (for Linear factors only)

1.3 Evaluation of definite integrals (simple problems)-

Evaluation of $\int_0^{\pi/2} \text{Sin}^n x.\, dx$, $\int_0^{\pi/2} \text{Cos}^n x\, dx$, $\int_0^{\pi/2} \text{Sin}^m x\ \text{Cos}^n x\, dx$

Using formulae without proof (m and n being positive integers only)

2. Coordinate Geometry

2.1 Equation of straight line in various standard forms (without proof), intersection of two straight lines, angle between two lines. Parallel and perpendicular lines, perpendicular distance formula.

2.2 General equation of a circle and its characteristics. To find the equation of a circle, given: Centre and radius, three points lying on it and coordinates of end points of a diameter.

2.3 Definition of conics (Parabola, Ellipse, Hyperbola) their standard equations without proof. Basic problems on conics when their foci, directrices or vertices are given.

3 Matrices and Determinants

3.1 Definition of matrix and its types.

3.2 Addition, subtraction and multiplication of matrices.

3.3 Expansion of Determinants.

4 Statistics

4.1 Measures of Central Tendency: Mean, Median, Mode
4.2 Measures of Dispersion: Mean deviation, Standard deviation
4.3 Basic Concepts of Probability.

COURSE OUTCOME

After the completion of the course the student will be able to:

- evaluate both indefinite and definite integrals by various methods
- identify various points in a 2-D space along with formulation of equations and graphs for different types of lines, circles, ellipses, parabolas etc.
- find the sum, difference and product of two or more matrices,
- evaluate determinants and their relations to matrices
- find the mean, median, mode and other measures of central tendency.
- solve basic problems on probability.

RECOMMENDED BOOKS:

1. R.D Sharma, Applied Mathematics-II.
2. H.K Das, Applied Mathematics.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 40th Edition, 2007.
4. S.S. Sabharwal, Sunita Jain, Eagle Parkashan, Applied Mathematics, Vol. I & II, Jalandhar.
5. Comprehensive Mathematics, Vol. I & II by Laxmi Publications, Delhi.
6. Reena Garg & Chandrika Prasad, Advanced Engineering Mathematics, Khanna Publishing House, New Delhi
7. Applied Mathematics-II, Eagle Publications.

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	16	35
2	10	20
3	12	25
4	10	20
Total	**48**	**100**

PROGRAM THREE YEAR DIPLOMA IN ENGINEERING AND TECHNOLOGY	
Course Code: **ES202**	Course Title: **Introduction to Computers and Information Technology**
Semester:**2nd**	Credit: **2**
Periods Per Week: **4 (L: 0 T: 0 P: 4)**	

(* Common to Architecture Assistantship, Automobile, Civil, Civil(PHE), QSCM,Computer , Electrical , E&C,Medical Electronics, Food Technology, Garment Technology, I&C,Leather Technology, Mechanical, Textile Design, Textile Technology, Travel and Tourism, MLT, Wood Technology and IT)

COURSE OBJECTIVE

Information technology has great influence on all aspects of our life. Primary purpose of using computer is to make the life easier. 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 tools of MS Office/Open Office using internet etc. form the broad competency profile of diploma holders. This exposure will enable the students to enter their professions with confidence, live in a harmonious way and contribute to the productivity.

COURSE CONTENT

1. **Basics of Information Technology**
   - 1.1. Its concept and scope, applications of IT, ethics and future with information technology.
   - 1.2. Impact of computer and IT in society.
   - 1.3. Computer application in office, book publishing, data analysis, accounting, investment, inventory control, graphics, air and railway ticket reservation, robotics, military, banks, Insurance financial transactions and many more.

2. **Basic Components of Computer System**
   - 2.1. Block diagram of a computer System and Processing of Data.
   - 2.2. Demonstration of computer system viz., Hardware, Software
   - 2.3. Concept of Memory and its various types, Primary and secondary memories (RAM, ROM, Storage Devices etc).

3. **Internet and its Applications**
   - 3.1. Introduction to Internet, its basic working.
   - 3.2. Concept of Email, Social Media, Cloud Computing.
   - 3.3. Basic ideas about IP Address, DNS, URL, Server, Web Browser,LAN etc.

4. Use of Various Basic Data Processing Softwares

4.1. Word Processing (Microsoft Word & Google Docs.)

4.1.1. File Management:

4.1.1.1. Opening, creating and saving a document, locating files, copying contents in some different file(s).

4.1.2. Editing a document:

4.1.2.1. Entering text, Cut, copy, paste using tool- bars

4.1.3. Formatting a document:

4.1.3.1. Using different fonts, changing font size and colour, changing the appearance through bold/ italic/ underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods

4.1.3.2. Aligning of text in a document, justification of document, Inserting bullets and numbering

4.1.3.3. Formatting paragraph, inserting page breaks and column breaks, line spacing

4.1.3.4. Use of headers, footers: Inserting footnote, end note, use of comments

4.1.3.5. Inserting date, time, special symbols, importing graphic images, drawing tools

4.1.4. Tables and Borders:

4.1.4.1. Creating a table,

4.1.4.2. Formatting cells,

4.1.4.3. Use of different border styles, shading in tables,

4.1.4.4. Merging of cells, partition of cells, inserting and deleting a row in a table

4.1.5. Print preview, zoom, page set up, printing options

4.1.6. Using Find, Replace options

4.2. Microsoft-Excel and Google Sheets

4.2.1. Introduction to Spreadsheet Application-Workbook and Worksheets

4.2.2. Working with data and formulas:

4.2.2.1. Addition, subtraction, division, multiplication, percentage and autosum.

4.2.2.2. Format data, create chart, printing chart, save worksheet, creating and formatting of charts and graphs

4.3. Presentation (Microsoft-PowerPoint and Google Slides)

4.3.1. Introduction to PowerPoint - How to start PowerPoint - Working environment: concept of toolbars, slide layout, templates etc. - Opening a new/existing presentation - Different views for viewing slides in a presentation: normal, slide sorter etc.

4.3.2. Addition, deletion and saving of slides.

4.3.3. Insertion of multimedia elements - Adding text boxes, importing pictures, movies and sound, tables and charts etc.

4.3.4. Formatting slides - Text formatting, changing slide layout, changing slide color scheme - Changing background, Applying design

template.

4.3.5. Viewing the presentation using slide navigator

COURSE OUTCOME

After the completion of the course the student will be able to:

- Identify the different hardware components and functional units of a Computer system.
- Explain basic concepts and working of internet.
- Create and format word documents by using different word processing software.
- Prepare the spread sheets and the presentation of data in different ways.
- Prepare power point presentations.

RECOMMENDED BOOKS:

1. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd-Jungpura, New Delhi
2. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
3. Fundamentals of Information Technology by Leon and Leon;Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
4. Basics of Information Technology, by Ishan Publications, Ambala
5. Information Technology for Management by Henery Lucas, 7th edition, Tata McGraw Hill Education Pvt Ltd, New Delhi

UNIT WISE TIME AND MARKSDISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	06	10
2	13	20
3	13	20
4	32	50
Total	**64**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN CIVIL ENGG / CIVIL (PHE) / QSCM	
Course Code: **ES207***	Course Title: **APPLIED MECHANICS***
Semester: 2ND	Credits: **05**
Periods Per Week :5 **(L: 4, T: 1, P:0)**	

(* Common to Automobile, Civil, Civil (PHE), QSCM, Mechanical and Wood Technology)

COURSE OBJECTIVE:

The objectives of the course are to determine the resultant of various forces and to compute support reactions using equilibrium conditions for various structures and to understand the significance of friction in equilibrium problems, basic machine rules and their application in different engineering problems

COURSE CONTENT

1. Basics of mechanics and force system (17 Hours)

1.1. Significance and relevance of Mechanics, Applied mechanics, Statics, Dynamics
1.2. Space, time, mass, particle, flexible body and rigid body. Scalar and vector quantity, Units of measurement (SI units) - Fundamental units and derived units.
1.3. Force – unit, representation as a vector and by Bow's notation, characteristics and effects of a force, Principle of transmissibility of force, Force system and its classification.
1.4. Resolution of a force - Orthogonal components of a force, moment of a force, Varignon's Theorem
1.5. Composition of forces – Resultant, analytical method for determination of resultant for concurrent, non-concurrent and parallel co-planar force systems – Law of triangle, parallelogram and polygon of forces

2. Equilibrium (15 Hours)

2.1. Equilibrium and Equilibrant, Free body and Free body diagram, Analytical and graphical methods of analysing equilibrium
2.2. Lami's Theorem – statement and explanation, Application for various engineering problems.
2.3. Types of beam, supports (simple, hinged, roller and fixed) and loads acting on beam (vertical and inclined point load, uniformly distributed load, couple)
2.4. Beam reaction for cantilever, simply supported beam with or without overhang subjected to combination of Point load and uniformly distributed load.
2.5. Beam reaction graphically for a simply supported beam subjected to vertical point loads only.

3. Friction (10 Hours)

3.1. Friction and its relevance in engineering, types and laws of friction, limiting equilibrium, limiting friction, co-efficient of friction, angle of friction, angle of repose, relation between co-efficient of friction and angle of friction.
3.2. Equilibrium of bodies on level surface subjected to force parallel and inclined to plane.
3.3. Equilibrium of bodies on inclined plane subjected to force parallel to the plane only.

4. Centroid and Centre of gravity (11 Hours)

4.1. Centroid of geometrical plane figures (square, rectangle, triangle, circle, semi-circle, quarter circle)
4.2. Centroid of composite figures composed of not more than three geometrical figures
4.3. Centre of Gravity of simple solids (Cube, cuboid, cone, cylinder, sphere, hemisphere)
4.4. Centre of Gravity of composite solids composed of not more than two simple solids

5. Simple lifting machine (11 Hours)

5.1. Simple lifting machine, load, effort, mechanical advantage, applications and advantages.
5.2. Velocity ratio, efficiency of machines, law of machines.
5.3. Ideal machine, friction in machine, maximum Mechanical advantage and efficiency, reversible and non-reversible machines, conditions for reversibility
5.4. Velocity ratios of Simple axle and wheel, Differential axle and wheel, Worm and worm wheel, Single purchase and double purchase crab winch, Simple screw jack, Weston's differential pulley block, geared pulley block.

COURSE OUTCOME

After completing this course, the student will be able to:

- Identify the force systems for given conditions by applying the basics of mechanics.
- Determine unknown force(s) of different engineering systems.
- Apply the principles of friction in various conditions for useful purposes.
- Find the centroid and centre of gravity of various components in engineering systems.
- Calculate mechanical advantage, velocity ratio and efficiency of simple lifting machine

RECOMMENDED BOOKS

1. D.S. Bedi, Engineering Mechanics, Khanna Publications, New Delhi.

2. Khurmi, R.S., Applied Mechanics, S. Chand & Co. New Delhi.
3. Bansal R K, A text book of Engineering Mechanics, Laxmi Publications.
4. Ramamrutham, Engineering Mechanics, S. Chand & Co. New Delhi.
5. Dhade, Jamadar &Walawelkar, Fundamental of Applied Mechanics, Pune VidhyarthiGruh.
6. Ram, H. D.; Chauhan, A. K., Foundations and Applications of Applied Mechanics,
   Cambridge University Press.
7. Meriam, J. L., Kraige, L.G., Engineering Mechanics- Statics, Vol. I, Wiley Publication, New Delhi
8. Applied Mechanics by Er. Arun Bangotra, Eagle Prakashan

UNIT WISE TIME AND MARKS DISTRIBUTION

Unit	Time (Hours)	Marks(%age)
1	17	25
2	15	22
3	10	17
4	11	18
5	11	18
Total	**64**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN CIVIL ENGG / CIVIL (PHE) / QSCM	
Course Code: **ES208***	Course Title: **APPLIED MECHANICS LAB***
Semester: 2ND	Credits: **01**
Periods Per Week :**2 (L: 0, T: 0, P:2)**	

(* Common to Automobile, Civil, Civil (PHE), QSCM, Mechanical and Wood Technology)

COURSE OBJECTIVES:

The objectives of the course are to determine the resultant of various forces and to compute support reactions using equilibrium conditions for various structures and to understand the significance of friction in equilibrium problems, basic machine rules and their application in different engineering problems

LIST OF PRACTICAL TO BE PERFORMED:

1. To study various equipment related to Engineering Mechanics.
2. To find the M.A., V.R., Efficiency and law of machine for Differential Axle and Wheel.
3. To find the M.A., V.R., Efficiency and law of machine for Simple Screw Jack.
4. Derive Law of machine using Worm and worm wheel.
5. Derive Law of machine using Single purchase crab.
6. Derive Law of machine using double purchase crab.
7. Derive Law of machine using Weston's differential or wormed geared pulley block.
8. Verification of Polygon Law of Forces using gravesand apparatus
9. Determine resultant of concurrent force system graphically.
10. Determine resultant of parallel force system graphically.
11. Verify Lami's theorem.
12. Study forces in various members of Jib crane.
13. Determine support reactions for simply supported beam.
14. To obtain support reactions of beam using graphical method.
15. Determine coefficient of friction for motion on horizontal and inclined plane.
16. Determine centroid of geometrical plane figures.

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN CIVIL ENGG / CIVIL (PHE) / QSCM	
Course Code: **CEPC202**	Course Title: **Construction Materials**
Semester: **2nd**	Credits: **4**
Periods Per Week**: 4 (L: 4, T: 0, P: 0)**	

COURSE OBJECTIVE:

The concerned students have to supervise construction of various types of civil works involving use of various materials like stones, bricks and tiles, cement and cement based products, lime, timber and wood based products, paints and varnishes, metals and other miscellaneous materials. The students should have requisite knowledge regarding characteristics, uses and availability of various building materials and skills in conducting tests to determine suitability of materials for various construction purposes. In addition, specifications of various materials should also be known (PWD/BIS) for effective quality control.

COURSE CONTENT

1. Building Stones

1.1 Requirements of good building stones
1.2 Quarrying of stones by various methods
1.3 Physical classification: Unstratified, startified and foliated rocks
1.4 Geological classification: Igneous, sedimentary and metamorphic rocks
1.5 Chemical classification; Calcareous, argillaceous and siliceous rocks

2. **Bricks**

2.1 Requirements of good bricks for construction.
2.2 Raw materials for brick manufacturing
2.3 Manufacturing of bricks
i. Preparation of clay
ii. Moulding, drying of bricks, burning of bricks
2.4 Types of kilns - Bull's Trench Kiln and Hoffman's Kiln
2.5 Classification and specifications of bricks as per BIS: 1077
2.6 Testing of common building bricks as per BIS: 3495
Compressive strength, water absorption test, efflorescence, Dimensional tolerance, soundness.

3. Tiles

3.1 Building tiles; Types of tiles-wall, ceiling, roofing and flooring tiles
3.2 Ceramic, terrazzo and PVC tiles: their properties and uses.
3.3 Vitrified tiles, Paver blocks.

4. Cement

4.1 Introduction, raw materials required for manufacturing cement.
4.2 Flow diagram of manufacturing of cement.
4.3 Various types of Cements and their properties – Short note Ordinary Portland cement, rapid hardening cement, low heat cement, high alumina cement, blast furnace slag cement, white and colored cement, Portland pozzolana cement, super sulphate cement.
4.4 Tests of cement – fineness, soundness, initial and final setting time etc. as per B.I.S. Code.

5. Paints and Varnishes:

5.1 Types, ingredients, properties and uses of oil paints, water paints, cement paints and varnishes.
5.2 Covering capacity of various paints.

6. Metals

6.1 Ferrous metals: Composition, properties and uses of cast iron, mild steel, HYSD steel.
6.2 Aluminum & Stainless Steel - Composition, properties and uses

7. Miscellaneous Materials

7.1 Plastics – Introduction and uses of various plastic products in buildings
7.2 Types and uses of insulating materials for sound and thermal insulation
7.3 Construction chemicals like water proofing compound, epoxies, polymers
7.4 Materials used in interior decoration works like POP, methods of doing POP

NOTE: Field visit may be planned to Cement Manufacturing Plant & Construction Site to explain and show the relevant things

RECOMMENDED BOOKS

1) Sharma, SK; and Mathur, GC; "Engineering Materials;" Delhi-Jalandhar, S. Chand and Co.
2) Surendra Singh; "Engineering Materials;" New Delhi, Vikas Publishing House Pvt. Ltd.
3) Chowdhuri, N; "Engineering Materials;" Calcutta, Technical Publishers of India.
4) Bahl, SK; "Engineering Materials;" Delhi, Rainbow Book Co.
5) Kulkarni, GJ; "Engineering Materials;" Ahmedabad, Ahmedabad Book Depot.

6) Gurcharan Singh; "Engineering materials", Delhi Standard Publishers
7) SC Rangawala, "Construction Materials", Charotar Publishers
8) Alam Singh, "Constrution Materials"

COURSE OUTCOME

After completion of the course the student will be able to:

- understand the use of stones as construction material
- calculate the strength parameters of Bricks
- identify the use and suitability of Tiles
- enumerate the Properties of various types of cement, their strength parameters
- distinguish between the various types of paints
- list the various types of metals and their properties.

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	7	12
2	13	20
3	4	06
4	14	20
5	7	12
6	6	10
7	13	20
Total	**64**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN CIVIL ENGG / CIVIL (PHE) / QSCM	
Course Code: **CEPC204**	Course Title: **Construction Materials Lab**
Semester: 2nd	Credits: 1
Periods Per Week: **2(L: 0, T: 0, P: 2)**	

COURSE OBJECTIVE:

The subject Constructions Materials Lab deals the determination of strength parameters of various construction materials

LIST OF PRACTICALS

1. To identify various types of stones used in building works by visual examination.
2. To determine water absorption of various types of stones used in construction Four types
3. To determine dimensional tolerance test of bricks.
4. To determine the water absorption of bricks, Soundness and efflorescence of bricks.
5. To determine the crushing strength of bricks
6. To determine fineness, consistency, setting time and physical test of cement
7. To determine compressive strength of cement – Any three types

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN CIVIL ENGG / CIVIL (PHE) / QSCM	
Course Code: **CEPC205**	Course Title: **Computer Aided Drawing (Cad)-I For Civil Engineering**
Semester:2nd	Credits: 2
Periods Per Week: 4 **(L: 0, T: 0, P: 4)**	

COURSE OBJECTIVE

Computer applications plays a very vital role in present day life and more so, in the professional life of diploma engineer. In order to enable the students to use the computers effectively in problem solving, this course offers applications of various computer software Auto CADD in civil engineering.

COURSE CONTENT

1. Introduction
   - 1.1 Study of Interface
   - 1.2 Drawing Tools – Understanding and working of commands related to:-
     - i. Draw tools
     - ii. Modify tool
     - iii. Annotative tool
     - iv. Dimension tool
2. Preparation of Plan, Elevation and Section for a Single Storey Two Room Building with Verandah (2D)
3. Preparation of Plan, Elevation and Section of a Dog Legged Staircase. (2D)
4. Preparation of Plan, Elevation and Section of a Septic Tank and Soak Pit. (2D)

RECOMMENDED BOOKS

1. AutoCAD Exercises for Beginners: Designers WorkBook for Practice by Shameer S.A
2. Introduction to AutoCAD 2D Design by Shanu Aggarwal
3. Civil Engineering Drawing by RS Malik, Asia Publishing House
4. Civil Engineering Drawing by V.B.Sikka. Katson Publishing, Ludhiana

UNIT WISE TIME AND MARKS DISTRIBUTION

Unit No.	Time Allotted (Hrs)	Marks Allotted (%)
1	13	20
2	25	40
3	13	20
4	13	20
Total	**64**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN CIVIL ENGG / CIVIL (PHE) / QSCM	
Course Code: **CEPC206**	Course Title: **Civil Engg Workshop Practices**
Semester: **2nd**	Credits: **3**
Periods Per Week: **5(L: 0, T: 1, P: 4)**	

COURSE OBJECTIVE:

The course of Civil Engineering Workshop Practices would facilitate the development of basic skills a Diploma holder is expected to posses. He/she should be able to supervise construction activities like brick masonry, woodwork, concreting, welding, finishing etc. including quality control and maintenances of safety to self, coworkers and the constructed components of the building.

The students are advised to practice each of the experiences with an understanding of necessary technical aspects and safety precautions needed to be observed.

COURSE CONTENT

1. **Masonry and Concreting**
   - 1.1. Brick and stone Masonry work, Different type of joints/bonds, Concept of line, plumb, right-angle and water level.
   - 1.2. Plastering, Pointing,
   - 1.3. Flooring, Skirting and Dado
   - 1.4. Concrete Laying: Proper Mixing of concrete, Use of tools like concrete mixtures and vibrators, different types of vibrators.
     - 1.4.1. Formwork
     - 1.4.2. Scaffolding
     - 1.4.3. Centering/ Shuttering
2. **Plumbing**
   - 2.1 Different types of pipes, joints, taps, fixtures and accessories used in plumbing.
   - 2.2 Components (pipes, bends, chambers etc.) used in sanitary/sewerage lines
   - 2.3 Scheme/plan for water supply and sanitary system for a simple residential building.

3. Carpentry, Welding and Drilling Work

3.1 Types of woods/timber, different types of tools, machines and accessories for wood works

3.2 Types of welding, ARC welding, Gas welding, Gas Cutting, welding of dissimilar materials, Selection of welding rod material, welding processes.

3.3 Fitting operation like chipping, filing, right angle, marking, drilling, tapping etc.

3.4 Drilling machine.

3.5 Safety precautions in carpentry, welding, fittings safety equipment's and its use.

4. Finishing Works

4.1 False ceiling, POP work, aluminum –glass works

4.2 Whitewashing and painting: brush, roller and spray painting, types of finishing, preparation of surface, need of primer

RECOMMENDED BOOKS

1. B.S .Raghuwanshi, Workshop Technology, Dhanpat Rai and sons ,NewDelhi 2014
2. Howard C. Massey, Basic Plumbing With Illustrations Revised Edition, Craftsman Book Co;
3. PWD Standard Data Book for Building Work.
4. CPWD Works Manual

UNIT WISE TIME AND MARKS DISTRIBUTION

Unit	Time Allotted (Hrs)	Marks Allotted (%)
1	20	30
2	14	20
3	15	25
4	15	25
Total	**64**	**100**

CURRICULUM

FOR

SECOND SEMESTER

DIPLOMA

IN

1. COMPUTER ENGINEERING
2. INFORMATION TECHNOLOGY

SUBJECT STUDY SCHEME (2nd Sem: Computer Engineering/IT)

Course Code	Subjects	Time in Hours				CREDITS		
		Theory	Tutorial	Practical	Total	Theory	Practical	Total
BS201	Applied Mathematics-II	3	1	--------	4	4	--------	4
ES202	Introduction to Computers and Information Technology	---	---	4	4	----	2	2
COPC201	Programming in 'C'	4	--------	--------	4	4	--------	4
COPC202	Programming in 'C' Lab	--------	--------	2	2	--------	1	1
COPC203	Computer Workshop	--------	1	4	5	--------	3	3
ES205	Basics of Electrical and Electronics Engineering	4	1	--	5	5	---	5
ES206	Basics of Electrical and Electronics Engineering Lab	--------	--------	2	2	--------	1	1
HS211	Communication and Interpersonal Skills	----	---	4	4	----	2	2
	Total	**11**	**3**	**16**	**30**	**13**	**9**	**22**

PROGRAM: THREE YEAR DIPLOMA IN ENGINEERING AND TECHNOLOGY *	
Course Code: **BS201**	Course Title: **Applied Mathematics-II**
Semester: **2nd**	Credit: **4**
Periods Per Week: **4 (L: 03, T: 01, P: 0)**	

(* Common to Architecture Assistantship, Automobile, Civil, Civil(PHE), QSCM, Computer , Electrical , E&C, Medical Electronics, Food Technology, I&C, Leather Technology, Mechanical, Textile Technology, Wood Technology and IT)

COURSE OBJECTIVE:

This course is designed to develop an understanding of basic mathematical and statistical tools which include matrices, determinants, integral calculus and coordinate geometry and the applications of such tools in the field of engineering and technology

COURSE CONTENT

1. Integral Calculus

1.1 Integration as inverse operation of differentiation

1.2 Simple integration by substitution, by parts and by partial fractions (for Linear factors only)

1.3 Evaluation of definite integrals (simple problems)-

Evaluation of $\int_0^{\pi/2} \text{Sin}^n x.\, dx$, $\int_0^{\pi/2} \text{Cos}^n x\, dx$, $\int_0^{\pi/2} \text{Sin}^m x\ \text{Cos}^n x\, dx$

Using formulae without proof (m and n being positive integers only)

2. Coordinate Geometry

2.1 Equation of straight line in various standard forms (without proof), intersection of two straight lines, angle between two lines. Parallel and perpendicular lines, perpendicular distance formula.

2.2 General equation of a circle and its characteristics. To find the equation of a circle, given: Centre and radius, three points lying on it and coordinates of end points of a diameter.

2.3 Definition of conics (Parabola, Ellipse, Hyperbola) their standard equations without proof. Basic problems on conics when their foci, directrices or vertices are given.

3. Matrices and Determinants

3.1 Definition of matrix and its types.

3.2 Addition, subtraction and multiplication of matrices.

3.3 Expansion of Determinants.

4. Statistics

4.1 Measures of Central Tendency: Mean, Median, Mode

4.2 Measures of Dispersion: Mean deviation, Standard deviation

4.3 Basic Concepts of Probability.

COURSE OUTCOME

After the completion of the course the student will be able to:

- Evaluate both indefinite and definite integrals by various methods
- Identify various points in a 2-D space along with formulation of equations and graphs for different types of lines, circles, ellipses, parabolas etc.
- Find the sum, difference and product of two or more matrices,
- Evaluate determinants and their relations to matrices
- Find the mean, median, mode and other measures of central tendency.
- Solve basic problems on probability.

RECOMMENDED BOOKS:

1. R.D Sharma, Applied Mathematics-II.
2. H.K Das, Applied Mathematics.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 40th Edition, 2007.
4. S.S. Sabharwal, Sunita Jain, Eagle Parkashan, Applied Mathematics, Vol. I & II, Jalandhar.
5. Comprehensive Mathematics, Vol. I & II by Laxmi Publications, Delhi.
6. Reena Garg & Chandrika Prasad, Advanced Engineering Mathematics, Khanna Publishing House, New Delhi
7. Applied Mathematics-II, Eagle Publications.

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	16	35
2	10	20
3	12	25
4	10	20
Total	**48**	**100**

PROGRAM THREE YEAR DIPLOMA IN ENGINEERING AND TECHNOLOGY	
Course Code: **ES202**	Course Title: **Introduction to Computers and Information Technology**
Semester:**2nd**	Credit: **2**
Periods Per Week: **4 (L: 0 T: 0 P: 4)**	

(* Common to Architecture Assistantship, Automobile, Civil, Civil (PHE), QSCM, Computer , Electrical , E&C,Medical Electronics, Food Technology, Garment Technology, I&C,Leather Technology, Mechanical, Textile Design, Textile Technology, Travel and Tourism, MLT, Wood Technology and IT)

COURSE OBJECTIVE

Information technology has great influence on all aspects of our life. Primary purpose of using computer is to make the life easier. 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 tools of MS Office/Open Office using internet etc. form the broad competency profile of diploma holders. This exposure will enable the students to enter their professions with confidence, live in a harmonious way and contribute to the productivity.

COURSE CONTENT

1. **Basics of Information Technology**
   - 1.1. Its concept and scope, applications of IT, ethics and future with information technology.
   - 1.2. Impact of computer and IT in society.
   - 1.3. Computer application in office, book publishing, data analysis, accounting, investment, inventory control, graphics, air and railway ticket reservation, robotics, military, banks, Insurance financial transactions and many more.

2. **Basic Components of Computer System**
   - 2.1. Block diagram of a computer System and Processing of Data.
   - 2.2. Demonstration of computer system viz., Hardware, Software
   - 2.3. Concept of Memory and its various types, Primary and secondary memories (RAM, ROM, Storage Devices etc).

3. **Internet and its Applications**
   - 3.1. Introduction to Internet, its basic working.
   - 3.2. Concept of Email, Social Media, Cloud Computing.
   - 3.3. Basic ideas about IP Address, DNS, URL, Server, Web Browser,LAN etc.

4. Use of Various Basic Data Processing Softwares

4.1. Word Processing (Microsoft Word & Google Docs.)

4.1.1. File Management:

4.1.1.1. Opening, creating and saving a document, locating files, copying contents in some different file(s).

4.1.2. Editing a document:

4.1.2.1. Entering text, Cut, Copy, Paste using tool- bars

4.1.3. Formatting a document:

4.1.3.1. Using different fonts, changing font size and color, changing the appearance through bold/ italic/ underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods

4.1.3.2. Aligning of text in a document, justification of document, Inserting bullets and numbering

4.1.3.3. Formatting paragraph, inserting page breaks and column breaks, line spacing

4.1.3.4. Use of headers, footers: Inserting footnote, end note, use of comments

4.1.3.5. Inserting date, time, special symbols, importing graphic images, drawing tools

4.1.4. Tables and Borders:

4.1.4.1. Creating a table,

4.1.4.2. Formatting cells,

4.1.4.3. Use of different border styles, shading in tables,

4.1.4.4. Merging of cells, partition of cells, inserting and deleting a row in a table

4.1.5. Print preview, zoom, page set up, printing options

4.1.6. Using Find, Replace options

4.2. Microsoft-Excel and Google Sheets

4.2.1. Introduction to Spreadsheet Application-Workbook and Worksheets

4.2.2. Working with data and formulas:

4.2.2.1. Addition, subtraction, division, multiplication, percentage and Auto sum.

4.2.2.2. Format data, create chart, printing chart, save worksheet, creating and formatting of charts and graphs

4.3. Presentation (Microsoft-PowerPoint and Google Slides)

4.3.1. Introduction to PowerPoint - How to start PowerPoint - Working environment: concept of toolbars, slide layout, templates etc. - Opening a new/existing presentation - Different views for viewing slides in a presentation: normal, slide sorter etc.

4.3.2. Addition, deletion and saving of slides.

4.3.3. Insertion of multimedia elements - Adding text boxes, importing

pictures, movies and sound, tables and charts etc.

4.3.4. Formatting slides - Text formatting, changing slide layout, changing slide color scheme - Changing background, Applying design template.

4.3.5. Viewing the presentation using slide navigator

COURSE OUTCOME

After the completion of the course the student will be able to:

- Identify the different hardware components and functional units of a Computer system.
- Explain basic concepts and working of internet.
- Create and format word documents by using different word processing software.
- Prepare the spread sheets and the presentation of data in different ways.
- Prepare power point presentations.

RECOMMENDED BOOKS:

1. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd-Jungpura, New Delhi
2. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
3. Fundamentals of Information Technology by Leon and Leon;Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
4. Basics of Information Technology, by Ishan Publications, Ambala
5. Information Technology for Management by Henery Lucas, 7th edition, Tata McGraw Hill Education Pvt Ltd, New Delhi

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	06	10
2	13	20
3	13	20
4	32	50
Total	**64**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAM IN COMPUTER ENGINEERING/IT	
Course Code: COPC201	**Course Title: PROGRAMMING IN C**
Semester:2ND	**Credits:4**
Periods per week:4(L:4 T:0P:0)	

COURSE OBJECTIVE: Computers play a vital role in present day life, more so, in the professional life of technician engineers. People working in the field of computer industry, use computers in solving problems more easily and effectively. This course offers the modern programming language C along with exposure to various applications of computers.

COURSE CONTENTS

1. Algorithm and Programming Development (08Hrs)
   - 1.1 Steps in development of a program.
   - 1.2 Flow charts, Algorithm development.
   - 1.3 Debugging
   - 1.4 History of C.
   - 1.5 Introduction to Interpreter and Compiler
2. Program Structure (12Hrs)
   - 2.1 Structure of a C Program.
   - 2.2 I/O statements, Assignment statements.
   - 2.3 Constants, Variables and data types.
   - 2.4 Operators and Expressions.
   - 2.5 Use of Header files & Library functions.
3. Control Structures (12Hrs)
   - 3.1 Introduction to Control Statements.
   - 3.2 Decision making with IF – statement, IF – Else and Nested IF.
   - 3.3 While and do-while, for loop.
   - 3.4 Break and switch statements
4. Functions (12Hrs)
   - 4.1 Introduction to functions.
   - 4.2 Function Declaration, Standard functions, Parameters and Parameter Passing.
   - 4.3 Call by value/reference, Global and Local Variables ,Recursion
5. Arrays and Structures (12Hrs)
   - 5.1 Introduction to Arrays.
   - 5.2 Array Declaration and Initialization.
   - 5.3 Single and Multidimensional Array.
   - 5.4 Arrays of characters.

5.5 Declaration of structures, Accessing structure members, Structure Initialization

6. Pointers (08Hrs)
   - 6.1 Introduction to Pointers.
   - 6.2 Address operator, Pointer and functions.
   - 6.3 Declaring and Initializing pointers.

COURSE OUTCOME:

After the completion of the course, the student will be able to:

- understand the concept of a C program and its components.
- solve programming exercises using loops
- use conditional statements to select a choice from two or more alternatives.
- use an array to store multiple pieces of homogenous data
- use a structure to store multiple pieces of heterogeneous data.
- apply the concept of Pointers in C-Programs

RECOMMENDED BOOKS

1. Programming in ANSI C by E Balaguruswami, , Tata McGraw Hill Education Pvt Ltd , New Delhi
2. Application Programming in C by RS Salaria, Khanna Book Publishing Co(P) Ltd. New Delhi
3. Programming in C by Gottfried, Schaum Series, , Tata McGraw Hill Education Pvt Ltd , New Delhi
4. Exploring C by Yashwant Kanetkar – BPB Publications, New Delhi
5. Programming in C by Stefin G. Coachin
6. Programming in C by R Subburaj, Vikas Publishing House Pvt. Ltd., Jangpura, New Delhi
7. Elements of C by M.H. Lewin, Khanna Publishers, New Delhi
8. Programming in C by Stephen G Kochan
9. Programming in C by BP Mahapatra, Khanna Publishers, New Delhi

UNIT WISE TIME AND MARKS DISTRIBUTION

Sr No	Topic	Time Allotted (Hrs)	Marks Allotted (%)
1	Algorithm and Programming Development	8	12
2	Program Structure	12	16
3	Control Structures	12	20
4	Functions	12	20
5	Arrays and Structures	12	20
6	Pointers	8	12
	Total	**64**	**100**

PROGRAM:THREE YEARS DIPLOMA PROGRAM IN COMPUTER ENGINEERING/IT	
Course Code: COPC202	**Course Title : PROGRAMMING IN 'C' Lab**
Semester:2ND	**Credits:1**
Periods per week:2(L:0 T:0 P:2)	

COURSE OBJECTIVE: The knowledge of C language will be reinforced by the practical exercises.

LIST OF PRACTICALS

1. Programming exercises on executing and editing a C program.
2. Programming exercises on defining variables and assigning values to variables.
3. Programming exercises on arithmetic and relational operators.
4. Programming exercises on arithmetic expressions and their evaluation
5. Programming exercises on formatting input/output using printf and scanf
6. Programming exercises using if statement.
7. Programming exercises using if – Else.
8. Programming exercises on switch statement.
9. Programming exercises on do – while statements.
10. Programming exercises on for – statement.
11. Programs on one-dimensional array.
12. Programs on two-dimensional arrays
13. Simple programs using structures.
14. Simple programs using pointers.

PROGRAM:THREE YEARS DIPLOMA PROGRAM IN COMPUTER ENGINEERING/IT	
Course Code: **COPC203**	Course Title : **COMPUTER WORKSHOP**
Semester:**2ND**	Credits:**3**
Periods per week:**5(L:0 T:1 P:4)**	

COURSE OBJECTIVE:

Students of Computer Engineering and Information Technology have to work with various hardware and software not only during academia but also in company. Thus, students should get familiar with various hardware, software, operating systems and networking. This course will provide student a much-needed knowledge of computer hardware and networking, enabling them to identify and rectify the onboard computer hardware, software and network related problems.

LIST OF PRACTICALS

1. Identify and list functions of various components and peripherals of given computer.
   Memory: primary and secondary memory: RAM, ROM, PROM etc. Input devices: keyboard, mouse, scanner, etc. output devices: VDU and Printer (Impact and non-Impact printers), Plotter etc. Primary and Secondary Storage (Auxiliary Storage), Secondary storage; magnetic disks – tracks and sectors, optical disk (CD, CD-RW and DVD Memory)
2. **Assembly of Computer:**
   Introduction to hardware peripherals like RAM, ROM, keyboard, Mouse, processors, etc. Working of SMPS. Study of various ports. Steps and precautions to assemble computer.
3. **Configuration of External Devices:**
   Printers: Installation, various types of configuration settings on printers, removing and mounting cartridges, basic troubleshooting (paper jams, print head cleaning etc.)
   Scanners: Installation, changing scan settings, scanning documents/images and saving in different formats.
   Setting up of webcams, speakers, microphones, Bluetooth devices, Memory card reader etc.
4. **Computer Network Tools:**
   Introduction to computer network. Study of various topologies. Preparing the network cable using crimping tools and connectors. Study of various network environments. Configuring the Static IP Address and DHCP to a PC in a network.
5. **Operating System and Software Installations:**
   Introduction to operating system. Types of operating system (Windows and Linux). Windows: - Introduction to software. Types of software (MS office, VLC media player, Winrar, open office, web browser, etc.) Case study of

Installations step for operating system (both Linux and Windows Based) and application Software. Creating Restore Points and Recovery.

6. **Disk Management:**
   Disk Management tools (Disk Cleanup, Disk Defragmenter, Backup). Formatting drives, Partitioning, File management, file recovery and compression tools.
7. **BIOS Configuration.**
   Study of BIOS Set-up- Advance set-up, Boot configuration, Boot Menu, Boot order, POST (Power on Self-Test), Identifying problems by Beep code errors,
8. **Basics of Cyber Security**
   Introduction to Virus/Spyware/Worm/Trojan Horse, their detection, prevention and cure. Installation, uninstallation and use of Antivirus software.

Note: An industrial visit to computer assembling/manufacturing unit may be arranged for the students for better understanding of the course.

PROGRAM:THREE YEARS DIPLOMA PROGRAM IN COMPUTER ENGINEERING/IT	
CourseCode:**ES205**	Course Title : **BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING**
Semester:**2ND**	Credits:**5**
Periods per week:5**(L:4 T: 1 P:0)**	

(Common with I&C)

COURSE OBJECTIVE:

The course contents could be taught and implemented with an aim to develop different skills leading to the achievement of the competencies in measurement of basic electrical quantities/parameters and use of major electrical/electronic machines/instruments.

COURSE CONTENTS

1. **Overview of DC Circuits**
   - 1.1. Ohms law and its verification.
   - 1.2. Series and parallel combination of resistors with simple numerical problems.
   - 1.3. Application of Kirchhoff's current law and Kirchhoff's voltage law to simple circuits.

2. **Electro Magnetic Induction**
   - 2.1 Concept of electro-magnetic field produced by flow of electric current
   - 2.2 Concept of magneto-motive force (MMF), flux, reluctance, permeability
   - 2.3 Analogy between electric and magnetic circuit.
   - 2.4 Faraday's laws of electro-magnetic induction, principles of self and Mutual induction.
   - 2.5 Series and parallel combination of inductors.
3. **Batteries**
   - 3.1. Basic idea of primary and secondary cells
   - 3.2. Construction, working principle and applications of Lead-Acid Batteries
   - 3.3. Brief idea of Lithium-ion batteries
   - 3.4. Series and parallel connections of batteries
   - 3.5. General idea of solar cells, solar panels and their applications
4. **AC Fundamentals**
   - 4.1. Concept of alternating current and voltage.
   - 4.2. Concepts of: cycle, frequency, time period, amplitude, instantaneous value, average value, r.m.s. value, maximum value
   - 4.3. Difference between ac and dc
5. **Various Types of Power Plants**
   - 5.1. Working principle and block diagram explanation of thermal and hydro power stations and their comparative study
6. **Semiconductor physics and diode**
   - 6.1 Classification of materials into insulators, conductors and semiconductors on the basis of energy band concept.
   - 6.2 Concept of Intrinsic and Extrinsic Semi-conductors

6.3 PN junction Diode : working Mechanism and its related terms, V-I Characteristics , and its application as half wave and full wave rectifier

6.4 Working and application of special purpose diodes: LED (Light Emitting Diode), photo diode, Zener diode

6.5 Filter circuits: Brief idea about shunt capacitor filter, series inductor filter, LC and Pie filter

7. **Bipolar-transistors**

7.1 Concept of a bipolar transistor, PNP and NPN transistors, their symbols and mechanism of current flow; Current relations in a transistor; concept of leakage current.

7.2 CB, CE, CC configurations of a transistor; Input and output characteristics in CB and CE configurations; Current amplification factors. Comparison of CB, CE and CC Configurations

7.3 Transistor as an amplifier in CE Configuration.

8. **Unipolar Transistors**

8.1 Construction, operation and characteristics of MOSFET/JFET and its applications.

8.2 Brief introduction of CMOS and its application.

COURSE OUTCOME

After completion of the course the student will be able to

- explain the basic terminology used in electricity like charge, current, voltage , resistance etc.
- solve various electric circuits for current, voltage or resistance.
- state the laws of electromagnetic induction and describe the effect on a current-carrying conductor when placed in a magnetic field.
- explain the concept of batteries , their construction and their applications.
- Describe the various concepts associated with AC and will be also able to distinguish it with DC.
- apply the knowledge of diodes in rectifiers, power adapters and various electronic circuits.
- apply the knowledge of semiconductors in various technical gadgets like mobile phones, Computers, LED, photocells, solar lights etc.
- explain the working and applications of FET and MOSFET

RECOMMENDEDBOOKS

1. Electrical Technology by B.LTheraja, S.Chand and Company, New Delhi
2. Electrical and Electronics Engineering by S.K Bhattacharya,Pearson Education, New Delhi
3. Basic Electrical Engineering by PS Dhogal, Tata McGraw-Hill Education Pvt Ltd, New Delhi
4. Basic Electrical and Electronics Engineering by Kumar K M, Vikas Publication House Pvt Ltd, New Delhi
5. Basic Electronics and Linear Circuits by N N Bhargawa and S C Gupta, Tata McGraw-Hill Education Pvt Ltd, New Delhi
6. Principles of Electrical and Electronics Engineering by V.K. Mehta, S. Chand and Co, New Delhi

7. Basic Electronics by J B Gupta, S K Kataria and Sons, New Delhi
8. Basic Electronics- Problems and solutions by Albert Molvino and David J Bates, Tata McGraw-Hill Education Pvt Ltd, New Delhi

UNIT WISE TIME AND MARKS DISTRIBUTION

S No	Unit	Time Allotted (Hrs)	Marks Allotted (%)
1.	Overview of DC Circuits	08	12
2.	Electro Magnetic Induction	08	12
3.	Batteries	05	10
4.	AC Fundamentals	12	18
5.	Various Types of Power Plants	05	08
6.	Semiconductor Physics and Diode	13	20
7.	Bipolar Transistors	08	12
8	Unipolar Transistors	05	08
	Total	**64**	**100**

PROGRAM:THREE YEARS DIPLOMA PROGRAM IN COMPUTER ENGINEERING/IT	
Course Code: **ES206**	**Course Title**: **BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB**
Semester: 2nd	**Credits:** 1
Periods Per Week :2 (L: 0, T:0, P: 2)	

COURSE OBJECTIVE:

This subject is a lab course to be supplemented by theory subject and aims to develop proficiency and understanding of practical outcomes of the subject taught in theory.

LIST OF PRACTICALS

Measurement of resistance of an ammeter and a voltmeter .

1. Verification of Ohms law.
2. Verification of Kirchhoff's Current and Voltage Laws in a dc circuit
3. Charging and testing of a lead - acid storage battery.
4. Plotting of V-I characteristics of a PN junction diode
5. Observation of the wave shapes for the following rectifier circuit
    i. Half-wave rectifier
    ii. Full-wave rectifier
6. Observation of wave shape of full wave rectifier with
    i. Shunt capacitor filter
    ii. Series inductor filter
7. Plotting of input and output characteristics of transistors in CE and CB configuration.
8. Plotting of V-I characteristics of MOSFET/JFET.

PROGRAM : THREE YEARS DIPLOMA PROGRAM IN COMPUTER ENGINEERING/IT	
Course Code : **HS 211**	Course Title : **Communications and Inter Personal Skills**
Semester : **2ND**	Credits: **2**
Periods per week: **4(L: 0 T: 0 P: 4)**	

COURSE OBJECTIVE: Soft skills, unlike hard skills that are technical, tangible, measurable, quantifiable and assessable, are practical, imperceptible and subtle qualitative traits that determine the efficacy of human communication at professional and personal levels. While hard skills acquisition can be correlated with one's intelligence quotient (IQ), soft skills development are intricately linked with one's emotional quotient (EQ) and spiritual quotient (SQ). Hard skills can aid an individual secure a position, yet soft skills help the person retain it, achieve excellence and fulfil self-actualization needs. Using academic as well as popular books, the course offers soft skills by integrating them at personal, professional, interpersonal and management levels.

LIST OF PRACTICALS

1. Self Assessment with regard to Strengths and Weaknesses (SWOT Analysis). Practice different ways to develop Self Confidence
2. Collect the list of different habits, hobbies, aims and goals of your class mates and frame different reports and charts (bar graphs and histograms, pie charts).
3. Seminar and group discussions on Motivation, Goal Setting, Life and Career Planning, self confidence, Attitudes and Personality Types, Managing Time, leadership and team management.
4. Different observation on thinking Skills Correcting Common Errors in day to day conversation
5. Making short stories, news, pictures, reports, advertisement and videos, etc. and present them in effective way (English only)
6. Vocabulary building
7. Indexing, Footnotes and bibliographic procedure
8. Managing Stress and Maintaining Positive Outlook, Managing Health. Practice and prepare different ways and exercise.
9. Practice on Conducting Meetings, Writing Minutes, Sending Memos and Notices.
10. Practice decision-making on different problems on available options.
11. Develop Professional Skills (Communicating Clearly: Understanding and Overcoming barriers)
12. Speaking from observation and reading.
13. Greetings -Apologies, request, social and professional Etiquette-Telephone etiquettes, Email Etiquettes
14. Learning to Appreciate and Give Praise; Presenting Bad News
15. Humour, Jokes and Anecdotes in Effective Communication Comprehensions.

REFERENCES

1. Personality Development and Soft Skills, Barun k. Mitra, Oxford Press
2. Business Communication, Shalini Kalia, Shailja Agarwal, Wiley India
3. Cornerstone Developing Soft Skills, Sheffield, Pearson
4. Managing Soft Skills for Personality Development -edited by B.N Ghosh, McGraw Hill India
5.Soft Skills An Integrated Approach to Maximize Personality, Gajendra S.Chauchan, Sangeeta Sharma, Wiley In

CURRICULUM

FOR

SECOND SEMESTER

DIPLOMA

IN

ELECTRICAL ENGINEERING

SUBJECT STUDY SCHEME (2nd Semester: Electrical Engineering)

Course Code	Subjects	Time in Hours				CREDITS		
		Theory	Tutorial	Practical	Total	Theory	Practical	Total
BS201	Applied Mathematics-II	3	1	--------	4	4	--------	4
ES202	Introduction to Computers and Information Technology	---	---	4	4	----	2	2
EEPC201	Fundamental of Electrical Engineering	3	1	----	4	4	----	4
EEPC202	Fundamental of Electrical Engineering Lab	----	--------	2	2	---	1	1
EEPC203	Basic Electronics	3	--------	----	3	3	---	3
EEPC204	Basic Electronics Lab	-----	--------	2	2	----	1	1
EEPC205	Material Science	3		--------	3	3	--------	3
EEPC206	Electrical Workshop Practice – I	----------	--------	8	8	--------	4	4
	Total	**12**	**2**	**16**	**30**	**14**	**8**	**22**

PROGRAM: THREE YEAR DIPLOMA IN ENGINEERING AND TECHNOLOGY *	
Course Code: **BS201**	Course Title: **Applied Mathematics-II**
Semester: **2nd**	Credit: **4**
Periods Per Week: **4 (L: 03, T: 01, P: 0)**	

(* Common to Architecture Assistantship, Automobile, Civil, Civil(PHE), QSCM,Computer , Electrical , E&C,Medical Electronics, Food Technology, I&C,Leather Technology, Mechanical,Textile Technology, Wood Technology and IT)

COURSE OBJECTIVE:

This course is designed to develop an understanding of basic mathematical and statistical tools which include matrices, determinants, integral calculus and coordinate geometry and the applications of such tools in the field of engineering and technology

COURSE CONTENT

1. Integral Calculus

1.1 Integration as inverse operation of differentiation

1.2 Simple integration by substitution, by parts and by partial fractions (for Linear factors only)

1.3 Evaluation of definite integrals (simple problems)-

Evaluation of $\int_0^{\pi/2} \sin^n x\, dx$, $\int_0^{\pi/2} \cos^n x\, dx$, $\int_0^{\pi/2} \sin^m x \cos^n x\, dx$

Using formulae without proof (m and n being positive integers only)

2. Coordinate Geometry

1.1 Equation of straight line in various standard forms (without proof), intersection of two straight lines, angle between two lines. Parallel and perpendicular lines, perpendicular distance formula.

1.2 General equation of a circle and its characteristics. To find the equation of a circle, given: Centre and radius, three points lying on it and coordinates of end points of a diameter.

1.3 Definition of conics (Parabola, Ellipse, Hyperbola) their standard equations without proof. Basic problems on conics when their foci, directrices or vertices are given.

3. Matrices and Determinants

3.1 Definition of matrix and its types.

3.2 Addition, subtraction and multiplication of matrices.

3.3 Expansion of Determinants.

4. Statistics

4.1 Measures of Central Tendency: Mean, Median, Mode

4.2 Measures of Dispersion: Mean deviation, Standard deviation
4.3 Basic Concepts of Probability.

COURSE OUTCOME

After the completion of the course the student will be able to:

- evaluate both indefinite and definite integrals by various methods
- identify various points in a 2-D space along with formulation of equations and graphs for different types of lines, circles, ellipses, parabolas etc.
- find the sum, difference and product of two or more matrices,
- evaluate determinants and their relations to matrices
- find the mean, median, mode and other measures of central tendency.
- solve basic problems on probability.

RECOMMENDED BOOKS:

1. R.D Sharma, Applied Mathematics-II.
2. H.K Das, Applied Mathematics.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 40th Edition, 2007.
4. S.S. Sabharwal, Sunita Jain, Eagle Parkashan, Applied Mathematics, Vol. I & II, Jalandhar.
5. Comprehensive Mathematics, Vol. I & II by Laxmi Publications, Delhi.
6. Reena Garg & Chandrika Prasad, Advanced Engineering Mathematics, Khanna Publishing House, New Delhi
7. Applied Mathematics-II, Eagle Publications.

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	16	35
2	10	20
3	12	25
4	10	20
Total	**48**	**100**

PROGRAM THREE YEAR DIPLOMA IN ENGINEERING AND TECHNOLOGY	
Course Code: **ES202**	Course Title: **Introduction to Computers and Information Technology**
Semester:**2nd**	Credit: **2**
Periods Per Week: **4 (L: 0 T: 0 P: 4)**	

(* Common to Architecture Assistantship, Automobile, Civil, Civil(PHE), QSCM,Computer , Electrical , E&C,Medical Electronics, Food Technology, Garment Technology, I&C,Leather Technology, Mechanical, Textile Design, Textile Technology, Travel and Tourism, MLT, Wood Technology and IT)

COURSE OBJECTIVE

Information technology has great influence on all aspects of our life. Primary purpose of using computer is to make the life easier. 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 tools of MS Office/Open Office using internet etc. form the broad competency profile of diploma holders. This exposure will enable the students to enter their professions with confidence, live in a harmonious way and contribute to the productivity.

COURSE CONTENT

1. **Basics of Information Technology**
   - 1.1. Its concept and scope, applications of IT, ethics and future with information technology.
   - 1.2. Impact of computer and IT in society.
   - 1.3. Computer application in office, book publishing, data analysis, accounting, investment, inventory control, graphics, air and railway ticket reservation, robotics, military, banks, Insurance financial transactions and many more.

2. **Basic Components of Computer System**
   - 2.1. Block diagram of a computer System and Processing of Data.
   - 2.2. Demonstration of computer system viz., Hardware, Software
   - 2.3. Concept of Memory and its various types, Primary and secondary memories (RAM, ROM, Storage Devices etc).

3. **Internet and its Applications**
   - 3.1. Introduction to Internet, its basic working.
   - 3.2. Concept of Email, Social Media, Cloud Computing.
   - 3.3. Basic ideas about IP Address, DNS, URL, Server, Web Browser,LAN etc.

4. Use of Various Basic Data Processing Softwares

4.1. Word Processing (Microsoft Word & Google Docs.)

4.1.1. File Management:

4.1.1.1. Opening, creating and saving a document, locating files, copying contents in some different file(s).

4.1.2. Editing a document:

4.1.2.1. Entering text, Cut, copy, paste using tool- bars

4.1.3. Formatting a document:

4.1.3.1. Using different fonts, changing font size and color, changing the appearance through bold/ italic/ underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods

4.1.3.2. Aligning of text in a document, justification of document, Inserting bullets and numbering

4.1.3.3. Formatting paragraph, inserting page breaks and column breaks, line spacing

4.1.3.4. Use of headers, footers: Inserting footnote, end note, use of comments

4.1.3.5. Inserting date, time, special symbols, importing graphic images, drawing tools

4.1.4. Tables and Borders:

4.1.4.1. Creating a table,

4.1.4.2. Formatting cells,

4.1.4.3. Use of different border styles, shading in tables,

4.1.4.4. Merging of cells, partition of cells, inserting and deleting a row in a table

4.1.5. Print preview, zoom, page set up, printing options

4.1.6. Using Find, Replace options

4.2. Microsoft-Excel and Google Sheets

4.2.1. Introduction to Spreadsheet Application-Workbook and Worksheets

4.2.2. Working with data and formulas:

4.2.2.1. Addition, subtraction, division, multiplication, percentage and autosum.

4.2.2.2. Format data, create chart, printing chart, save worksheet, creating and formatting of charts and graphs

4.3. Presentation (Microsoft-PowerPoint and Google Slides)

4.3.1. Introduction to PowerPoint - How to start PowerPoint - Working environment: concept of toolbars, slide layout, templates etc. - Opening a new/existing presentation - Different views for viewing slides in a presentation: normal, slide sorter etc.

4.3.2. Addition, deletion and saving of slides.

4.3.3. Insertion of multimedia elements - Adding text boxes, importing pictures, movies and sound, tables and charts etc.

4.3.4. Formatting slides - Text formatting, changing slide layout, changing slide color scheme - Changing background, Applying design

template.

4.3.5. Viewing the presentation using slide navigator

COURSE OUTCOME

After the completion of the course the student will be able to:

- Identify the different hardware components and functional units of a Computer system.
- Explain basic concepts and working of internet.
- Create and format word documents by using different word processing software.
- Prepare the spread sheets and the presentation of data in different ways.
- Prepare power point presentations.

RECOMMENDED BOOKS:

1. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd-Jungpura, New Delhi
2. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
3. Fundamentals of Information Technology by Leon and Leon;Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
4. Basics of Information Technology, by Ishan Publications, Ambala
5. Information Technology for Management by Henery Lucas, 7th edition, Tata McGraw Hill Education Pvt Ltd, New Delhi

UNIT WISE TIME AND MARKSDISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	06	10
2	13	20
3	13	20
4	32	50
Total	**64**	**100**

PROGRAM : **THREE YEARS DIPLOMA PROGRAM IN ELECTRICAL ENGINEERING**	
Course code : **EEPC201**	Course Title: **Fundamentals of Electrical Engineering**
Semester : **2ND**	Credit :**4**
Periods per week:**4**	**L : 3 T : 1 P: 0**

COURSE OBJECTIVE:

To provide basic knowledge of the different elements and concepts of electrical engineering field and their applications to help students deal with electrical engineering principles and applications in industrial processes of different fields.

CONTENTS

1 BASIC CONCEPTS AND DC CIRCUITS (12 Hours)

1.1 Different forms of energy , Advantages & Applications of electrical energy

1.2 Basic concept of charge, current, voltage, resistance, power, energy and their units , Conversion of units of work, power and energy from one form to another

1.3 Active and passive components

1.4 Concept of current and voltage sources, constant voltage and current sources, their graphical representation & Conversion, Difference between actual voltage source and constant voltage source

1.5 Ohm's law, resistances in series and in parallel ,Kirchhoff's laws and their applications in solving electrical network problems

2 ELECTROMAGNETISM AND ELECTROMAGNETIC INDUCTION (12 Hours)

2.1. Introduction to electromagnetism, Magnetic field around a straight current carrying conductor and a solenoid. Methods to find its direction, force between two parallel current carrying conductors & Force on a current carrying conductor placed in the magnetic field.

2.2. Magnetic circuits, Magnetic flux, mmf, Reluctance, Permeance, comparison between magnetic circuits and electrical circuits, Series and parallel magnetic circuits, simple problems , Importance of Air Gap, Concept of Leakage Flux , B- H Curve ,Magnetic Hysteresis, Hysteresis loss, importance of hysteresis loop.

2.3. Basic concept of electromagnetic induction and Faraday's Laws of electromagnetic induction. Lenz's law, Fleming's Right and Left Hand Rule, Induced EMF and its types , Principle of self and mutually induced EMF, Coefficient of self and mutual induction and simple problems

,Inductances in series and in parallel , Energy stored in a magnetic field ,Concept of eddy currents, eddy current loss

3 ELECTROSTATICS (7 Hours)

3.1 Coulombs law, electric potential and electric potential difference, Electric field, electric field intensity, electric lines of force, electric flux
3.2 Capacitance, types of capacitors, capacitance of parallel plate capacitor, series and parallel combination of capacitors, Dielectric and its effect on capacitance, dielectric break down
3.3 Application of electrostatics in electrostatic precipitator

4 BATTERIES (12 Hours)

4.1 Basic idea about primary and secondary cells
4.2 Working principle, construction and applications of Lithium Ion, Lead acid, Nickel Cadmium and Silver Oxide Cells
4.3 Charging methods used for lead acid accumulator / Batteries ,Care and maintenance of a lead acid battery
4.4 Grouping of cells in series and parallel (simple numerical problems).
4.5 Testing of lead Acid battery for fully charged conditions and their specifications.
4.6 Advantages and disadvantages of Lithium Ion Batteries

5 AC FUNDAMENTALS (5 Hours)

5.1 Concept of alternating current and voltage, sinusoidal current and voltage
5.2 Concept of important terms such as Wave form, Instantaneous value ,cycle, Alternation ,Time period , Frequency, peak value , Average Value , Effective value etc and equations of instantaneous values, average value, r.m.s value, form factor, power factor etc
5.3 Difference between a.c and d.c and Advantages of AC over DC and vice versa

COURSE OUTCOMES

After the completion of this course, the student will be able to

- explain the basic terminology used in electricity like charge, current, voltage , resistance etc.
- solve basic problems related to Capacitors.
- express electric current as flow of charge.
- solve various electric circuits for current, voltage or resistance.
- list the effects of an electric current and its common applications.
- determine the energy consumed by an appliance.
- state the laws of electromagnetic induction and describe the effect on a current-carrying conductor when placed in a magnetic field.

- explain the concept of batteries , their construction and their applications.
- Describe the various concepts associated with AC and will be also able to distinguish it with DC.

RECOMMENDED BOOKS

1. Fundamentals of Electrical Engineering by Sahdev, Uneek Publication, Jalandhar
2. Basic Electrical Engineering by PS Dhogal, Tata McGraw Hill Education Pvt. Ltd., New Delhi
3. Electrical Science by VK Mehta, S Chand and Co., New Delhi
4. Electrical Engineering by DR Arora, Ishan Publications, Ambala
5. Electrical Technology by JB Gupta, SK Kataria and Sons, New Delhi
6. Electrical Technology by BL Theraja, S Chand & Co., New Delhi
7. Electrical Science by S. Chandhni, R Chakrabarti and PK Chattopadhyay. Narosa Publishing House Pvt. Ltd., New Delhi
8. Basic Electrical Engineering by Mool Singh, Galgotia Publication Pvt. Ltd., New Delhi
9. Principles of Electrical Engineering by BR Gupta, S Chand & Co., New Delhi
10. Handbook of Electrical Engineering by SL Bhatia, Khanna Publishers, New Delhi

UNIT WISE TIME AND MARKS DISTRIBUTION

UNIT	TIME (Hrs)	MARKS (%age)
1	12	25
2	12	25
3	07	15
4	12	25
5	05	10
TOTAL	**48**	**100**

PROGRAM : **THREE YEARS DIPLOMA PROGRAM IN ELECTRICAL ENGINEERING**	
Course code : **EEPC202**	Course Title: **Fundamentals of Electrical Engineering LAB**
Semester : **2ND**	Credit : **1**
Periods per week : **2**	**L : 0 T : 0 P: 2**

COURSE OBJECTIVE:
To provide basic knowledge of the different elements and concepts of electrical Engineering field and their applications practically to help students deal with electrical engineering principles and applications in industrial processes of different fields.

LIST OF PRACTICALS

1. Determination of voltage-current relationship in a dc circuit under specific physical conditions and to draw conclusions (to verify ohm's law)
2. Filament lamp Measure the resistance of a cold lamp filament with the help of calculations. Measure the current drawn by the lamp at different voltages from zero to 220 volts and the resistance of lamp at different voltages, plot a graph between current and voltage
3. a. Measurement of resistances using multimeter and their comparison with colour code values
   b. To verify that $R_t = R_1+R_2+\ldots$ where R_1, R_2 etc. are resistances connected in series
   c. To verify $\frac{1}{Rt} = \frac{1}{R_1} + \frac{1}{R_2} + \text{- - - - - - - } \frac{1}{R_m}$
   Where R_1, R_2 etc. are resistances connected in parallel
4. Verification of Kirchhoff's current and voltage laws applied to DC circuits
   a. To construct a circuit arrangement consisting of resistances in series, parallel and in combination
   b. Identification of node points in the circuit
   c. To see that algebraic sum of currents at node point is zero
   d. To see that algebraic sum of emfs and voltage drops in a closed loop is zero
5. To observe the a.c and d.c wave shapes on CRO
6. Conversion of Galvanometer into an Ammeter and voltmeter of given range.
7. To measure very low resistance and very high resistance using Wheat Stone bridge
8. To find the time constant of a capacitor
9. Study the charging and discharging characteristics of lead acid and lithium ion batteries.
10. Study the charging and discharging characteristics of battery management system.
11. To find ratio of inductance values of a coil having air /iron core respectively and to see the effect of introduction of a magnetic core on coil inductance

Note: The results should be verified analytically also.

PROGRAM : **THREE YEARS DIPLOMA PROGRAM IN ELECTRICAL ENGINEERING**	
Course code :**EEPC203**	Course Title: **Basic Electronics**
Semester : **2ND**	Credit : **3**
Periods per week : **3**	**L : 3 T : 0 P: 0**

COURSE OBJECTIVE:

To provide basic knowledge of the different elements and concepts of electronic engineering field and to learn basic concepts of various active and passive electronic components, Signals, Op-Amp and their applications, to help students deal with electronics engineering principles and applications in industrial processes of different fields.

COURSE CONTENTS

1. SEMICONDUCTOR DIODES (12Hours)

1.1 Concept of doping, Types of semiconductors and effect of temperature on semiconductors.

1.2 PN Junction, mechanism of current flow in PN junction, drift and diffusion currents, depletion layer, potential barrier, effect of forward and reverse biasing in a PN junction. Concept of junction capacitance in forward and reverse biased conditions. Breakdown mechanism

1.3 Ideal diode, Semiconductor diode characteristics, static and dynamic resistance

1.4 Use of diode as half wave and full wave rectifiers (centre tapped and bridge type), relation between DC output and AC input voltage,rectifier efficiency

1.5 Concept of ripples, filter circuits – shunt capacitor, series inductor, and pie (π) filters and their applications

1.6 Diode ratings/specifications

1.7 Various types of diodes such as zener diode, varactor diode, schottky diode, light emitting diode, tunnel diode, photo diode; & working characteristics and applications of Zener and LED Diode only.

1.8 Concept of Wave-shaping: R-C differentiating and integrating circuits, Diode clipping circuits , Diode clamping circuits & Applications of wave-shaping circuits.

2 Transistors (12Hours)

2.1 Concept of junction transistor, PNP and NPN transistors, their symbols and mechanism of current flowTransistor configurations: common base (CB), common emitter (CE) and common collector (CC) and their current relations comparison of the three configurations

2.2 Transistor biasing, its need, operating point, effect of temperature on the operating point of a transistor and need of stabilization of operating point. Different biasing circuits

2.3 Working of Single stage transistor amplifier circuit in CE configuration, physical and graphical explanation, phase reversal DC and AC load line

2.4 Multi Stage Transistor Amplifiers : Need , Different types of coupled two-stage amplifiers, Their circuit details, working, frequency response, applications, limitations voltage gain, current gain, power gain, frequency response, decibel gain and band width, Loading effect in multistage amplifiers

3 Audio Power Amplifier & Feedback in Amplifiers (10 Hours)

3.1 Difference between voltage and power amplifier, performance quantities in Power Amplifier, Classification of power amplifiers, collector efficiency, Impedance matching using transformer ,Heat sinks in power amplifiers

3.2 Circuit details, working and advantages of Push-pull amplifier and complementary symmetry push-pull amplifier (no mathematical derivations)

3.3 Feedback & its types , Voltage gain of an amplifier with negative feedback $A_{fb} = A / (1 + \beta A)$, Effect of negative feedback on voltage gain, stability, distortion, band width, output and input impedance of an amplifier (No mathematical derivation)

3.4 Typical feedback circuits, Effect of removing the emitter by-pass capacitor on a CE transistor amplifier, Emitter follower and its applications

4 SINUSOIDAL OSCILLATORS (5 Hours)

4.1 Sinusoidal Oscillators – positive feedback in amplifiers

4.2 Difference between an oscillator and an alternator

4.3 Essentials of an oscillator

4.4 Circuit details and working of Different oscillators viz. Tuned Collector, Hartley and Colpitt's oscillators

4.5 Introduction to piezoelectric crystal and crystal oscillator circuit

5 FIELD EFFECT TRANSISTOR (FET) (9 Hours)

5.1 Construction, operation, characteristics and applications of a JFET , JFET as an amplifier

5.2 Construction, working principle and applications of a MOSFET

5.3 Comparison between BJT, JFET and MOSFET

COURSE OUTCOMES

After completion of this course the student should be able to

- apply the knowledge of diodes in rectifiers, power adapters and various electronic circuits.
- apply the knowledge of semiconductors in various technical gadgets like mobile phones, computers ,LED, photocells, solar lights etc.
- apply the knowledge of transistors in amplifiers and Multistage amplifiers

- differentiate between voltage and power amplifiers.
- explain the advantages of feedback in amplifiers
- explain the applications of oscillators
- explain the working and applications of FET and MOSFET

RECOMMENDED BOOKS

1. Basic Electronics and Linear Circuit by NN Bhargava, Kulshreshta and SC Gupta, Tata McGraw Hill Education Pvt Ltd, New Delhi.
2. Electronic Principles by SK Sahdev, Dhanpat Rai & Co., New Delhi
3. Principles of Electrical and Electronics Engineering by VK Mehta; S Chand and Co., New Delhi
4. Electronic Components and Materials by SM Dhir, Tata McGraw Hill Publishing Company Pvt Ltd, New Delhi.
5. Principles of Electronics by SK Bhattacharya and RenuVig, SK Kataria and Sons, Delhi
6. Electronics Devices and Circuits by Millman and Halkias; McGraw Hill.
7. Principles of Electronics by Albert Paul Malvino; Tata McGraw Hill Education Pvt Ltd, New Delhi.
8. Basic Electronics – Problems and Solutions by Albert Malvino and David J. Bates; Tata McGraw Hill Education Pvt Ltd, New Delhi.
9. Basic Electronics by J.S. Katre, Sandeep Bajaj, Tech. Max. Publications, Pune.

UNIT WISE TIME AND MARKS DISTRIBUTION

UNIT	TIME(Hrs)	MARKS (%age)
1	12	25
2	12	25
3	10	20
4	5	10
5	9	20
TOTAL	**48**	**100**

PROGRAM : **THREE YEARS DIPLOMA PROGRAM IN ELECTRICAL ENGINEERING**	
Course code : **EEPC204**	Course Title: **Basic Electronics Lab**
Semester : **2ND**	Credit : **1**
Periods per week : **2**	**L : 0 T : 0 P: 2**

COURSE OBJECTIVE:

To provide basic knowledge of the different elements and concepts of electronic engineering field and to learn basic concepts of various active and passive electronic components, Signals, Op-Amp and their applications, to help students deal with electronics engineering principles and applications in industrial processes of different fields.

LIST OF PRACTICALS

1. Identification and testing of electronic components such as resistor, inductor, capacitor, diode, transistor and different types of switches used in Electronic circuits

2. V-I characteristics of a Semiconductor diode and to calculate its static and dynamic resistance
3. a) V-I characteristics of a Zener diode and finding its reverse breakdown voltage
   b) Fabrication of a Zener diode voltage stabilizer circuit using PCB
4. Observation of input and output wave shapes of a half-wave and full – wave rectifier and verification of relationship between dc output and ac input voltage
5. Observation of input and output wave shapes of a full wave rectifier with (i) shunt capacitor) (ii) series inductor (iii) Π filter circuits
6. Plotting input and output characteristics of a transistor in CB configuration and CE configuration
7. Measurement of operating point in case of (i) fixed biased circuit (ii) potential divider biasing circuit and to observe the effect of temperature variation on the operating point.
8. To study the effect of coupling capacitor on lower cut off frequency and upper cut off frequency by plotting frequency response curve of a two stage RC coupled amplifier
9. To observe the effect of negative current feedback on the voltage gain of a single stage transistor amplifier by removing emitter bye-pass capacitor.
10. To measure (a) voltage gain (b) input and output impedance for an emitter follower circuit
11. To measure frequency generation in (a) Hartley (b) R-C Phase Shift Oscillator
12. Clipping of both portion of sine-wave using:
    a. diode and dc source
    b. zener diodes Clamping a sine-wave to:
       i)Negative dc voltage ii) Positive dc voltage
13. To plot V-I characteristics of a FET

PROGRAM : **THREE YEARS DIPLOMA PROGRAM IN ELECTRICAL ENGINEERING**	
Course code : **EEPC205**	Course Title: **Material Science**
Semester : **2ND**	Credit :**3**
Periods per week :**3**	**L : 3 T : 0 P: 0**

COURSE OBJECTIVE:

A diploma holder in Electrical Engineering will be involved in maintenance, repair and production of electrical equipment and systems. In addition, he may be required to procure, inspect and test electrical and electronic engineering materials. Knowledge of various types of materials will be needed in order to execute the above mentioned functions. He may also have to decide for an alternative when a particular material is either not readily available in the market or its cost becomes prohibitive.

1. Classification (2 Hours)

Classification of materials into conducting, semi conducting and insulating materials through a brief reference to their atomic structure and energy bands, energy band structure of semiconductor , generation and recombination of electron hole pairs. Energy band structure of Silicon and Germanium , Silicon versus Germanium for mobility and conductivity

2. Conducting Materials (10 Hours)

2.1 Introduction
2.2 Resistance and factors affecting it such as alloying and temperature etc
2.3 Classification of conducting material as low resistivity and high resistivity materials
2.3.1 Low resistance materials

Copper:

General properties as conductor: Resistivity, temperature coefficient, density, mechanical properties of hard-drawn and annealed copper, corrosion, contact resistance. Application in the field of electrical engineering.

Aluminium:

General properties as conductor: Resistivity, temperaturecoefficient, density, Mechanical properties of hard and annealed aluminium, solderability, contact resistance. Applications of aluminium in the field of electrical engineering.

Steel:

General properties as conductor: Resistivity, corrosion, temperature coefficient, density, mechanical properties, solderability, Applications in the field of electrical engineering.
Bundle conductors and its applications.
Low resistivity copper alloys: Brass, Bronze (cadmium and

Beryllium), and their practical applications with reasons for the same
Applications of special metals e.g. Silver, Gold, Platinum etc.

2.3.2 High resistivity materials and their applications e.g., manganin, constantin, Nichrome, mercury, platinum, carbon and tungsten, Tantalum

2.4 Superconductors and their applications

3. INSULATING MATERIALS GENERAL PROPERTIES: (10 Hours)

3.1 Electrical Properties:
Volume resistivity, surface resistance, dielectric loss, dielectric strength (breakdown voltage) dielectric constant

3.2 Physical Properties:
Hygroscopicity, tensile and compressive strength, abrasive resistance, brittleness

3.3 Thermal Properties:
Heat resistance, classification according to permissible temperature rise. Effect of overloading on the life of an electrical appliance, increase in rating with the use of insulating materials having higher thermal stability, Thermal conductivity, Electro-thermal breakdown in solid dielectrics

3.4 Chemical Properties: Solubility, chemical resistance, weatherability

3.5 Mechanical properties , tensile structure

4. INSULATING MATERIALS AND THEIR APPLICATIONS: (7 Hours)

4.1 Plastics

- Definition and classification
- Thermosetting and Thermo-plastic material and their applications
- Procedure of preparation of plastic (PVC)

4.2 Natural insulating materials, properties and their applications

- Mica and Mica products
- Asbestos and asbestos products
- Ceramic materials (porcelain and steatite)
- Glass and glass products
- Cotton
- Silk
- Paper (dry and impregnated)
- Rubber, Bitumen
- Mineral and insulating oil for transformers switchgear capacitors, high voltage insulated cables, insulating varnishes for coating and impregnation

- Enamels for winding wires
- Glass fibre sleeves

4.3 Gaseous materials; Air, Hydrogen, Nitrogen, SF6 their properties and applications

5. MAGNETIC MATERIALS: (9 Hours)

5.1 Introduction - ferromagnetic materials, permeability, B-H curve, magnetic saturation, hysteresis loop including coercive force and residual magnetism, concept of eddy current and hysteresis loss, curie temperature, magnetostriction effect, method of reduction of eddy current loss and hysteresis loss.

5.2 Soft Magnetic Materials:

- Alloyed steels with silicon: High silicon, alloy steel for transformers, low silicon alloy steel for electric rotating machines
- Cold rolled grain oriented steels for transformer, Non-oriented steels for rotating machine
- Nickel-iron alloys
- Soft Ferrites

5.3 Hard magnetic materials

Tungsten steel, chrome steel, hard ferrites and cobalt steel, their applications

6. SPECIAL MATERIALS (10 Hours)

Thermocouple, bimetals, leads soldering and fuses material, mention their applications

Brief introduction to Various engineering materials necessary for fabrication of electrical machines such as motors, generators, transformers etc .

The teacher should bring different materials, electronic components and devices in the class while taking lectures and explain and make students familiar with them. Also he may give emphasis on practical applications of these devices and components in the field. In addition, the students should be given exercises on identification of materials used in various electronic gadgets etc .and be encouraged to do practical work independently and confidently.

COURSE OUTCOMES:

After completion of this course the students will be able to

- differentiate between conductors , semiconductors and insulators
- enumerate the Properties of different insulating and conducting Materials
- list the various applications of insulating materials
- list the Magnetic Materials and their applications

RECOMMENDED BOOKS

1 Electrical and Electronic Engineering Materials by SK Bhattacharya, Khanna Publishers, New Delhi

2 Electronic Components and Materials by Grover and Jamwal, Dhanpat Rai and Co., New Delhi
3. Electrical Engineering Materials by Sahdev, Uneek International Publications
4. Electronic Components and Materials by SM Dhir, Tata Mc Graw Hill, New Delhi
5. Electrical Engineering Materials by PL Kapoor, Khanna Publishers, New Delhi
6. Electrical and Electronics Engineering Materials BR Sharma and Others, Satya Parkashan, New Delhi
7. Electrical and Electronics Engineering Materials DR Arora, Ishan Publications, Ambala City
8. Electrical Engineering Materials by Rakesh Dogra, SK Kataria and Sons, NEW Delhi

UNIT WISE TIME AND MARKS DISTRIBUTION

UNIT	TIME(Hrs)	MARKS (%age)
1	02	5
2	10	20
3	10	20
4	7	15
5	9	20
6	10	20
TOTAL	**48**	**100**

PROGRAM : **THREE YEARS DIPLOMA PROGRAM IN ELECTRICAL ENGINEERING**	
Course code: EEPC206	Course Title: **Electrical Workshop Practice – I**
Semester: 2ND	Credit : 4
Periods per week **:8**	**L : 0 T : 0 P: 8**

COURSE OBJECTIVE::

An electrical diploma holder will be required to inspect, test and modify the work done by skilled workers working under him. In addition, many a times, it will become necessary for him to demonstrate the correct method and procedure of doing a job. In order to carry out this function effectively in addition to conceptual understanding of the method or procedure he must possess appropriate manual skills. The subject aims at developing special skills required for repairing, fault finding, wiring in electrical appliances and installations.

LIST OF PRACTICALS

1. Various Electrical Symbols used in Domestic and Industrial Installation and Power System as per BIS.
2. Study of electrical safety measures as mentioned in the Electricity Rules and shock treatment including first aid
3. Wire jointing
   Straight married joint , Technology-joint , Western union joint , Britania joint , Twist sleeve joint & Bolted type joint
4. Types of wiring and to make different light control circuits in the following types of wiring.
   i. Casing and capping (PVC) wiring
   ii. ii Conduit wiring (surface / concealed)
5. Filling and crimping of thimbles (using hydraulic and hand crimping tool)
6. Study of ISI standard for MCBs and Conduct one test on MCB on above basis
7. Construction /assembly of Distribution Board and Extension Board
   a. Wiring of main distribution board with four outgoing circuits for light and fan loads including main switch and fuses (only internal connection)
   b. Assembly of distribution board panel using MCB, main switch, change over switch, ELCB and RCCB
   c. Construction of an extension board with two 5A sockets and one I5A Socket controlled by their respective switches, a fuse and indicator with series test lamp provision.
8. Simple light and Alarm Circuits
   a. One lamp controlled by two switches (staircase circuit)
   b. Two lamps controlled by three switches (double staircase circuit)
   c. Two ordinary bells (for day and night) used at a distant residence
   d. Bell response circuit using one bell and one relay

e. Bell response circuit of an office (for three rooms)
f. Traffic light control system for two roads crossing.

9. Testing of domestic wiring installation using megger
10. Fault finding and repair of a LED lamp
11. Wiring and testing of alarm and indicating circuits using relay, push buttons and bells (simple single phase circuits)

RECOMMENDED BOOKS

1. A Text book of Electrical Workshop Practices By Dr. Umesh Rathore and Naresh Kumar Sharma Katson Publications
2. Electrical Workshop safety , Commissioning , Maintenance and testing of Electrical Equipment By R P Singh Wiley Publications
3. Electrical Workshop and wiring practice By D Jayachandra Falcon Publishers
4. Electrical Workshop A TEXT BOOK 2ND Edition by R P Singh I K International
5. Electrical Wiring an introduction 2ND Edition by Satheesh Kumar, Ane Book Pvt Ltd.

CURRICULUM

FOR

SECOND SEMESTER

DIPLOMA

IN

1. ELECTRONICS AND COMMUNICATION ENGINEERING
2. MEDICAL ELECTRONICS

SUBJECT STUDY SCHEME (2nd Sem: Electronics and Communication Engineering/Medical Electronics)

Course Code	Subjects	Time in Hours				CREDITS		
		Theory	Tutorial	Practical	Total	Theory	Practical	Total
BS201	Applied Mathematics-II	3	1	--------	4	4	--------	4
ES202	Introduction to Computers and Information Technology	---	---	4	4	----	2	2
EEPC201	Fundamentals of Electrical Engineering	3	1	---	4	4	---	4
EEPC202	Fundamentals of Electrical Engineering Lab	---	---	2	2	---	1	1
ECPC203	Fundamentals of Electronics	3	---	---	3	3	---	3
ECPC204	Fundamentals of Electronics Lab	---	---	2	2	---	1	1
ECPC205	Digital Electronics	3	--------	--------	3	3	--------	3
ECPC206	Digital Electronics Lab	--------	--------	2	2	--------	1	1
ECPC209	Electrical and Electronics Workshop-II	--------	--------	6	6	--------	3	3
	Total	**12**	**2**	**16**	**30**	**14**	**8**	**22**

PROGRAM: THREE YEAR DIPLOMA IN ENGINEERING AND TECHNOLOGY *	
Course Code: **BS201**	Course Title: **Applied Mathematics-II**
Semester: **2nd**	Credit: **4**
Periods Per Week: **4 (L: 03, T: 01, P: 0)**	

(* Common to Architecture Assistantship, Automobile, Civil, Civil(PHE), QSCM,Computer , Electrical , E&C,Medical Electronics, Food Technology, I&C,Leather Technology, Mechanical,Textile Technology, Wood Technology and IT)

COURSE OBJECTIVE:

This course is designed to develop an understanding of basic mathematical and statistical tools which include matrices, determinants, integral calculus and coordinate geometry and the applications of such tools in the field of engineering and technology

COURSE CONTENT

1. Integral Calculus

1.1 Integration as inverse operation of differentiation

1.2 Simple integration by substitution, by parts and by partial fractions (for Linear factors only)

1.3 Evaluation of definite integrals (simple problems)-

Evaluation of $\int_0^{\pi/2} \text{Sin}^n x.\, dx$, $\int_0^{\pi/2} \text{Cos}^n x\, dx$, $\int_0^{\pi/2} \text{Sin}^m x\ \text{Cos}^n x\, dx$

Using formulae without proof (m and n being positive integers only)

2. **Coordinate Geometry**

2.1 Equation of straight line in various standard forms (without proof), intersection of two straight lines, angle between two lines. Parallel and perpendicular lines, perpendicular distance formula.

2.2 General equation of a circle and its characteristics. To find the equation of a circle, given: Centre and radius, three points lying on it and coordinates of end points of a diameter.

2.3 Definition of conics (Parabola, Ellipse, Hyperbola) their standard equations without proof. Basic problems on conics when their foci, directrices or vertices are given.

3 Matrices and Determinants

3.1 Definition of matrix and its types.

3.2 Addition, subtraction and multiplication of matrices.

3.3 Expansion of Determinants.

4 Statistics

4.1 Measures of Central Tendency: Mean, Median, Mode

4.2 Measures of Dispersion: Mean deviation, Standard deviation

4.3 Basic Concepts of Probability.

COURSE OUTCOME

After the completion of the course the student will be able to:

- evaluate both indefinite and definite integrals by various methods
- identify various points in a 2-D space along with formulation of equations and graphs for different types of lines, circles, ellipses, parabolas etc.
- find the sum, difference and product of two or more matrices,
- evaluate determinants and their relations to matrices
- find the mean, median, mode and other measures of central tendency.
- solve basic problems on probability.

RECOMMENDED BOOKS:

1. R.D Sharma, Applied Mathematics-II.
2. H.K Das, Applied Mathematics.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 40th Edition, 2007.
4. S.S. Sabharwal, Sunita Jain, Eagle Parkashan, Applied Mathematics, Vol. I & II, Jalandhar.
5. Comprehensive Mathematics, Vol. I & II by Laxmi Publications, Delhi.
6. Reena Garg & Chandrika Prasad, Advanced Engineering Mathematics, Khanna Publishing House, New Delhi
7. Applied Mathematics-II, Eagle Publications.

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	16	35
2	10	20
3	12	25
4	10	20
Total	**48**	**100**

PROGRAM THREE YEAR DIPLOMA IN ENGINEERING AND TECHNOLOGY	
Course Code: **ES202**	Course Title: **Introduction to Computers and Information Technology**
Semester:**2nd**	Credit: **2**
Periods Per Week: **4 (L: 0 T: 0 P: 4)**	

(* Common to Architecture Assistantship, Automobile, Civil, Civil(PHE), QSCM,Computer , Electrical , E&C,Medical Electronics, Food Technology, Garment Technology, I&C,Leather Technology, Mechanical, Textile Design, Textile Technology, Travel and Tourism, MLT, Wood Technology and IT)

COURSE OBJECTIVE

Information technology has great influence on all aspects of our life. Primary purpose of using computer is to make the life easier. 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 tools of MS Office/Open Office using internet etc. form the broad competency profile of diploma holders. This exposure will enable the students to enter their professions with confidence, live in a harmonious way and contribute to the productivity.

COURSE CONTENT

1. **Basics of Information Technology**
   - 1.1. Its concept and scope, applications of IT, ethics and future with information technology.
   - 1.2. Impact of computer and IT in society.
   - 1.3. Computer application in office, book publishing, data analysis, accounting, investment, inventory control, graphics, air and railway ticket reservation, robotics, military, banks, Insurance financial transactions and many more.

2. **Basic Components of Computer System**
   - 2.1. Block diagram of a computer System and Processing of Data.
   - 2.2. Demonstration of computer system viz., Hardware, Software
   - 2.3. Concept of Memory and its various types, Primary and secondary memories (RAM, ROM, Storage Devices etc).

3. **Internet and its Applications**
   - 3.1. Introduction to Internet, its basic working.
   - 3.2. Concept of Email, Social Media, Cloud Computing.
   - 3.3. Basic ideas about IP Address, DNS, URL, Server, Web Browser, LAN etc.

4. Use of Various Basic Data Processing Softwares

4.1. Word Processing (Microsoft Word & Google Docs.)

4.1.1. File Management:

4.1.1.1. Opening, creating and saving a document, locating files, copying contents in some different file(s).

4.1.2. Editing a document:

4.1.2.1. Entering text, Cut, copy, paste using tool- bars

4.1.3. Formatting a document:

4.1.3.1. Using different fonts, changing font size and colour, changing the appearance through bold/ italic/ underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods

4.1.3.2. Aligning of text in a document, justification of document, Inserting bullets and numbering

4.1.3.3. Formatting paragraph, inserting page breaks and column breaks, line spacing

4.1.3.4. Use of headers, footers: Inserting footnote, end note, use of comments

4.1.3.5. Inserting date, time, special symbols, importing graphic images, drawing tools

4.1.4. Tables and Borders:

4.1.4.1. Creating a table,

4.1.4.2. Formatting cells,

4.1.4.3. Use of different border styles, shading in tables,

4.1.4.4. Merging of cells, partition of cells, inserting and deleting a row in a table

4.1.5. Print preview, zoom, page set up, printing options

4.1.6. Using Find, Replace options

4.2. Microsoft-Excel and Google Sheets

4.2.1. Introduction to Spreadsheet Application-Workbook and Worksheets

4.2.2. Working with data and formulas:

4.2.2.1. Addition, subtraction, division, multiplication, percentage and autosum.

4.2.2.2. Format data, create chart, printing chart, save worksheet, creating and formatting of charts and graphs

4.3. Presentation (Microsoft-PowerPoint and Google Slides)

4.3.1. Introduction to PowerPoint - How to start PowerPoint - Working environment: concept of toolbars, slide layout, templates etc. - Opening a new/existing presentation - Different views for viewing slides in a presentation: normal, slide sorter etc.

4.3.2. Addition, deletion and saving of slides.

4.3.3. Insertion of multimedia elements - Adding text boxes, importing pictures, movies and sound, tables and charts etc.

4.3.4. Formatting slides - Text formatting, changing slide layout, changing

slide color scheme - Changing background, Applying design template.

4.3.5. Viewing the presentation using slide navigator

COURSE OUTCOME

After the completion of the course the student will be able to:

- Identify the different hardware components and functional units of a Computer system.
- Explain basic concepts and working of internet.
- Create and format word documents by using different word processing software.
- Prepare the spread sheets and the presentation of data in different ways.
- Prepare power point presentations.

RECOMMENDED BOOKS:

1. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd-Jungpura, New Delhi
2. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
3. Fundamentals of Information Technology by Leon and Leon;Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
4. Basics of Information Technology, by Ishan Publications, Ambala
5. Information Technology for Management by Henery Lucas, 7th edition, Tata McGraw Hill Education Pvt Ltd, New Delhi

UNIT WISE TIME AND MARKSDISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	06	10
2	13	20
3	13	20
4	32	50
Total	**64**	**100**

PROGRAM : **THREE YEARS DIPLOMA PROGRAM IN ELECTRONICS AND COMMUNICATION ENGINEERING / MEDICAL ELECTRONICS**	
Course code :**EEPC201**	Course Title: **Fundamentals of Electrical Engineering**
Semester : **2ND**	Credit : **4**
Periods per week: **4**	**L : 03 T : 01 P: 00**

COURSE OBJECTIVE:

To provide basic knowledge of the different elements and concepts of electrical engineering field and their applications to help students deal with electrical engineering principles and applications in industrial processes of different fields.

CONTENTS

1. BASIC CONCEPTS AND DC CIRCUITS

1.1 Different forms of energy, Advantages & Applications of electrical energy

1.2 Basic concept of charge, current, voltage, resistance, power, energy and their units, Conversion of units of work, power and energy from one form to another

1.3 Active and passive components

1.4 Concept of current and voltage sources, constant voltage and current sources, their graphical representation & Conversion, Difference between actual voltage source and constant voltage source

1.5 Ohm's law, resistances in series and in parallel, Kirchhoff's laws and their applications in solving electrical network problems

2. ELECTROMAGNETISM AND ELECTROMAGNETIC INDUCTION

2.1 Introduction to electromagnetism, Magnetic field around a straight current carrying conductor and a solenoid. Methods to find its direction, force between two parallel current carrying conductors & Force on a current carrying conductor placed in the magnetic field.

2.2 Magnetic circuits, Magnetic flux, mmf, Reluctance, Permeance, comparison between magnetic circuits and electrical circuits, Series and parallel magnetic circuits, simple problems , Importance of Air Gap, Concept of Leakage Flux , B- H Curve ,Magnetic Hysteresis, Hysteresis loss, importance of hysteresis loop.

2.3 Basic concept of electromagnetic induction and Faraday's Laws of electromagnetic induction. Lenz's law, Fleming's Right and Left Hand Rule, Induced EMF and its types , Principle of self and mutually induced EMF, Coefficient of self and mutual induction and simple problems ,Inductances in series and in parallel , Energy stored in a magnetic field ,Concept of eddy currents, eddy current loss

3. ELECTROSTATICS

3.1 Coulombs law, electric potential and electric potential difference, Electric field, electric field intensity, electric lines of force, electric flux

3.2 Capacitance, types of capacitors, capacitance of parallel plate capacitor, series and parallel combination of capacitors, Dielectric and its effect on capacitance, dielectric break down

3.3 Application of electrostatics in electrostatic precipitator

4. BATTERIES

4.1 Basic idea about primary and secondary cells

4.2 Working principle, construction and applications of Lithium Ion, Lead acid, Nickel Cadmium and Silver Oxide Cells

4.3 Charging methods used for lead acid accumulator / Batteries ,Care and maintenance of a lead acid battery

4.4 Grouping of cells in series and parallel (simple numerical problems).

4.5 Testing of lead Acid battery for fully charged conditions and their specifications.

4.6 Advantages and disadvantages of Lithium Ion Batteries

5. AC FUNDAMENTALS

5.1 Concept of alternating current and voltage, sinusoidal current and voltage

5.2 Concept of important terms such as Wave form, Instantaneous value ,cycle, Alternation ,Time period , Frequency, peak value , Average Value , Effective value etc and equations of instantaneous values, average value, r.m.s value, form factor, power factor etc

5.3 Difference between a.c and d.c and Advantages of AC over DC and vice versa

COURSE OUTCOMES

After the completion of this course, the student will be able to

- explain the basic terminology used in electricity like charge, current, voltage , resistance etc.
- solve basic problems related to Capacitors.
- express electric current as flow of charge.
- solve various electric circuits for current, voltage or resistance.
- list the effects of an electric current and its common applications.
- determine the energy consumed by an appliance.
- state the laws of electromagnetic induction and describe the effect on a current-carrying conductor when placed in a magnetic field.
- explain the concept of batteries , their construction and their applications.
- Describe the various concepts associated with AC and will be also able to distinguish it with DC.

RECOMMENDED BOOKS

1. Fundamentals of Electrical Engineering by Sahdev, Uneek Publication, Jalandhar
2. Basic Electrical Engineering by PS Dhogal, Tata McGraw Hill Education Pvt. Ltd., New Delhi
3. Electrical Science by VK Mehta, S Chand and Co., New Delhi
4. Electrical Engineering by DR Arora, Ishan Publications, Ambala
5. Electrical Technology by JB Gupta, SK Kataria and Sons, New Delhi
6. Electrical Technology by BL Theraja, S Chand & Co., New Delhi
7. Electrical Science by S. Chandhni, R Chakrabarti and PK Chattopadhyay. Narosa Publishing House Pvt. Ltd., New Delhi
8. Basic Electrical Engineering by Mool Singh, Galgotia Publication Pvt. Ltd., New Delhi
9. Principles of Electrical Engineering by BR Gupta, S Chand & Co., New Delhi
10. Handbook of Electrical Engineering by SL Bhatia, Khanna Publishers, New Delhi

UNIT WISE TIME AND MARKS DISTRIBUTION

UNIT	TIME (Hrs)	MARKS (%age)
1	12	25
2	12	25
3	7	15
4	12	25
5	5	10
TOTAL	**48**	**100**

PROGRAM : **THREE YEARS DIPLOMA PROGRAM IN ELECTRONICS AND COMMUNICATION ENGINEERING/ MEDICAL ELECTRONICS**	
Course code : **ECPC202**	Course Title: **Fundamentals of Electrical Engineering LAB**
Semester : **2ND**	Credit : **1**
Periods per week : **2**	**L : 0 T : 0 P: 2**

COURSE OBJECTIVE:

To provide basic knowledge of the different elements and concepts of electrical Engineering field and their applications practically to help students deal with electrical engineering principles and applications in industrial processes of different fields.

LIST OF PRACTICALS

1. Determination of voltage-current relationship in a dc circuit under specific physical conditions and to draw conclusions (to verify ohm's law)
2. Filament lamp Measure the resistance of a cold lamp filament with the help of calculations. Measure the current drawn by the lamp at different voltages from zero to 220 volts and the resistance of lamp at different voltages, plot a graph between current and voltage
3. a. Measurement of resistances using multimeter and their comparison with colour code values
   b. To verify that $R_t = R_1+R_2+\ldots$ where R_1, R_2 etc. are resistances connected in series
   c. To verify $\frac{1}{R_t} = \frac{1}{R_1} + \frac{1}{R_2} + \cdots + \frac{1}{R_m}$
   Where R_1, R_2 etc. are resistances connected in parallel
4. Verification of Kirchhoff's current and voltage laws applied to DC circuits
   a. To construct a circuit arrangement consisting of resistances in series, parallel and in combination
   b. Identification of node points in the circuit
   c. To see that algebraic sum of currents at node point is zero
   d. To see that algebraic sum of emfs and voltage drops in a closed loop is zero
5. To observe the a.c and d.c wave shapes on CRO
6. Conversion of Galvanometer into an Ammeter and voltmeter of given range.
7. To measure very low resistance and very high resistance using Wheat Stone bridge
8. To find the time constant of a capacitor
9. Study the charging and discharging characteristics of lead acid and lithium ion batteries.
10. Study the charging and discharging characteristics of battery management system.
11. To find ratio of inductance values of a coil having air /iron core respectively and to see the effect of introduction of a magnetic core on coil inductance

PROGRAM: **THREE YEARS DIPLOMA PROGRAMME IN 1.ELECTRONICS AND COMMUNICATION ENGINEERING 2. MEDICAL ELECTRONICS**	
Course Code**: ECPC203**	Course Title**: Fundamentals of Electronics**
Semester: **2nd**	Credits**: 3**
Periods Per Week **:3 (L: 3, T:0, P: 0)**	

COURSE OBJECTIVES: The course aims at introducing the basic concept of electronics which forms the building block of the world of electronics, communication, computer and information technologies.

CONTENTS

1. Semi conductor physics (08 hrs)

   1.1 Review of basic atomic structure and energy levels, concept of insulators, conductors and semi conductors and their energy level diagram, atomic structure of Germanium (Ge) and Silicon (Si) and their formation of covalent bonds.
   1.2 Concept of intrinsic and extrinsic semi conductor,Majority and minority carriers, process of doping.
   1.3 P and N type semiconductors and their conductivity, effect of temperature on conductivity of intrinsic semi conductors.

2. Semi conductor diode: (08 hrs)

   2.1 PN junction diode, mechanism of current flow in PN junction, forward and reverse biased PN junction, potential barrier, drift and diffusion currents, depletion layer, concept of junction capacitance in forward and reverse biased condition.
   2.2 V-I characteristics, static and dynamic resistance of a diode and their value calculation from the characteristics.
   2.3 Application of diode as half-wave, full wave and bridge rectifiers. Peak Inverse Voltage(PIV) rating, rectification efficiencies and ripple factor , shunt capacitor filter, series inductor filter, LC and Pie filter.

3. Special diodes (04 Hrs)

   3.1 Zener diodes and its working, Zener and avalanche breakdown.
   3.2 Application of Zener Diode as voltage Regulator
   3.3 Introduction to Photo diode ,LED,Schottkey diode, varactor diode, PIN diode.

4. Bipolar-transistors: (10 hrs)

4.1 Concept of a bipolar transistor, its structure, PNP and NPN transistors, their symbols and mechanism of current flow; Current relations in a transistor; concept of leakage current

4.2 CB, CE, CC configurations of a transistor; Input and output characteristics in CB ,CE,CC configurations; input and output dynamic resistance in CB and CE configurations; Current amplification factors. Comparison of CB, CE and CC Configurations

5. Transistor Biasing Circuits (06hrs)

5.1 Concept of transistor biasing and selection of operating point.

5.2 Need for stabilization of operating point.

5.3 Different types of biasing circuits.

6. Unipolar Transistors (06 hrs)

6.1 Construction, operation and characteristics of MOSFET/JFET and their applications.

6.2 Brief introduction of CMOS and its application.

7. Single stage transistor amplifier: (06 hrs)

7.1 Single stage transistor amplifier circuit.

7.2 Explanation of phase reversal of output voltage with respect to input voltage.

COURSE OUTCOMES

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

- Identify and able to understand physics behind various types of materials.
- Describe the VI characteristics of PN junction diode and Zener diode.
- Fabricate half wave, full wave and bridge rectifier and observe waveforms of each
- Draw input and output characteristics of transistor in CB and CE mode
- Measure voltage gain, input and output impedance in a single state CE amplifier circuit.
- Analyze the characteristics of FET and MOSFET.

RECOMMENDED BOOKS

1. Kulshreshta and SC Gupta, "Basic Electronics and Linear Circuit" byTata McGraw Hill Education Pvt Ltd., New Delhi.
2. VK Mehta, "Principles of Electrical and Electronics Engineering" by S Chand and Co., New Delhi
3. Robert Boylestad,LouisNashelsky,"Electronic Devices and Circuit Theory",Pearson Education.
4. Albert Paul Malvino, "Principles of Electronics" by Tata McGraw Hill Education Pvt Ltd., New Delhi.
5. Albert Malvino and David J. Bates, "Basic Electronics – Problems and Solutions" by Tata McGraw Hill Publishing Company Pvt Ltd, New Delhi.
6. J.S. Katre, Sandeep Bajaj, "Basic Electronics" by Tech. Max. Publications, Pune.
7. SK Sahdev, "Electronic Principles" by Dhanpat Rai& Co., New Delhi

UNIT WISE TIME AND MARKS DISTRIBUTION

Sr No	Unit Name	Time Allotted (Hrs)	Marks Allotted (%)
1.	Semiconductor Physics	08	20
2.	Semiconductor Diode	08	20
3	Special Diodes	04	10
4.	Bipolar Transistors	10	20
5.	Transistor biasing circuits	06	10
6.	Unipolar Transistors	06	10
7.	Sigle stage amplifiers	06	10
	Total	**48**	**100**

PROGRAM: **THREE YEARS DIPLOMA PROGRAMME IN 1.ELECTRONICS AND COMMUNICATION ENGINEERING 2. MEDICAL ELECTRONICS**	
Course Code**: ECPC204**	Course Title**: Fundamentals of Electronics Lab**
Semester: **2nd**	Credits**: 1**
Periods Per Week **:2 (L: 0, T:0, P: 2)**	

COURSE OBJECTIVES:

This subject is a lab course to be supplemented by theory subject and aims to develop proficiency and understanding of practical outcomes of the subjects treated in theory.

LIST OF PRACTICALS

1. Plotting of V-I characteristics of a PN junction diode
2. Plotting of V-I characteristics of a Zener diode
3. Fabrication of Half-wave rectifier circuit on breadboard and observe the output
4. Fabrication of Full-wave rectifier circuit on breadboard and observe the output
5. Plotting of the wave shape of full wave rectifier with
    a. Shunt capacitor filter
    b. Series inductor filter
6. Plotting of input and output characteristics and calculation of parameters of transistors in CE configuration.
7. Plotting of input and output characteristics and calculation of parameters of transistors in CB configuration.
8. Measurement of voltage gain, input and output impedance in a single stage CE amplifier circuit.
9. Plotting of V-I characteristics of JFET.

PROGRAM: **THREE YEARS DIPLOMA PROGRAMME IN** **1. ELECTRONICS AND COMMUNICATION ENGINEERING** **2. MEDICAL ELECTRONICS**	
Course Code**: ECPC205**	Course Title**: DIGITAL ELECTRONICS**
Semester**: 2nd**	Credits**: 3**
Periods Per Week **:3 (L: 3, T:0, P: 0)**	

COURSE OBJECTIVE: The course aims at introducing the concept of Digital Electronics which forms the foundation to the digital world of today's era. This subject aims to give a background in the broad field of digital systems design and microprocessors.

COURSE CONTENT

1. Introduction
   a) Comparison between analog and digital signal.
   b) Applications and advantages of digital signals

2. Number System and Codes
   a) Binary, octal and hexadecimal number system: conversion from Octal, Decimal and hexadecimal to binary and vice-versa.
   b) Binary addition, subtraction, multiplication and division including binary points. 1's and 2's complement method of addition/subtraction
   c) Concept of code, weighted and non-weighted codes, examples of 8421, BCD, excess-3 and Gray code.

3. Logic Gates
   a) Concept of negative and positive logic
   b) Definition, symbols and truth tables of NOT, AND, OR, NAND, NOR, EXOR Gates, NAND and NOR as universal gates.
4. Logic Simplification
   a) Postulates of Boolean algebra, De Morgan's Theorems. Various identities. Formulation of truth table and Boolean equation for simple problem. Implementation of Boolean (logic) equation with gates
   b) Karnaugh map (upto 4 variables) and simple application in developing combinational logic circuits
5. Arithmetic circuits
   a) Half adder and Full adder circuit, design and implementation.
   b) Half and Full subtractor circuit, design and implementation.
   c) 4 bit adder/subtracter.
   d) Adder and Subtractor IC (7484)
6. Encoders and Decoders, Multiplexer and De-Multiplexers
   a) Encoders and decoders – their types and block/circuit diagram explanation of each type.
   b) Multiplexers and De-Multiplexers- their types and block/circuit diagram explanation of each type
   c) Different types and ICs.

7. Latches and flip flops
   a) Concept and types of latch with their working and applications
   b) Operation using waveforms and truth tables of RS, T, D, Master/Slave JK flip flops.
   c) Difference between a latch and a flip flop
   d) Flip flop ICs
8. Counters
   a) Introduction to Asynchronous and Synchronous counters
   b) Decade counter.
   c) Up/down counter
   d) Counter ICs
9. Introduction to Shift Registers

COURSE OUTCOME

After completion of the course the student will be able to

- understand the fundamental concepts of Digital Electronics
- derive basic logic gates and universal gates and illustrate realization of Boolean expression
- design adder and subtractor circuits using logic gates
- design and test combinational and sequential logic circuits

RECOMMENDEDBOOKS.

1. Digital Electronics by Thomas Floyd.
2. Digital Electronics and Applications by Malvino Leach, Tata McGraw Hill Education Pvt Ltd, New Delhi
3. Digital Logic Designs by Morris Mano, Prentice Hall of India, New Delhi
4. Digital Electronics by RP Jain, Tata McGraw Hill Education Pvt Ltd, New Delhi
5. Digital Electronics by KS Jamwal, DhanpatRai and Co., New Delhi
6. Digital Electronics by BR Gupta, DhanpatRai& Co., New Delhi

UNIT WISE TIME AND MARKS DISTRIBUTION

Unit No	Topic	Time (hrs)	Marks (%age)
1.	Introduction	02	05
2.	Number System & Codes	05	10
3	Logic Gates	05	10
4	Logic Simplification	07	15
5	Arithmetic Circuits	08	20
6	Encoders and Decoders, Multiplexers and Demultiplexers	08	15
7	Latches and Flip flops	05	10
8	Counters	05	10
9	Introduction to Shift Registers	03	05
	Total	**48**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN 1.ELECTRONICS AND COMMUNICATION ENGINEERING 2. MEDICAL ELECTRONICS	
Course Code: **ECPC206**	Course Title: **DIGITAL ELECTRONICS LAB**
Semester: **2nd**	Credits: **1**
Periods Per Week :**2 (L: 0, T:0, P: 2)**	

COURSE OBJECTIVE:

This course is a lab course related to the theory subject of Digital Electronics.

LIST OF PRACTICALS

1. Verification and interpretation of truth tables for AND, OR, NOT NAND, NOR and Exclusive OR (EXOR) and Exclusive NOR(EXNOR) gates
2. Realization of logic functions with the help of NAND or NOR gates
3. To design a half adder using XOR and NAND gates and verification of its operation & Construction of a full adder circuit using XOR and NAND gates and verify its operation
4. 4 bit adder, 2's complement subtractor circuit using an 4 bit adder IC and an XOR IC and verify the operation of the circuit.
5. To design a NOR Gate Latch and verification of its operation
6 Verification of truth table for positive edge triggered, negative edge triggered, level triggered IC flip-flops (At least one IC each of D latch, D flip-flop, JK flip-flops).
7. Verification of truth table for encoder and decoder ICs, Mux and DeMux ICs.
8. To design a decade counter and verify its operation.

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN 1.ELECTRONICS AND COMMUNICATION ENGINEERING 2. MEDICAL ELECTRONICS	
COURSE CODE: **ECPC209**	COURSE TITLE: **ELECTRICAL AND ELECTRONIC WORKSHOP - II**
SEMESTER: **2ND**	CREDITS: **3**
PERIODS PER WEEK :**6 (L: 0, T:0, P: 6)**	

COURSE OBJECTIVE:

The students will be required to inspect, test and modify the work done by skilled workers working under him. In addition, many a times, it will become necessary for them to demonstrate the correct method and procedure of doing a job. In order to carry out this function effectively in addition to conceptual understanding of the method or procedure he must possess appropriate manual skills. The subject aims at developing special skills required for repairing, fault finding, wiring in electrical appliances and installations and besides working at the lower levels like PCB/breadboards etc.

COURSE CONTENTS

1. **Electric Shop – II**

1.1. Estimating and costing of power connection.

1.1.1. **Job I**: Connecting single-phase energy meter and testing it.

1.1.2. **Job II**: Checking continuity of connection (with tester and series lamp) location of faults with a multimeter) and their rectification in simple machines and/or other electric circuits fitted with earthing.

1.2. Demonstration of dismantling, servicing and reassembling

1.2.1. **Job III**: a table fan/ceiling fan

1.2.2. Job IV: electric iron, Electric heater etc.

1.3. Testing

1.3.1. **Job V**: Testing Single phase/three phase electrical motor by using voltmeters, ammeter, clip on meter, tachometer etc.

1.3.2. **Job VI**: Reversing the rotation of a motor.

2. Electronic Shop- II

2.1. PCB soldering/ De-soldering Techniques

2.1.1. **Job VII**: Demonstrate the jointing methods on general purpose PCB boards mounting and dismantling of various components

2.2. Application and Use of Measuring and Test Equipment

2.2.1. **Job VIII:** Identification of active and passive components. Use of Multimeter in testing of active and passive components.

2.2.2. **Job IX**: Single beam simple CRO, Single Generator and function-Generator, function of energy knob on the front panel.

2.2.3. **Job X:** Regulated power supply-fixed and variable voltage, single output as well as dual output.

2.3. Identification and familiarization with active and passive components

2.3.1. **Job XI:** Color code and types of resistor, capacitors and potentiometers (including VDR, LDR, and thermistor). Identification of components including LED, LCD, UJT, FET, Coils, relays, read relays, transformers, Linear and Digital ICs, Thyristors, etc. Exposure to modern soldering and de-soldering processes

2.4. Field visits to relevant work-places

CURRICULUM

FOR

SECOND SEMESTER

DIPLOMA IN

FOOD TECHNOLOGY

SUBJECT STUDY SCHEME (2nd Semester: Food Technology)

Course Code	Subjects	TIME IN HOURS				CREDITS		
		Theory	Tutorial	Practical	Total	Theory	Practical	Total
BS201	Applied Mathematics-II	3	1	--------	4	4	--------	4
ES202	Introduction to Computers and Information Technology	---	---	4	4	----	2	2
HS203	Language & Communication Skills – II	3	--------	---	3	3	---	3
HS204	Language & Communication Skills – II Lab	---	--------	2	2	---	1	1
FTPC201	Basic Microbiology	3	--------	---	3	3	---	3
FTPC202	Basic Microbiology Lab	---	--------	2	2	---	1	1
FTPC203	Technology of Fruit and Vegetables	3	--------	----	3	3	---	3
FTPC204	Technology of Fruit and Vegetables Lab	----	--------	2	2	---	1	1
FTPC205	Food Chemistry & Nutrition	2	--------	---	2	2	---	2
FTPC206	Food Chemistry & Nutrition Lab	---	--------	4	4	---	2	2
	Total	14	1	14	29*	15	7	22

* Note: The remaining 1 hour in a week shall be utilized for sports and other activities like debates, seminar etc.

PROGRAM: THREE YEAR DIPLOMA IN ENGINEERING AND TECHNOLOGY *	
Course Code: **BS201**	Course Title: **Applied Mathematics-II**
Semester: **2nd**	Credit: **4**
Periods Per Week: **4 (L: 03, T: 01, P: 0)**	

(* Common to Architecture Assistantship, Automobile, Civil, Civil(PHE), QSCM,Computer , Electrical , E&C,Medical Electronics, Food Technology, I&C,Leather Technology, Mechanical,Textile Technology, Wood Technology and IT)

COURSE OBJECTIVE:

This course is designed to develop an understanding of basic mathematical and statistical tools which include matrices, determinants, integral calculus and coordinate geometry and the applications of such tools in the field of engineering and technology

COURSE CONTENT

1. Integral Calculus

1.1 Integration as inverse operation of differentiation

1.2 Simple integration by substitution, by parts and by partial fractions (for Linear factors only)

1.3 Evaluation of definite integrals (simple problems)-

Evaluation of $\int_0^{\pi/2} \sin^n x\, dx$, $\int_0^{\pi/2} \cos^n x\, dx$, $\int_0^{\pi/2} \sin^m x \cos^n x\, dx$

Using formulae without proof (m and n being positive integers only)

2. **Coordinate Geometry**

2.1 Equation of straight line in various standard forms (without proof), intersection of two straight lines, angle between two lines. Parallel and perpendicular lines, perpendicular distance formula.

2.2 General equation of a circle and its characteristics. To find the equation of a circle, given: Centre and radius, three points lying on it and coordinates of end points of a diameter.

2.3 Definition of conics (Parabola, Ellipse, Hyperbola) their standard equations without proof. Basic problems on conics when their foci, directrices or vertices are given.

3 Matrices and Determinants

3.1 Definition of matrix and its types.

3.2 Addition, subtraction and multiplication of matrices.

3.3 Expansion of Determinants.

4 Statistics

4.1 Measures of Central Tendency: Mean, Median, Mode

4.2 Measures of Dispersion: Mean deviation, Standard deviation
4.3 Basic Concepts of Probability.

COURSE OUTCOME

After the completion of the course the student will be able to:

- evaluate both indefinite and definite integrals by various methods
- identify various points in a 2-D space along with formulation of equations and graphs for different types of lines, circles, ellipses, parabolas etc.
- find the sum, difference and product of two or more matrices,
- evaluate determinants and their relations to matrices
- find the mean, median, mode and other measures of central tendency.
- solve basic problems on probability.

RECOMMENDED BOOKS:

1. R.D Sharma, Applied Mathematics-II.
2. H.K Das, Applied Mathematics.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 40th Edition, 2007.
4. S.S. Sabharwal, Sunita Jain, Eagle Parkashan, Applied Mathematics, Vol. I & II, Jalandhar.
5. Comprehensive Mathematics, Vol. I & II by Laxmi Publications, Delhi.
6. Reena Garg & Chandrika Prasad, Advanced Engineering Mathematics, Khanna Publishing House, New Delhi
7. Applied Mathematics-II, Eagle Publications.

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	16	35
2	10	20
3	12	25
4	10	20
Total	**48**	**100**

PROGRAM THREE YEAR DIPLOMA IN ENGINEERING AND TECHNOLOGY	
Course Code: **ES202**	Course Title: **Introduction to Computers and Information Technology**
Semester:**2nd**	Credit: **2**
Periods Per Week: **4 (L: 0 T: 0 P: 4)**	

(* Common to Architecture Assistantship, Automobile, Civil, Civil(PHE), QSCM,Computer , Electrical , E&C,Medical Electronics, Food Technology, Garment Technology, I&C,Leather Technology, Mechanical, Textile Design, Textile Technology, Travel and Tourism, MLT, Wood Technology and IT)

COURSE OBJECTIVE

Information technology has great influence on all aspects of our life. Primary purpose of using computer is to make the life easier. 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 tools of MS Office/Open Office using internet etc. form the broad competency profile of diploma holders. This exposure will enable the students to enter their professions with confidence, live in a harmonious way and contribute to the productivity.

COURSE CONTENT

1. **Basics of Information Technology**
   - 1.1. Its concept and scope, applications of IT, ethics and future with information technology.
   - 1.2. Impact of computer and IT in society.
   - 1.3. Computer application in office, book publishing, data analysis, accounting, investment, inventory control, graphics, air and railway ticket reservation, robotics, military, banks, Insurance financial transactions and many more.

2. **Basic Components of Computer System**
   - 2.1. Block diagram of a computer System and Processing of Data.
   - 2.2. Demonstration of computer system viz., Hardware, Software
   - 2.3. Concept of Memory and its various types, Primary and secondary memories (RAM, ROM, Storage Devices etc).

3. **Internet and its Applications**
   - 3.1. Introduction to Internet, its basic working.
   - 3.2. Concept of Email, Social Media, Cloud Computing.
   - 3.3. Basic ideas about IP Address, DNS, URL, Server, Web Browser, LAN etc.

4. Use of Various Basic Data Processing Softwares

4.1. Word Processing (Microsoft Word & Google Docs.)

4.1.1. File Management:

4.1.1.1. Opening, creating and saving a document, locating files, copying contents in some different file(s).

4.1.2. Editing a document:

4.1.2.1. Entering text, Cut, copy, paste using tool- bars

4.1.3. Formatting a document:

4.1.3.1. Using different fonts, changing font size and colour, changing the appearance through bold/ italic/ underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods

4.1.3.2. Aligning of text in a document, justification of document, Inserting bullets and numbering

4.1.3.3. Formatting paragraph, inserting page breaks and column breaks, line spacing

4.1.3.4. Use of headers, footers: Inserting footnote, end note, use of comments

4.1.3.5. Inserting date, time, special symbols, importing graphic images, drawing tools

4.1.4. Tables and Borders:

4.1.4.1. Creating a table,

4.1.4.2. Formatting cells,

4.1.4.3. Use of different border styles, shading in tables,

4.1.4.4. Merging of cells, partition of cells, inserting and deleting a row in a table

4.1.5. Print preview, zoom, page set up, printing options

4.1.6. Using Find, Replace options

4.2. Microsoft-Excel and Google Sheets

4.2.1. Introduction to Spreadsheet Application-Workbook and Worksheets

4.2.2. Working with data and formulas:

4.2.2.1. Addition, subtraction, division, multiplication, percentage and autosum.

4.2.2.2. Format data, create chart, printing chart, save worksheet, creating and formatting of charts and graphs

4.3. Presentation (Microsoft-PowerPoint and Google Slides)

4.3.1. Introduction to PowerPoint - How to start PowerPoint - Working environment: concept of toolbars, slide layout, templates etc. - Opening a new/existing presentation - Different views for viewing slides in a presentation: normal, slide sorter etc.

4.3.2. Addition, deletion and saving of slides.

4.3.3. Insertion of multimedia elements - Adding text boxes, importing

pictures, movies and sound, tables and charts etc.

4.3.4. Formatting slides - Text formatting, changing slide layout, changing slide color scheme - Changing background, Applying design template.

4.3.5. Viewing the presentation using slide navigator

COURSE OUTCOME

After the completion of the course the student will be able to:

- Identify the different hardware components and functional units of a Computer system.
- Explain basic concepts and working of internet.
- Create and format word documents by using different word processing software.
- Prepare the spread sheets and the presentation of data in different ways.
- Prepare power point presentations.

RECOMMENDED BOOKS:

1. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd-Jungpura, New Delhi
2. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
3. Fundamentals of Information Technology by Leon and Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
4. Basics of Information Technology, by Ishan Publications, Ambala
5. Information Technology for Management by Henery Lucas, 7th edition, Tata McGraw Hill Education Pvt Ltd, New Delhi

UNIT WISE TIME AND MARKSDISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	06	10
2	13	20
3	13	20
4	32	50
Total	**64**	**100**

PROGRAM THREE YEAR DIPLOMA IN FOOD TECHNOLOGY	
Course Code **: HS203**	Course Title**: Language & Communication Skills – II**
Semester**: 2ND**	Credits**: 03**
Periods per Week**: 3 (L: 3 T: 0 P:0)**	

COURSE OBJECTIVE:

The objective of this course is to develop effective communication skills and also to inculcate soft skills among the students in professional and inter-personal communications facilitating their all-round development of personality. At the end of the course, the student will be able to develop comprehension skills, Professional etiquettes; improve vocabulary; use proper grammar; acquire writing skills and explore various aspects of soft skills.

COURSE CONTENT

Unit 1: Short stories and Poetry (08hrs)

1.1 Section A: - Short Stories
- Three Questions : Leo Tolstoy
- The last leaf : O Henry

1.2. Section B:-Poems
- The Psalm of life : H.W. Longfellow
- Say Not Struggle Naught Availeth : A.H. Clough

Unit 2: Essentials of Grammar (10hrs)

2.1. Basics of grammar (Parts of speech)
2.2. Subject -Verb Agreement
2.3. Tenses
2.4. Voice (Active and Passive)
2.5. One word substitution
2.6. Correct /Incorrect sentences

Unit 3. Techniques of Writing. (10hrs)

3.1. Comprehension of an Unseen Passage
3.2. Paragraph Writing
3.3. Circulars
3.4. Memos

Unit 4: Soft Skills (12hrs)

4.1. Intrapersonal and Interpersonal skills - Meaning and Importance.

4.2. Self-Management Skills

- Goal setting- Meaning, Importance, types and ways to achieve goals.
- Time Management- Meaning, benefits and strategies to improve time management.
- Self-motivation -Meaning and Importance.
- Stress management -.Meaning, Causes and Techniques of stress management.
- Positive Thinking
- Problem-solving- Meaning, Steps and importance.
- Decision Making - Meaning, process/stages and Importance of decision making

4.3. Team work and Leadership skills -Concept of Teams; Building effective teams; Concept of Leadership and honing Leadership skills.

Unit 5: Etiquettes (08hrs)

5.1. Etiquettes - Meaning, Types and Importance

5.2. Professional etiquettes- ABC (Appearance, Behavior, Communication) of Professional Etiquettes, Importance of Professional etiquettes.

- Office Etiquette - Meaning, Importance and Tips.
- Meeting etiquettes - Meaning, Importance and Tips.
- Telephone etiquettes.

COURSE OUTCOME

After the completion of the course the student will be able to:

Unit 1:

- Read, analyze, and interpret works of literature.
- Make themselves proficient in literary contexts.
- Learn different words in the text which in turn will enhance their language (Vocabulary).

Unit 2:

- Identify the different parts of speech and their usage in the sentence.
- Know about the application of various grammatical items like Subject-Verb Agreement, Tenses, and Voice etc.
- Enrich his/her vocabulary and enhance grammar accuracy.

Unit 3:

- Comprehend the passage and able to answer the linked questions.
- Plan, organize and present ideas coherently on a given topic.
- Compose circulars and memos which in turn will enhance their writing skill.

Unit 4:

- Set goals, manage time and stress, solve problems and organize oneself effectively.
- Know about self-motivation and its importance.
- be a team player and know how to develop leadership skills.

Unit 5:

- Demonstrate personal and professional etiquettes.

RECOMMENDED BOOKS:

1. Kulbhushan Kumar," Effective Communication Skills", Khanna Publishing House, New Delhi (Revised Edition 2018)
2. M. Ashraf Rizvi,"Effective Technical Communication". Mc-Graw Hill: Delhi, 2002.
3. Sanjay Kumar and PushpLata, "Communication Skills "Oxford University Press, 2011
4. Meenakshi Raman &Sangeeta Sharma, "Technical Communication: Principle and Practice". New Delhi:OUP, 2011.
5. Francis Peter S.J.,"Soft Skills and Professional Communication"
6. K.R. Lakshminarayana& T. Murugavel, "Managing Soft Skills", Scitech Publications. 2009
7. NK Aggarwal and FT Wood, "English Grammar, Composition and Usage".Macmillan Publishers India Ltd; New Delhi.
8. Dr. Alex, "Soft skills"
9. Gopalaswamy Ramesh and MahadevanRamesh,"The Ace of Soft Skills: Attitude, Communication and Etiquette for Success". Pearson

UNIT WISE TIME AND MARKS DISTRIBUTION

UNIT	TIME (Hrs)	MARKS (%age)
1	08	20
2	10	20
3	10	20
4	12	25
5	08	15
TOTAL	**48**	**100**

PROGRAM THREE YEAR DIPLOMA IN FOOD TECHNOLOGY	
Course Code **:HS204**	Course Title**: Language & Communication Skills – II Lab**
Semester**: 2nd**	Credits**: 01**
Periods per Week**: 2 (L: 0 T: 0 P:2)**	

COURSE OBJECTIVE:

Language is the most commonly used medium of self-expression in all spheres of human life personal, social and professional. A student must have a fair knowledge of English language and skills to communicate effectively to handle the future jobs in industry. The objective of this course is to develop effective communication skills and also to inculcate soft skills among the students in professional and inter-personal communications facilitating their all-round development of personality. At the end of the course, the student will be able to develop comprehension skills, Professional etiquettes; improve vocabulary; use proper grammar; acquire writing skills and explore various aspects of soft skills. It is expected that each polytechnic will establish a communication skill laboratory for conducting practicals mentioned in the curriculum.

LIST OF PRACTICALS:

1. Ice breaking Activity and JAM session
2. Developing conversational ability - Describing yourself, describing objects around you, Describing People.
3. Situational Dialogues- Role Play- Expressions in various situations- Self introduction and introducing others- Greetings- Taking Leave - Apologies- Requests etc.
4. Listening with Comprehension-Listening to recorded lectures, poems, interviews, speeches, documentaries etc. - Taking notes while listening
5. Professional etiquettes- Netiquette, Telephone Etiquette, Introduction and first impression, Business meeting etiquette, Dressing and Dinning Etiquette.
6. Reading articles from newspaper, magazines, journals etc.
7. Public speaking - Extempore and Impromptu Speech
8. Grammar - Words often misspelt - confused/ misused; Common errors in pronunciation; Idiomatic expressions.
9. Professional Skills- Drafting Job Application Letter, CV/ Resume; Interview skills.
10. Demonstrating the do's and don'ts of facing the interview.

PROGRAM: THREE YEAR DIPLOMA IN FOOD TECHNOLOGY	
Course Code: **FTPC201**	Course Title: **BASIC MICROBIOLOGY**
Semester:**2nd**	Credit: **3**
Periods Per Week: **3 (L: 3 T: 0 P: 0)**	

COURSE OBJECTIVE

The main objectives of this subject are to develop knowledge and skills in the students in the following major areas:

a). The nature of micro-organisms found in food
b). Techniques to assess the growth of micro-organisms
c). Nature of useful micro-organisms
d). Techniques to identify the micro-organisms

The basic knowledge and skills about these aspects are essential to understand others subject areas and for the application of microbiological considerations required in the food preservation and processing technology.

COURSE CONTENTS:

1. Introduction (20hrs)

1.1. Classification of living system: Whittaker's five Kingdom concepts.
1.2. Definition of Microbiology.
1.3. Historical Developments in Microbiology.
1.4. Classification of microorganisms (Unicellular, Multicellular, Prokaryotes, Eukaryotes).
1.5. Cell and cell organelles (including ribosome's, mitochondria, endoplasmic reticulum, vacuoles etc.) – their functions

2. Pure culture: (15hrs)

2.1. Streak plating, pour plating, spread plating, serial dilution technique.

3. Microbial Growth: (12hrs)

3.1. Growth curve and its different phases, factors affecting microbial growth.

4. Bacteria: (20hrs)

4.1. Structure size and shape.
4.2. Types depending upon different requirements.
4.3. Gram positive and negative bacteria.
4.4. Mode of reproduction.

5. **Fungi: (13hrs)**

5.1. Yeast and moulds- Structure: their growth requirements,
5.2. Mode of reproduction, its importance

COURSE OUTCOMES

After the completion of the course the student will be able to:

Unit 1:

- Comprehend & Analyze the concept of cell & its organelles and the living systems

Unit 2:

- Learn the concept of various plating & preservation techniques of microbial cultures

Unit 3:

- Gain knowledge of microbial growth along with its phases

Unit 4:

- Comprehend & Analyze the complete bacterial cell structure and various types of bacteria

Unit 5:

- Determine the structure, growth & reproduction of fungi & its types.

Note: -

Teachers should make use of charts and other appropriate media to support classroom instruction. Emphasis during the practical session should be on performance by individual students and teacher should develop instructional manual for various exercises to facilitate the students. Visits to some of the local industries and quality control canters may be arranged to demonstrate various aspects of basic microbiology to the students. Experts may be invited to deliver lectures on latest developments in the field.

RECOMMENDED BOOKS:

1. Essentials of Microbiology by K.S. Bilgrami, CBS
2. Food Microbiology by W.C. Frazier: Tata McGraw Hill
3. Modern Food Microbiology by James M. Jay; CBS
4. Bacteriology by Salle
5. Basic Food Microbiology; Bannett Chapmen and Hall
6. Standard Methods for Waste Water Analysis – American Public Health Association (APHA)

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	12	25
2	09	19
3	07	15
4	12	25
5	08	16
Total	**48**	**100**

PROGRAM: THREE YEAR DIPLOMA IN FOOD TECHNOLOGY	
Course Code: **FTPC202**	Course Title: **BASIC MICROBIOLOGY LAB**
Semester: **2nd**	Credit: **1**
Periods Per Week: **2 (L: 0 T: 0 P: 2)**	

COURSE OBJECTIVE

The main objectives of this subject are to develop knowledge and skills in the students in the following major areas:

a). The nature of micro-organisms found in food
b). Techniques to assess the growth of micro-organisms
c). Nature of useful micro-organisms
d). Techniques to identify the micro-organisms

The basic knowledge and skills about these aspects are essential to understand others subject areas and for the application of microbiological considerations required in the food preservation and processing technology.

LIST OF PRACTICALS:-

1. Study of microscope
2. Study of bacteria, yeast &moulds under Microscope.
3. Size determination of microorganisms under microscope
4. Media preparation for fungi & bacteria
5. Preparation of glass wares for sterilization
6. Methods of sterilization-dry heat and moist heat
7. Enumeration of bacteria in the media by pour plating, spread plating and streaking techniques
8. Gram staining of bacteria

PROGRAM THREE YEAR DIPLOMA IN FOOD TECHNOLOGY	
Course Code: **FTPC203**	Course Title: **TECHNOLOGY OF FRUIT AND VEGETABLES**
Semester:**2nd**	Credit: **3**
Periods Per Week: **3 (L: 3 T: 0 P: 0)**	

COURSE OBJECTIVE:

This subject is aimed to develop an understanding in processing techniques and skills in handling equipment/machines used for preservation and value addition of perishables like fruits and vegetables

COURSE CONTENTS:

Unit 1: Introduction: (02hrs)
- Status and scope of fruits and vegetables industry in India.
- Classification, composition and nutritive value of fruits and vegetables

Unit 2: Preparatory Operations and Related Equipment: (04hrs)
- Cleaning, sorting, grading, peeling and blanching methods

Unit 3: Ingredients and processes for the manufacture (10hrs)
- Jam, jellies, marmalade, preserves
- Pickles and chutneys
- Defects and factors affecting the quality of above

Unit 4: Tomato Products: (10hrs)
- Ingredients and their role,
- Process for the manufacture of tomato ketchup, sauce, puree and paste.

Unit 5: Juices: (10hrs)
- Raw materials, extraction, classification, processing and aseptic packaging

Unit 6: Thermal processing of fruits and vegetables (05hrs)
- Definition , various techniques of thermal processing and their effects on the quality of fruits and vegetable products,
- Types of containers and their selection , spoilage of canned foods

Unit 7: Dehydration of Fruits & Vegetables (04hrs)
- Dehydration of Fruits: equipment and process for dehydration of plums, apricot, apple, fig, grapes peach etc:
- Dehydration of Vegetables: equipment and process for dehydration of peas, cauliflower, potato, methi, mushroom, tomato etc . Dehydration of different fruits.
- Osmo-dehydration – basic concept.

Unit 8: Freezing : (03hrs)

- Freezing process of different fruits and vegetables. Changes during freezing.

INSTRUCTIONAL STRATEGY:

This being one of the most important subjects, teacher should lay emphasis on developing basic understanding of various concepts and principles and procedures involved herein. Suitable tutorial exercises may be designed by the teachers, which require students visit to various industries. Students may also be exposed to various National and international standards. Visits to the relevant industry for demonstrating various operations involved in fruits and vegetables processing, is a must. Experts from the industry may be invited to deliver lectures on the latest technology. Knowledge about pollution control and devices for the same may be provided to the students. Wherever relevant, students may be made aware about safety aspects.

COURSE OUTCOMES

After the completion of the course the student will be able to:

- Explain the classification and composition of fruits and vegetables
- Analyze the Unit operations of fruit and vegetable technology
- Prepare & analyze the manufacturing process of fruit and vegetables products
- Prepare & analyze the Manufacturing process of Tomato products
- Prepare & analyze the Manufacturing process of various Juices
- Determine thermal techniques and their effect on fruit and vegetable products.
- Determine the procedure of Dehydration of fruits and vegetables
- Determine the Freezing process of fruits and vegetables.

RECOMMENDED BOOKS

1. Fruits and Vegetable Preservation by Girdhari Lal and Sidappa; ICAR (New Delhi)
2. Preservation of Fruits and Vegetable by Srivastava; IBD Co., Lucknow
3. Preservation of Fruits and Vegetable by VijayaKhader; Kalyani Publication
4. Post Harvest Technology of Fruits and Vegetables – Handling, Processing, Fermentation and Waste Management by LR Verma and VK Joshi
5. Processing Fruits: Science & Technology vol 1-2 by Somogyi
6. Processing Vegetables: Science & Technology vol 1-2 by Somogyi
7. The Technology of Food Preservation by Desrosier
8. Food Science by Potter
9. Food Science by Mudambi

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	02	05
2	04	09
3	10	19
4	10	19
5	10	19
6	05	12
7	04	09
8	03	08
Total	**48**	**100**

PROGRAM THREE YEAR DIPLOMA IN FOOD TECHNOLOGY	
Course Code: **FTPC204**	Course Title: **TECHNOLOGY OF FRUIT AND VEGETABLES LAB**
Semester:**2nd**	Credit: **1**
Periods Per Week: **2 (L: 0 T: 0 P: 2)**	

COURSE OBJECTIVE:

This subject is aimed to develop an understanding in processing techniques and skills in handling equipment/machines used for preservation and value addition of perishables like fruits and vegetables

LIST OF PRACTICALS:

1. Preparation of Jam, jelly and preserve
2. Preparation of pickle by various methods
3. Preparation of chutney
4. Extraction of tomato juice by hot and cold break methods
5. Preparation of tomato sauce/ketchup
6. Preparation of tomato puree/paste
7. Extraction of juice by various methods
8. Bottling and processing of fruit juice
9. Preparation of syrup and brine solutions
10. Dehydration of peas, potatoes
11. Dehydration of grapes and apples
12. Freezing of peas
13. Visits to different fruit and vegetable processing industries

PROGRAM: THREE YEAR DIPLOMA IN FOOD TECHNOLOGY	
Course Code: **FTPC205**	Course Title: **FOOD CHEMESTRY & NUTRITION**
Semester:**2ND**	Credit: **2**
Periods Per Week: **2 (L: 2 T: 0 P: 0)**	

COURSE OBJECTIVE:

Diploma holders in food technology are required to test the food products in the laboratories and should have theoretical as well as practical understanding of food chemistry and nutrition, which relates to different aspects of food chemistry and nutrients such as water, carbohydrates, fats, protein, minerals, vitamins, food pigments, enzymes etc. Hence the subject is included for developing these competencies.

COURSE CONTENT:

Unit 1: FOOD AND FOOD GROUPS: (03hrs)
Definition and functions of food. Introduction to food groups. Scope of food chemistry.

Unit 2: Water : (03hrs)
Structure of water molecule, types and properties of water, water activity and its importance

Unit 3: Carbohydrates: (05hrs)
Basic composition, classification, sources and importance.

Unit 4: Proteins : (04hrs)
Basic composition, classification, sources and importance.

Unit 5: Fats: (05hrs)
Basic composition, classification, sources and importance.

Unit 6: Minerals & Vitamins: (04hrs)
Functions and sources of minerals-calcium, iodine, zinc, iron.
Functions and sources of fat soluble and water soluble vitamins

Unit 7: Food Pigments: (04hrs)
Importance and plant sources of pigments (Chlorophyll, Anthocyanin, carotenoids, lycopene)

Unit 8: Enzymes: (04hrs)
Definitions, mode of action, importance sources and classification

COURSE OUTCOMES

After the completion of the course the student will be able to:

- Explain the importance and scope of food chemistry
- Determine the concept of water and water activity
- Analyze & examine the concept of carbohydrates, structure and importance of carbohydrates
- Analyze & examine the concept, structure and importance of proteins
- Analyze & examine the concept, structure and importance of Fats
- Analyze & examine the concept of minerals and Vitamins
- Analyze & Examine the concept of Food Pigments.
- Analyze & Examine the concept of Enzymes

INSTRUCTIONAL STRATEGY:-

This is one of the basic subjects for the diploma holders in food technology. Teacher should design appropriate tutorial exercises for the students. Students may be given sufficient practice on different experiments, individually, under the guidance of teacher. Teachers may also prepare charts and slides. Student may be taken to industry for showing different tests.

RECOMMENDED BOOKS:

1. Essentials of Food and Nutrition by Swaminathan Vol. I and II, Health Kalyani publishers, New Delhi
2. Food Chemistry by LH Meyer, Van Nostrand Reinhold Co. New York ...
3. Hand book of Analysis of Fruits and Vegetables by S. Ranganna, Tata Me GrawHill. Publishing Company, New Delhi
4. Biochemistry by Mohinder Singh, Sejwal Publisher. New Delhi
5. Introduction to Biochemistry by Braverman, Elsevier Scientific Publishing
6. Food Chemistry by Linhinger, CBS Publishers, Delhi ...
7. Food Chemistry by FANNEMA,

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	03	09
2	03	11
3	05	16
4	04	11
5	05	16
6	04	13
7	04	11
8	04	13
TOTAL	**32**	**100**

PROGRAM: THREE YEAR DIPLOMA IN FOOD TECHNOLOGY	
Course Code: **FTPC206**	Course Title: **FOOD CHEMESTRY & NUTRITION LAB**
Semester:**2ND**	Credit: **2**
Periods Per Week: **4 (L: 0 T: 0 P: 4)**	

COURSE OBJECTIVE:

Diploma holders in food technology are required to test the food products in the laboratories and should have theoretical as well as practical understanding of food chemistry and nutrition, which relates to different aspects of food chemistry and nutrients such as water, carbohydrates, fats, protein, minerals, vitamins, food pigments, enzymes etc. Hence the subject is included for developing these competencies.

LIST OF PRACTICALS:

1. Determination of moisture in a given food sample.
2. Determination of protein in a given food sample.
3. Determination of carbohydrates in a given food sample.
4. Determination of ash in a given food sample.
5. Determination of crude fat in a given food sample.
6. Determination of pH of a given sample.
7. Determination of acidity of given food sample/beverage.
8. Determination of total non reducing and reducing sugars
9. Identification of pigments in a given food sample
10. Visit to hospital/slide show on various nutritional deficiency disorder

CURRICULUM

FOR

SECOND SEMESTER

DIPLOMA IN

GARMENT TECHNOLOGY

SUBJECT STUDY SCHEME (2nd Sem: Garment Technology)

Course Code	Subjects	Time in Hours				CREDITS		
		Theory	Tutorial	Practical	Total	Theory	Practical	Total
HS203	Language and Communication Skills-II	3	--------	---	3	3	---	3
HS204	Language and Communication Skills-II Lab	----	--------	2	2	---	1	1
GTPC201	Textile Science-II	3	--------	---	3	3	---	3
GTPC202	Textile Science-II Lab	---	--------	2	2	----	1	1
ES202	Introduction to Computers and Information Technology	---	---	4	4	----	2	2
GTPC203	Basic Pattern Making and Style Interpretation-II	3	--------	---	3	3	---	3
GTPC204	Basic Pattern Making and Style Interpretation-II Lab	---	--------	4	4	---	2	2
GTPC205	Fashion Illustration-II	--------	1	2	3	--------	2	2
GTPC206	Garment Construction-II	--------	1	4	5	--------	3	3
BS204	Environmental Science	2	--	--	2	2	--	2
	Total	12	2	18	31*	11	11	22

Note: - The extra one hour should be managed by putting one extra working hour for during one day among the days in a week.

PROGRAM: THREE YEARS DIPLOMA PROGRAM IN GARMENT TECHNOLOGY	
Course Code **: HS203**	Course Title**: Language& Communication Skills – II**
Semester**: 2nd**	Credits**: 03**
Periods per Week**: 3 (L: 3 T: 0 P:0)**	

COURSE OBJECTIVE:

The objective of this course is to develop effective communication skills and also to inculcate soft skills among the students in professional and inter-personal communications facilitating their all-round development of personality. At the end of the course, the student will be able to develop comprehension skills, Professional etiquettes; improve vocabulary; use proper grammar; acquire writing skills and explore various aspects of soft skills.

COURSE CONTENT

Unit 1: Short stories and Poetry (08hrs)

1.1 Section A: - Short Stories
- Three Questions : Leo Tolstoy
- The last leaf : O Henry

1.2. Section B:-Poems
- The Psalm of life : H.W. Longfellow
- Say Not Struggle Naught Availeth : A.H. Clough

Unit 2: Essentials of Grammar (10hrs)

2.1. Basics of grammar (Parts of speech)
2.2. Subject -Verb Agreement
2.3. Tenses
2.4. Voice (Active and Passive)
2.5. One word substitution
2.6. Correct /Incorrect sentences

Unit 3. Techniques of Writing. (10hrs)

3.1. Comprehension of an Unseen Passage
3.2. Paragraph Writing
3.3. Circulars
3.4. Memos

Unit 4: Soft Skills (12hrs)

4.1. Intrapersonal and Interpersonal skills - Meaning and Importance.
4.2. Self-Management Skills

- Goal setting- Meaning, Importance, types and ways to achieve goals.
- Time Management- Meaning, benefits and strategies to improve time management.
- Self-motivation -Meaning and Importance.
- Stress management -.Meaning, Causes and Techniques of stress management.
- Positive Thinking
- Problem-solving- Meaning, Steps and importance.
- Decision Making - Meaning, process/stages and Importance of decision making

4.3. Team work and Leadership skills -Concept of Teams; Building effective teams; Concept of Leadership and honing Leadership skills.

Unit 5: Etiquettes (08hrs)

5.1. Etiquettes - Meaning, Types and Importance

5.2. Professional etiquettes- ABC (Appearance, Behavior, Communication) of Professional Etiquettes, Importance of Professional etiquettes.

- Office Etiquette - Meaning, Importance and Tips.
- Meeting etiquettes - Meaning, Importance and Tips.
- Telephone etiquettes.

COURSE OUTCOME

After the completion of the course the student will be able to:

Unit 1:

- Read, analyze, and interpret works of literature.
- Make themselves proficient in literary contexts.
- Learn different words in the text which in turn will enhance their language (Vocabulary).

Unit 2:

- Identify the different parts of speech and their usage in the sentence.
- Know about the application of various grammatical items like Subject-Verb Agreement, Tenses, and Voice etc.
- Enrich his/her vocabulary and enhance grammar accuracy.

Unit 3:

- Comprehend the passage and able to answer the linked questions.
- Plan, organize and present ideas coherently on a given topic.
- Compose circulars and memos which in turn will enhance their writing skill.

Unit 4:

- Set goals, manage time and stress, solve problems and organize oneself effectively.
- Know about self-motivation and its importance.
- be a team player and know how to develop leadership skills.

Unit 5:

- Demonstrate personal and professional etiquettes.

RECOMMENDED BOOKS:

1. Kulbhushan Kumar," Effective Communication Skills", Khanna Publishing House, New Delhi (Revised Edition 2018)
2. M. Ashraf Rizvi,"Effective Technical Communication". Mc-Graw Hill: Delhi, 2002.
3. Sanjay Kumar and PushpLata, "Communication Skills "Oxford University Press, 2011
4. Meenakshi Raman &Sangeeta Sharma, "Technical Communication: Principle and Practice". New Delhi:OUP, 2011.
5. Francis Peter S.J.,"Soft Skills and Professional Communication"
6. K.R. Lakshminarayana & T. Murugavel, "Managing Soft Skills", Scitech Publications. 2009
7. NK Aggarwal and FT Wood, "English Grammar, Composition and Usage".Macmillan Publishers India Ltd; New Delhi.
8. Dr. Alex, "Soft skills"
9. Gopalaswamy Ramesh and Mahadevan Ramesh,"The Ace of Soft Skills: Attitude, Communication and Etiquette for Success". Pearson

UNIT WISE TIME AND MARKS DISTRIBUTION

UNIT	TIME (Hrs)	MARKS (%age)
1	08	20
2	10	20
3	10	20
4	12	25
5	08	15
TOTAL	**48**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAM IN GARMENT TECHNOLOGY	
Course Code : HS204	**Course Title: Language & Communication Skills – II Lab**
Semester: 2nd	**Credits: 01**
Periods per Week: 2 (L: 0 T: 0 P:2)	

COURSE OBJECTIVE:

Language is the most commonly used medium of self-expression in all spheres of human life personal, social and professional. A student must have a fair knowledge of English language and skills to communicate effectively to handle the future jobs in industry. The objective of this course is to develop effective communication skills and also to inculcate soft skills among the students in professional and inter-personal communications facilitating their all-round development of personality. At the end of the course, the student will be able to develop comprehension skills, Professional etiquettes; improve vocabulary; use proper grammar; acquire writing skills and explore various aspects of soft skills. It is expected that each polytechnic will establish a communication skill laboratory for conducting practical's mentioned in the curriculum.

LIST OF PRACTICALS:

1. Ice breaking Activity and JAM session
2. Developing conversational ability - Describing yourself, Describing objects around you, Describing People.
3. Situational Dialogues- Role Play- Expressions in various situations- Self introduction and introducing others- Greetings- Taking Leave - Apologies- Requests etc.
4. Listening with Comprehension-Listening to recorded lectures, poems, interviews, speeches, documentaries etc. - Taking notes while listening
5. Professional etiquettes- Netiquette, Telephone Etiquette, Introduction and first impression, Business meeting etiquette, Dressing and Dinning Etiquette.
6. Reading articles from newspaper, magazines, journals etc.
7. Public speaking - Extempore and Impromptu Speech
8. Grammar - Words often misspelt - confused/ misused; Common errors in pronunciation; Idiomatic expressions.
9. Professional Skills- Drafting Job Application Letter, CV/ Resume; Interview skills.
10. Demonstrating the do's and don'ts of facing the interview.

PROGRAM: THREE YEARS DIPLOMA PROGRAM IN GARMENTTECHNOLOGY	
Course Code : **GTPC201**	Course Title : **Textile science II**
Semester: **2nd**	Credits : **03**
Periods per week: **3(L: 3, T: 0, P: 0)**	

COURSE OBJECTIVE:-.

The knowledge and skills related to textile science is essential to provide a comprehensive insight into the basic knowledge about fabric structure, dyeing, printing and finishing affecting the ultimate performance and use of the fabric by the consumer.

COURSE CONTENT

Unit 1: Fabric Structure

- Fabric Structure and properties of Knits:
- Classification: warp and weft knits
- Weft knits: Plain, Purl, Rib and interlock
- Warp knits: Tricot and raschel

Unit 2: Finishes

- Classification of finishes

Unit 3: Application of colour

- Dyeing – Definition, stages of dyeing (fibre, yarn, piece dyeing, garment dyeing)**Unit 4: Printing**
- Printing – definition, methods and type of printing techniques
- Direct: block, Screen
- Tie and dye

Unit 5: Common faults in fabrics

- Weaving defects
- Colour defects
- Printing defects
- Knitting defects

Unit 6: Fabric Shrinkage

- Causes
- Prevention
- Measurement

COURSE OUTCOMES

After the completion of the course the student will be able to

- identify and analyze different types of knits

- recognize the various finishing processes
- acknowledge the various stages of dyeing
- understand the different printing techniques
- recognize Fabric shrinkage
- recognize the various fabric defects

Note: The teacher may develop master samples to demonstrate various processes. The students may be asked to prepare swatch files. The students should be taken for a visit to textile testing laboratory, dyeing and printing industries to familiarize with the various processes.

RECOMMENDED BOOKS:

1 Understanding Textiles by Phyllis Tortora, Macmillan Publishing Co. New York
2 Modern Textiles by RothySiegert Lyle, Wiley John & Sons, Inc. New York
3 Encyclopaedia of Textiles, Fibres and Non-woven Fabrics
4 Textiles Fiber to Fabric – P Corbman, McGraw Hill Book Co, Inc. New York
5 Fabric Science by Joseph Pizzuto, A&C Black Publishers Ltd. New York
6 Fabric Defects (Causes and Remedies) by SS Satsangi , Usha Publishers, New Delhi
7 Managing Quality in the Apparel Industry – PV Mehta and SK Bhardwaj
8 Clothing, Textiles and Their Care by Dr.RajwinderK.Randhawa, Happer& Row Publishers, New York
9 Clothing, Textiles and Laundry by SushmaGupta,NeeruGarg and Renu Saini, Kalyani Publishers, New Delhi
10 A Text Book of Home Science by Dr. Neelam Grewal, Wiley Publishers, New York

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	12	25
2	12	25
3	07	15
4	05	10
5	05	10
6	07	15
Total	**48**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAM IN GARMENTTECHNOLOGY	
Course Code : GTPC202	**Course Title : Textile science II Lab**
Semester: 2nd	**Credits : 01**
Periods per week: 2(L:0,T:0, P:2)	

COURSE OBJECTIVE:-.

The knowledge and skills related to textile science is essential to provide a comprehensive insight into the basic knowledge about fabric structure, dyeing, printing and finishing affecting the ultimate performance and use of the fabric by the consumer.

LIST OF PRACTICALS:

1. Identify and analyze different type of knits samples and enlist their characteristics (design) Visits to a knitting unit to understand different knitting machines and processes
2. Visit of a finishing mill to observe various finishing processes
3. Different techniques of Dyeing (Make a sample file)
4. Identify the fabric samples on basis of the printing techniques
    - Block printing
    - Vegetable printing
    - Screen printing
    - Tie and dye method (Make a sample file of all printing methods)
5. Exercises related to locating and recognition of fabric defects with different methods
6. Measurement of fabric shrinkage of knit

PROGRAM THREE YEAR DIPLOMA IN ENGINEERING AND TECHNOLOGY	
Course Code: **ES202**	Course Title: **Introduction to Computers and Information Technology**
Semester:**2nd**	Credit: **2**
Periods Per Week: **4 (L: 0 T: 0 P: 4)**	

(* Common to Architecture Assistantship, Automobile, Civil, Civil(PHE), QSCM,Computer , Electrical , E&C,Medical Electronics, Food Technology, Garment Technology, I&C,Leather Technology, Mechanical, Textile Design, Textile Technology, Travel and Tourism, MLT, Wood Technology and IT)

COURSE OBJECTIVE

Information technology has great influence on all aspects of our life. Primary purpose of using computer is to make the life easier. 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 tools of MS Office/Open Office using internet etc. form the broad competency profile of diploma holders. This exposure will enable the students to enter their professions with confidence, live in a harmonious way and contribute to the productivity.

COURSE CONTENT

1. **Basics of Information Technology**
   - 1.1. Its concept and scope, applications of IT, ethics and future with information technology.
   - 1.2. Impact of computer and IT in society.
   - 1.3. Computer application in office, book publishing, data analysis, accounting, investment, inventory control, graphics, air and railway ticket reservation, robotics, military, banks, Insurance financial transactions and many more.

2. **Basic Components of Computer System**
   - 2.1. Block diagram of a computer System and Processing of Data.
   - 2.2. Demonstration of computer system viz., Hardware, Software
   - 2.3. Concept of Memory and its various types, Primary and secondary memories (RAM, ROM, Storage Devices etc).

3. **Internet and its Applications**
   - 3.1. Introduction to Internet, its basic working.
   - 3.2. Concept of Email, Social Media, Cloud Computing.
   - 3.3. Basic ideas about IP Address, DNS, URL, Server, Web Browser,LAN etc.

4. Use of Various Basic Data Processing Softwares

4.1. Word Processing (Microsoft Word & Google Docs.)

4.1.1. File Management:

4.1.1.1. Opening, creating and saving a document, locating files, copying contents in some different file(s).

4.1.2. Editing a document:

4.1.2.1. Entering text, Cut, copy, paste using tool- bars

4.1.3. Formatting a document:

4.1.3.1. Using different fonts, changing font size and colour, changing the appearance through bold/ italic/ underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods

4.1.3.2. Aligning of text in a document, justification of document,Inserting bullets and numbering

4.1.3.3. Formatting paragraph, inserting page breaks and column breaks, line spacing

4.1.3.4. Use of headers, footers: Inserting footnote, end note, use of comments

4.1.3.5. Inserting date, time, special symbols, importing graphic images, drawing tools

4.1.4. Tables and Borders:

4.1.4.1. Creating a table,

4.1.4.2. Formatting cells,

4.1.4.3. Use of different border styles, shading in tables,

4.1.4.4. Merging of cells, partition of cells, inserting and deleting a row in a table

4.1.5. Print preview, zoom, page set up, printing options

4.1.6. Using Find, Replace options

4.2. Microsoft-Excel and Google Sheets

4.2.1. Introduction to Spreadsheet Application-Workbook and Worksheets

4.2.2. Working with data and formulas:

4.2.2.1. Addition, subtraction, division, multiplication, percentage and autosum.

4.2.2.2. Format data, create chart, printing chart, save worksheet, creating and formatting of charts and graphs

4.3. Presentation (Microsoft-PowerPoint and Google Slides)

4.3.1. Introduction to PowerPoint - How to start PowerPoint - Working environment: concept of toolbars, slide layout, templates etc. - Opening a new/existing presentation - Different views for viewing slides in a presentation: normal, slide sorter etc.

4.3.2. Addition, deletion and saving of slides.

4.3.3. Insertion of multimedia elements - Adding text boxes, importing pictures, movies and sound, tables and charts etc.

4.3.4. Formatting slides - Text formatting, changing slide layout, changing slide color scheme - Changing background, Applying design template.

4.3.5. Viewing the presentation using slide navigator

COURSE OUTCOME

After the completion of the course the student will be able to:

- Identify the different hardware components and functional units of a Computer system.
- Explain basic concepts and working of internet.
- Create and format word documents by using different word processing software.
- Prepare the spread sheets and the presentation of data in different ways.
- Prepare power point presentations.

RECOMMENDED BOOKS:

1. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd-Jungpura, New Delhi
2. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
3. Fundamentals of Information Technology by Leon and Leon;Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
4. Basics of Information Technology, by Ishan Publications, Ambala
5. Information Technology for Management by Henery Lucas, 7th edition, Tata McGraw Hill Education Pvt Ltd, New Delhi

UNIT WISE TIME AND MARKSDISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	06	10
2	13	20
3	13	20
4	32	50
Total	**64**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAM IN GARMENT TECHNOLOGY	
Course Code : **GTPC203**	Course Title : **BASIC PATTERN MAKING AND STYLE INTERPRETATION - II**
Semester: **2ND**	Credits :**03**
Periods per week: **3(L:3 T: 0 P: 0)**	

COURSE OBJECTIVE:

The students should know various considerations of design in making of garments, scope and importance of drafting and pattern making so that they are able to take measurements, interpret the style of any given design and make the pattern.

COURSE CONTENT

1. **Principle of pattern Making**
   - 1.1. Manipulation
   - 1.2. Addition
   - 1.3. Contouring
2. **Pattern details – Terminology and classification of:**
   - 2.1. Collars
   - 2.2. Sleeves
   - 2.3. Yokes
   - 2.4. Pockets
3. **Pattern Styles**
   - 3.1. Skirts, types of Skirts & Terminology
4. **Pattern Styles**
   - 4.1. Pants, types of pants & Terminology
5. **Figures**
   - 5.1. Study of the basic figure types, figure defects and developing patterns for them

COURSE OUTCOMES

After the completion of the course the student will be able to

- acknowledge the Principles of Pattern Making
- know properly the pattern terminology
- understand the different types of skirts and pants.
- recognize the various figure problems

Note: The students may be taken to the nearby garment manufacturing organizations to demonstrate various pattern making and style interpretation processes.

RECOMMENDED BOOKS

1. Pattern Making for Fashion design by Helen Joseph Armstrong, Vikas Publishing House Pvt. Ltd. New Delhi
2. The ABC's of Grading by Murray Sachei
3. Basic Pattern Skills for Fashion Design by Bernard Zamko, A& C Black Publishers,
4. New York Design Apparel Through the Flat Pattern by Ernestine Ko
5. Pattern Cutting and Making up by Martin Shoben, CBS Publishers, & Distributors Pvt. Ltd. Chennai

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	07	15
2	14	25
3	09	20
4	09	20
5	09	20
Total	**48**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAM IN GARMENT TECHNOLOGY	
Course Code : **GTPC204**	Course Title : **BASIC PATTERN MAKING AND STYLE INTERPRETATION – II LAB**
Semester: **2ND**	Credits :**02**
Periods per week: **4(L:0 T: 0 P: 4)**	

COURSE OBJECTIVE:

The students should know various considerations of design in making of garments, scope and importance of drafting and pattern making so that they are able to take measurements, interpret the style of any given design and make the pattern.

LIST OF PRACTICALS

Drafting of Basic Women Bodice Block and Sleeve Block – Bust 32,34,36 inches

1. **Adaptation of Adults basic sleeve to:**
   - 1.1. Puff sleeve
   - 1.2. Cap sleeve
   - 1.3. Flared sleeve
   - 1.4. Leg-o-mutton sleeve
   - 1.5. Paglan sleeve

   (Presentation should be done in 12x12 inches envelop with sketch and all Pattern details)

2. **Drafting and adaptation of various collars**
   - 2.1. Cape collar
   - 2.2. Sailor's collar
   - 2.3. Convertible collar
   - 2.4. Shawl collar
   - 2.5. Chinese collar

   (Presentation should be done in 12x12 inches envelop with sketch and all pattern details)

3. **Design, Draft and Adapt & Layout the Women bodice block into**:
   - 3.1. Simple A-Line Kameez (Layout of all exercises should be done on ¼ scale)
   - 3.2. Maxi (Special feature: -Yoke, Flared sleeve)
   - 3.3. Churidar Pyjama
   - 3.4. Saree Blouse with darts.

   (Presentation should be done in 12x12 inches envelop with sketch and all pattern details)

PROGRAM: THREE YEARS DIPLOMA PROGRAM IN GARMENT TECHNOLOGY	
Course Code : **GTPC205**	Course Title : **FASHION ILLUSTRATION -II**
Semester: **2ND**	Credits :**02**
Periods per week: **3(L: 0 T: 1 P: 2)**	

COURSE OBJECTIVE:

The skill in fashion illustration is essential for the students of garment technology so as to develop in them the creativity. After going through this subject, the student of garment technology will be able to illustrate different types of figures and dresses in different colour media

COURSE CONTENT

Unit 1: Profile head step by step

1.1. Turning Head
1.2. Three-dimensional head

Unit 2: Illustration of Kid Figures (Boys and Girls) playing pose, uniform and Winter Clothing

Unit 3 Flat sketching of the following- Skirts, Pants, Tops

Unit 4 Sketching of flesh Figure in different poses with Dresses

Unit 5 Rendering the dresses in various textures and colours.

Unit 6 To study the illustration of styles of different designers (Indian and western outfits)

Note: The above exercises should be done with the following medium: -
Pencils (4B,6B),Pencil colours, water colours, Poster colours, Brush colours etc

All the Practical exercises should be done on Drawing Files of Large size (16x16 inches file)

Note: The students may be taken to the nearby garment manufacturing organizations to demonstrate various pattern making and style interpretation processes.

RECOMMENDED BOOKS

1 Fashion Drawing Designs; Magazine of Thailand, New Age Publishers, Delhi
2 Pattern Designs for Haute Couture, Volume 1, New Age Publishers, Delhi
3 Fashion Drawing – The Basic Principles by Anne Allen and Julion seaman, Haper& Row, New York
4 Latest Fashion Style by Winter Hiver, New Age Publishers, Delhi
5 Jasmine's New Look, On Indian Fashion Scene, Haper and Row, New York
6 Lifestyles: Fashion Styles by Katheryn Samuel, McGraw Hill Book Co. New York
7 Spring and Summer Collection; Tokyo, New York

8 Singer Sewing Book
9 A Complete Guide to Sewing, Mager Publisher Pocket Books, Inc. New York

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	5	15
2	5	15
3	4	10
4	6	20
5	6	20
6	6	20
Total	**32**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAM IN GARMENT TECHNOLOGY	
Course Code : **GTPC206**	Course Title : **Garment Construction-II**
Semester : **2nd**	Credits: **3**
Periods per week: **5 (L: 0 T: 1 P: 4)**	

COURSE OBJECTIVE: - The diploma holders in garment technology are supposed to prepare various components of garments such as plackets, neckline variations, sleeves, pocket, so it is very essential that they should be able to fabricate various components of fashion.

COURSE CONTENT

UNIT 1: Preparation of various types of samples of Pockets

1.1 Patch, welt, bound, in-seam/side-seam)
(Make a file for presentation)

UNIT 2 Preparation of various types of sleeves

2.1 Puff sleeve
2.2 Cap sleeve
2.3 Flared sleeve
2.4 Leg-o-mutton sleeve to be fitted in a bodice
2.5 Reglan
(Make a file for Presentation)

UNIT 3 Preparation of various types of collars

3.1 Cape collar
3.2 Sailor's collar
3.3 Convertible collar
3.4 Shirt collar
3.5 Shawl collar
3.6 Chinese collar

(Make a file for Presentation)

UNIT 4 Construction of Children Garments

4.1 Apron (special Feature – Do fabric paint)
4.2 Bloomer
4.3 Romper (special Feature – Do patch work)
4.4 Baby Frock with yoke (special Feature – Do hand embroidery on yoke)
4.5 Saree Blouse with Front and Back dart manipulation.

RECOMMENDED BOOKS

1 Clothing Construction by Doongaji; RaajParkashan Ltd., Delhi
2 System of Cutting by Zarapkar
3 Clothing Construction by Evelyn A Mansfield, HougutanMiffin Co., Boston
4 Creative Sewing by Allynie Bane; McGraw Hill Book Co., Inc., New York
5 Complete Guide to Sewing by Readers Digest
6 Fashion Maker by Betty Foster, UBS Publishers Distributors Ltd, New Delhi
7 Fashion Clothes- She by Debbie Bliss, Sue Penerill, MK Kohli& AL KohliPublishers, Industrial Area, Chandigarh
8 Basic Processes and Clothing Construction by SherieDoongaji and RaushiniDespande, UBS Publishers and Distributors Ltd. New Delhi
9 Simplicity Revised ABC of Short-Cut Sewing, CBS Publishers and Distributors Ltd. New Delhi
10 The Brides Sewing Book by Anne Ladbury
11 Stitch by Stitch by Tarstar Books, MK Kohli Publisher, Industrial Area, Chandigarh
12 Pattern Cutting and Making up by Martin Shoben, Janet Ward Publishers, London
13 The art of Sewing by Aina Jacob Thomas; UBS Publishers Distributors Ltd., New Delhi

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	10	15
2	10	15
3	19	30
4	25	40
Total	**64**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN GARMENT TECHNOLOGY	
Course Code: **BS204**	Course Title: **ENVIRONMENTAL SCIENCE**
Semester: 2nd	Credits: **2**
Periods Per Week: **2(L: 2, T: 0, P:0)**	

COURSE OBJECTIVE

The three main goals of environmental science are: to learn how the natural world works, to understand how humans interact with the environment, and to find ways to deal with environmental problems and live more sustainably.

COURSE CONTENT

1. Ecosystem

1.1 Structure of ecosystem, Biotic & Abiotic components

1.2 Food chain and food web

1.3 Aquatic (Lentic and Lotic) and terrestrial ecosystem

1.4 Carbon, Nitrogen, Sulphur, Phosphorus cycle.

1.5 Global warming -Causes, effects, process, Green House Effect, Ozone depletion

2. Air and Noise Pollution

2.1 Definition of pollution and pollutant, Natural and manmade sources of air pollution

2.2 Air Pollutants: Types, Particulate Pollutants: Effects and control

2.3 Gaseous Pollution Control: Absorber, Catalytic Converter, Effects of air pollution due to Refrigerants, I.C., Boiler

2.4 Noise pollution: sources of pollution, measurement of pollution level, Effects of Noise pollution, Noise pollution (Regulation and Control) Rules.

3. Water and Soil Pollution (

3.1 Sources of water pollution, Types of water pollutants, Characteristics of water pollutants Turbidity, pH, total suspended solids, total solids BOD and COD: Definition, calculation

3.2 Waste Water Treatment: Primary methods: sedimentation, froth floatation, Secondary methods: Activated sludge treatment, Trickling filter, Bioreactor, Tertiary Method: Membrane separation technology, RO (reverse osmosis)

3.3 Causes, Effects and Preventive measures of Soil Pollution: Causes-Excessive use of Fertilizers, Pesticides and Insecticides, Irrigation, E-Waste.

4. Solid Waste Management, ISO 14000 and Environmental Management

4.1 Solid waste generation- Sources and characteristics of: Municipal solid waste, E-waste, biomedical waste.

4.2 Metallic wastes and Non-Metallic wastes (lubricants, plastics, rubber) from industries.

4.3 Collection and disposal: MSW (3R, principles, energy recovery, sanitary landfill), Hazardous waste

4.4 Air quality act 2004, air pollution control act 1981 and water pollution and control act 1996.

4.5 Structure and role of Central and state pollution control board.

4.6 Concept of Carbon Credit, Carbon Footprint.

4.7 ISO14000: Implementation in industries, Benefits.

COURSE OUTCOME

After completion of the course the student be able to:

- Appreciate concepts and methods from ecological and physical sciences and their application in environmental problem solving.
- Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.
- work and produce most efficient, economical and eco-friendly finished products.
- Solve various engineering problems applying ecosystem to produce eco – friendly products.
- Use relevant air and noise control method to solve domestic and industrial problems.
- Use relevant water and soil control method to solve domestic and industrial problems.
- Solve local solid and e-waste problems.

RECOMMENDED BOOKS

1. S.C. Sharma & M.P. Poonia, Environmental Studies,Khanna Publishing House,NewDelhi
2. Arceivala, Soli Asolekar, Shyam, Waste Water Treatment for Pollution Control and Reuse, Mc-Graw Hill Education India Pvt. Ltd., New York, 2007, ISBN:978-07-062099-
3. Nazaroff, William, Cohen, Lisa, Environmental Engineering Science, Willy, New York, 2000
4. O.P. Gupta, Elements of Environmental Pollution Control, Khanna Publishing House, New Delhi

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	06	16
2	08	20
3	08	24
4	10	40
Total	**32**	**100**

CURRICULUM
FOR
SECOND SEMESTER
DIPLOMA IN
INSTRUMENTATION AND
CONTROL ENGINEERING

SUBJECT STUDY SCHEME (2nd Sem: INSTRUMENTATION & CONTROL ENGINEERING)

Course Code	Subjects	Time in Hours				Credits		
		Theory	Tutorial	Practical	Total	Theory	Practical	Total
BS201	Applied Mathematics-II	3	1	--------	4	4	--------	4
ES202	Introduction to Computers and Information Technology	---	---	4	4	----	2	2
HS203	Soft Skills and Personality Development	3	---	---	3	3	---	3
HS204	Soft Skills and Personality Development Lab	---	---	2	2	---	1	1
ES205	Basics of Electrical and Electronics	4	1	----	5	5	---	5
ES206	Basic of Electrical and Electronics Lab	---	---	2	2	--	1	1
ICPC201	Fundamental of Instrumentation Engineering	3		-------	3	3	------	3
ICPC202	Fundamental of Instrumentation Engineering Lab	------	--------	2	2	-----	1	1
ICPC203	Instrumentation Workshop	-------	--------	4	4	-------	2	2
	Total	13	2	14	29*	15	7	22

* Note: The remaining one hour in a week shall be utilized for sports and other activities like debates, seminar etc.

PROGRAM: THREE YEAR DIPLOMA IN ENGINEERING & TECHNOLOGY	
Course Code: **BS201**	Course Title: **Applied Mathematics-II**
Semester: **2nd**	Credit: **4**
Periods Per Week: **4 (L: 03, T: 01, P: 0)**	

(* Common to Architecture Assistantship, Automobile, Civil, Civil(PHE), QSCM,Computer , Electrical , E&C,Medical Electronics, Food Technology, I&C, Leather Technology, Mechanical, Textile Technology, Wood Technology and IT)

COURSE OBJECTIVE:

This course is designed to develop an understanding of basic mathematical and statistical tools which include matrices, determinants, integral calculus and coordinate geometry and the applications of such tools in the field of engineering and technology

COURSE CONTENT

1. Integral Calculus

1.1 Integration as inverse operation of differentiation

1.2 Simple integration by substitution, by parts and by partial fractions (for Linear factors only)

1.3 Evaluation of definite integrals (simple problems)-

Evaluation of $\int_0^{\pi/2} \sin^n x\, dx$, $\int_0^{\pi/2} \cos^n x\, dx$, $\int_0^{\pi/2} \sin^m x \cos^n x\, dx$

Using formulae without proof (m and n being positive integers only)

2. Coordinate Geometry

2.1 Equation of straight line in various standard forms (without proof), intersection of two straight lines, angle between two lines. Parallel and perpendicular lines, perpendicular distance formula.

2.2 General equation of a circle and its characteristics. To find the equation of a circle, given: Centre and radius, three points lying on it and coordinates of end points of a diameter.

2.3 Definition of conics (Parabola, Ellipse, Hyperbola) their standard equations without proof. Basic problems on conics when their foci, directrices or vertices are given.

3 Matrices and Determinants

3.1 Definition of matrix and its types.

3.2 Addition, subtraction and multiplication of matrices.

3.3 Expansion of Determinants.

4 Statistics

4.1 Measures of Central Tendency: Mean, Median, Mode

4.2 Measures of Dispersion: Mean deviation, Standard deviation

4.3 Basic Concepts of Probability.

COURSE OUTCOME

After the completion of the course the student will be able to:

- evaluate both indefinite and definite integrals by various methods
- identify various points in a 2-D space along with formulation of equations and graphs for different types of lines, circles, ellipses, parabolas etc.
- find the sum, difference and product of two or more matrices,
- evaluate determinants and their relations to matrices
- find the mean, median, mode and other measures of central tendency.
- solve basic problems on probability.

RECOMMENDED BOOKS:

1. R.D Sharma, Applied Mathematics-II.
2. H.K Das, Applied Mathematics.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 40th Edition, 2007.
4. S.S. Sabharwal, Sunita Jain, Eagle Parkashan, Applied Mathematics, Vol. I & II, Jalandhar.
5. Comprehensive Mathematics, Vol. I & II by Laxmi Publications, Delhi.
6. Reena Garg & Chandrika Prasad, Advanced Engineering Mathematics, Khanna Publishing House, New Delhi
7. Applied Mathematics-II, Eagle Publications.

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	16	35
2	10	20
3	12	25
4	10	20
Total	**48**	**100**

PROGRAM THREE YEAR DIPLOMA IN ENGINEERING AND TECHNOLOGY	
Course Code: **ES202**	Course Title: **Introduction to Computers and Information Technology**
Semester:**2nd**	Credit: **2**
Periods Per Week: **4 (L: 0 T: 0 P: 4)**	

(* Common to Architecture Assistantship, Automobile, Civil, Civil(PHE), QSCM, Computer , Electrical , E&C, Medical Electronics, Food Technology, Garment Technology, I&C, Leather Technology, Mechanical, Textile Design, Textile Technology, Travel and Tourism, MLT, Wood Technology and IT)

COURSE OBJECTIVE

Information technology has great influence on all aspects of our life. Primary purpose of using computer is to make the life easier. 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 tools of MS Office/Open Office using internet etc. form the broad competency profile of diploma holders. This exposure will enable the students to enter their professions with confidence, live in a harmonious way and contribute to the productivity.

COURSE CONTENT

1. **Basics of Information Technology**
   - 1.1. Its concept and scope, applications of IT, ethics and future with information technology.
   - 1.2. Impact of computer and IT in society.
   - 1.3. Computer application in office, book publishing, data analysis, accounting, investment, inventory control, graphics, air and railway ticket reservation, robotics, military, banks, Insurance financial transactions and many more.

2. **Basic Components of Computer System**
   - 2.1. Block diagram of a computer System and Processing of Data.
   - 2.2. Demonstration of computer system viz., Hardware, Software
   - 2.3. Concept of Memory and its various types, Primary and secondary memories (RAM, ROM, Storage Devices etc).

3. **Internet and its Applications**
   - 3.1. Introduction to Internet, its basic working.
   - 3.2. Concept of Email, Social Media, Cloud Computing.
   - 3.3. Basic ideas about IP Address, DNS, URL, Server, Web Browser,LAN etc.

4. **Use of Various Basic Data Processing Softwares**
   - ***4.1. Word Processing (Microsoft Word & Google Docs.)***

4.1.1. File Management:
4.1.1.1. Opening, creating and saving a document, locating files, copying contents in some different file(s).
4.1.2. Editing a document:
4.1.2.1. Entering text, Cut, copy, paste using tool- bars
4.1.3. Formatting a document:
4.1.3.1. Using different fonts, changing font size and colour, changing the appearance through bold/ italic/ underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods
4.1.3.2. Aligning of text in a document, justification of document, Inserting bullets and numbering
4.1.3.3. Formatting paragraph, inserting page breaks and column breaks, line spacing
4.1.3.4. Use of headers, footers: Inserting footnote, end note, use of comments
4.1.3.5. Inserting date, time, special symbols, importing graphic images, drawing tools
4.1.4. Tables and Borders:
4.1.4.1. Creating a table,
4.1.4.2. Formatting cells,
4.1.4.3. Use of different border styles, shading in tables,
4.1.4.4. Merging of cells, partition of cells, inserting and deleting a row in a table
4.1.5. Print preview, zoom, page set up, printing options
4.1.6. Using Find, Replace options

4.2. Microsoft-Excel and Google Sheets

4.2.1. Introduction to Spreadsheet Application-Workbook and Worksheets
4.2.2. Working with data and formulas:
4.2.2.1. Addition, subtraction, division, multiplication, percentage and autosum.
4.2.2.2. Format data, create chart, printing chart, save worksheet, creating and formatting of charts and graphs

4.3. Presentation (Microsoft-PowerPoint and Google Slides)

4.3.1. Introduction to PowerPoint - How to start PowerPoint - Working environment: concept of toolbars, slide layout, templates etc. - Opening a new/existing presentation - Different views for viewing slides in a presentation: normal, slide sorter etc.
4.3.2. Addition, deletion and saving of slides.
4.3.3. Insertion of multimedia elements - Adding text boxes, importing pictures, movies and sound, tables and charts etc.
4.3.4. Formatting slides - Text formatting, changing slide layout, changing slide color scheme - Changing background, Applying design template.
4.3.5. Viewing the presentation using slide navigator

COURSE OUTCOME

After the completion of the course the student will be able to:

- Identify the different hardware components and functional units of a Computer system.
- Explain basic concepts and working of internet.
- Create and format word documents by using different word processing software.
- Prepare the spread sheets and the presentation of data in different ways.
- Prepare power point presentations.

RECOMMENDED BOOKS:

1. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd-Jungpura, New Delhi
2. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
3. Fundamentals of Information Technology by Leon and Leon;Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
4. Basics of Information Technology, by Ishan Publications, Ambala
5. Information Technology for Management by Henery Lucas, 7th edition, Tata McGraw Hill Education Pvt Ltd, New Delhi

UNIT WISE TIME AND MARKSDISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	06	10
2	13	20
3	13	20
4	32	50
Total	**64**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAM IN INSTRUMENTATION AND CONTROL ENGINEERING	
Course Code: **HS 205**	Course Title: **Soft Skills and Personality Development**
Semester: **2ND**	Credits: **3**
Periods per week: **(L: 3 T: 0 P: 0)**	

COURSE OBJECTIVE: Soft skills, unlike hard skills that are technical, tangible, measurable, quantifiable and assessable, are practical, imperceptible and subtle qualitative traits that determine the efficacy of human communication at professional and personal levels. While hard skills acquisition can be correlated with one's intelligence quotient (IQ), soft skills developments are intricately linked with one's emotional quotient (EQ) and spiritual quotient (SQ). Hard skills can aid an individual secure a position, yet soft skills help the person retain it, achieve excellence and fulfil self-actualization needs. Using academic as well as popular books, the course offers soft skills by integrating them at personal, professional, interpersonal and management levels.

COURSE CONTENT

Unit 1
Personal Skills

Self-Assessment; Identifying Strength & Limitations; Habits, Will-Power and Drives; Developing Self-Esteem and Building Self-Confidence, Significance of Self-Discipline
Understanding Perceptions, Attitudes and Personality Types.
Mind-Set: Growth and Fixed; Values and Beliefs
Motivation and Achieving Excellence; Self-Actualization Need Goal Setting, Life and Career Planning; Constructive Thinking

Unit 2
Professional Skills

Communicating Clearly: Understanding and Overcoming barriers; Cross gender/Cross Cultural communication, Strategic communication.
Active Listening
Persuasive Speaking and Presentation Skills
Conducting Meetings, Writing Minutes, Sending Memos and Notices
Etiquette: Effective E-mail Communication; Telephone Etiquette
Body Language in Group Discussion and Interview

Unit 3
Interpersonal Skills

Enhancing Empathy, Showing Sympathy and Dealing with Antipathy; Gaining Trust and Developing Emotional Bonding
Ethics and Etiquettes (Social and Official Settings); Respecting Privacy; Civic Sense and Care for the Environment
Negotiating, Decision-Making, Conflict-Resolution, Five Styles

Emotional Literacy; Assertiveness versus Aggressiveness; Learning to Say "No."; Learning to Appreciate and Give Praise; Presenting Bad News
Humour, Jokes and Anecdotes in Effective Communication

Unit 4
Management Skills

Managing Time and Beating Procrastination
Managing People: Leading and Working with Team (Co-ordination and Co-operation); Developing Accountability, Commitment and Responsibility; Behaving Conscientiously
Managing Stress and Maintaining Positive Outlook
Managing Health, Boosting Memory, Enhancing Study Skills
Managing Money and Love; Balancing Personal and Professional Life

Course Outcome
After the completion of the course, the student will be able to:

- Develop Self Confidence
- Learn attitudes and personality types
- Learn communication skills and etiquettes of communication
- know about interpersonal skills and management skills

REFERENCES

1. Personality Development and Soft Skills,Barun k. Mitra, Oxford Press
2. Business Communication, Shalini Kalia, ShailjaAgarwal,Wiley India
3. Cornerstone Developing Soft Skills, Sheffield, Pearson
4. Managing Soft Skills for Personality Development -edited by B.N Ghosh, McGraw Hill India
5. Soft Skills An Integrated Approach to Maximize Personality, Gajendra S.Chauchan, Sangeeta Sharma, Wiley In

UNIT WISE TIME AND MARKS DISTRIBUTION

UNIT NO	TIME (HOURS)	MARKS
01	15	25
02	18	30
03	10	25
04	05	20
TOTAL	**48**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAM IN INSTRUMENTATION AND CONTROL ENGINEERING	
Course Code: **HS 206**	Course Title: **Soft Skills and Personality Development Lab**
Semester: **2ND**	Credits: **1**
Periods per week: **2(L: 0 T: 0 P: 2)**	

COURSE OBJECTIVE: Soft skills, unlike hard skills that are technical, tangible, measurable, quantifiable and assessable, are practical, imperceptible and subtle qualitative traits that determine the efficacy of human communication at professional and personal levels. While hard skills acquisition can be correlated with one's intelligence quotient (IQ), soft skills development are intricately linked with one's emotional quotient (EQ) and spiritual quotient (SQ). Hard skills can aid an individual secure a position, yet soft skills help the person retain it, achieve excellence and fulfil self-actualization needs. Using academic as well as popular books, the course offers soft skills by integrating them at personal, professional, interpersonal and management levels.

LIST OF PRACTICALS

1. Thinking Skills Correcting Common Errors in day to day conversation making picture and improving diagram to English word
2. Field Diary and lab record
3. Ice Breaking Activity and Just A Minute Session
4. Speaking from observation and reading
5. Greetings -Apologies, request, social and professional Etiquette Telephone etiquettes
6. Indexing, Footnotes and bibliographic procedure
7. Vocabulary building
8. Report Making
9. Comprehensions

PROGRAM: THREE YEARS DIPLOMA PROGRAM IN INSTRUMENTATION AND CONTROL ENGINEERING	
Course Code: **ES205**	Course Title : **BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING**
Semester:**2ND**	Credits:**5**
Periodsperweek:5**(L:4 T: 1P:0)**	

*Common With Computer Engineering and IT

COURSE OBJECTIVE:

The course contents could be taught and implemented with an aim to develop different skills leading to the achievement of the competencies in measurement of basic electrical quantities/parameters and use of major electrical/electronic machines/instruments.

COURSE CONTENTS

1. Overview of DC Circuits

1.1. Ohms law and its verification.
1.2. Series and parallel combination of resistors with simple numerical problems.
1.3. Application of Kirchhoff's current law and Kirchhoff's voltage law to simple circuits.

2. Electro Magnetic Induction

2.1. Concept of electro-magnetic field produced by flow of electric current
2.2. Concept of magneto-motive force (MMF), flux, reluctance, permeability
2.3. Analogy between electric and magnetic circuit.
2.4. Faraday's laws of electro-magnetic induction, principles of self and Mutual induction.
2.5. Series and parallel combination of inductors.

3. Batteries

3.1. Basic idea of primary and secondary cells
3.2. Construction, working principle and applications of Lead-Acid Batteries
3.3. Brief idea of Lithium-ion batteries
3.4. Series and parallel connections of batteries
3.5. General idea of solar cells, solar panels and their applications

4. AC Fundamentals

4.1. Concept of alternating current and voltage.
4.2. Concepts of: cycle, frequency, time period, amplitude, instantaneous value, average value, r.m.s. value, maximum value
4.3. Difference between ac and dc

5. Various Types of Power Plants

5.1. Working principle and block diagram explanation of thermal and hydro power stations and their comparative study

6. **Semiconductor physics and diode**

6.1. Classification of materials into insulators, conductors and semiconductors on the basis of energy band concept.
6.2. Concept of Intrinsic and Extrinsic Semi-conductors
6.3. PN junction Diode : working Mechanism and its related terms, V-I Characteristics , and its application as half wave and full wave rectifier
6.4. Working and application of special purpose diodes: LED(light Emitting diode), photo diode, Zener diode.
6.5. Filter circuits: Brief idea about shunt capacitor filter, series inductor filter, LC and Pie filter

7. **Bipolar-transistors:**

7.1. Concept of a bipolar transistor, PNP and NPN transistors, their symbols and mechanism of current flow; Current relations in a transistor; concept of leakage current.
7.2. CB, CE, CC configurations of a transistor; Input and output characteristics in CB and CE configurations; Current amplification factors. Comparison of CB, CE and CC Configurations
7.3. Transistor as an amplifier in CE Configuration.

8. **Unipolar Transistors**
8.1. Construction, operation and characteristics of MOSFET/JFET and its applications.
8.2. Brief introduction of CMOS and its application.

COURSE OUTCOME

After completion of the course the student will be able to

- explain the basic terminology used in electricity like charge, current, voltage , resistance etc.
- solve various electric circuits for current, voltage or resistance.
- state the laws of electromagnetic induction and describe the effect on a current-carrying conductor when placed in a magnetic field.
- explain the concept of batteries , their construction and their applications.
- Describe the various concepts associated with AC and will be also able to distinguish it with DC.
- apply the knowledge of diodes in rectifiers, power adapters and various electronic circuits.
- apply the knowledge of semiconductors in various technical gadgets like mobile phones, Computers, LED, photocells, solar lights etc.
- explain the working and applications of FET and MOSFET

RECOMMENDEDBOOKS

1. Electrical Technology by B.LTheraja, S.Chand and Company, New Delhi
2. Electrical and Electronics Engineering by S.K Bhattacharya, Pearson Education, New Delhi
3. Basic Electrical Engineering by PS Dhogal, Tata McGraw-Hill Education Pvt Ltd, New Delhi
4. Basic Electrical and Electronics Engineering by Kumar K M, Vikas Publication House Pvt Ltd, New Delhi
5. Basic Electronics and Linear Circuits by N N Bhargawa and S C Gupta, Tata McGraw-Hill Education Pvt Ltd, New Delhi
6. Principles of Electrical and Electronics Engineering by V.K. Mehta, S. Chand and Co, New Delhi
7. Basic Electronics by J B Gupta, S K Kataria and Sons, New Delhi
8. Basic Electronics- Problems and solutions by Albert Molvino and David J Bates, Tata McGraw-Hill Education Pvt Ltd, New Delhi

UNIT WISE TIME AND MARKS DISTRIBUTION

No	Unit	Time Allotted (Hrs)	Marks Allotted (%)
1.	Overview of DC Circuits	08	12
2.	Electro Magnetic Induction	08	12
3.	Batteries	05	10
4.	AC Fundamentals	12	18
5.	Various Types of Power Plants	05	08
6.	Semiconductor Physics and Diode	13	20
7.	Bipolar Transistors	08	12
8	Unipolar Transistors	05	08
	Total	**64**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAM IN INSTRUMENTION AND CONTROL ENGINEERING	
Course Code: **ES206**	Course Title: **BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB ***
Semester: **2nd**	Credits: **1**
Periods Per Week :**2 (L: 0, T:0, P: 2)**	

(*Common with Computer Engineering/IT)

COURSE OBJECTIVE:

This subject is a lab course to be supplemented by theory subject and aims to develop proficiency and understanding of practical outcomes of the subject taught in theory.

LIST OF PRACTICALS

1. Measurement of resistance of an ammeter and a voltmeter .
2. Verification of Ohms law.
3. Verification of Kirchhoff's Current and Voltage Laws in a dc circuit
4. Charging and testing of a lead - acid storage battery.
5. Plotting of V-I characteristics of a PN junction diode
6. Observation of the wave shapes for the following rectifier circuit
    i. Half-wave rectifier
    ii. Full-wave rectifier
7. Observation of wave shape of full wave rectifier with
    i. Shunt capacitor filter
    ii. Series inductor filter
8. Plotting of input and output characteristics of transistors in CE and CB configuration.
9. Plotting of V-I characteristics of MOSFET/JFET.

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN INSTRUMENTATION & CONTROL ENGINEERING	
Course Code: **ICPC 201**	Course Title: **FUNDAMENTAL OF INSTRUMENTATION ENGINEERING**
Semester: **2ND**	Credits: **3**
Periods Per Week :3 **(L: 3, T: 0, P: 0)**	

COURSE OBJECTIVE:

The objective of the course is to impart the knowledge of basic principles involved in instrumentation systems. The student will learn the measurement concept, building blocks of instrumentation system, various types and characteristics of instruments, displaying variables besides instrument selection criteria. The student will also learn about errors in measurements. These concepts will help the student in forming a solid foundation for higher learning in the area of Instrumentation engineering.

COURSE CONTENT

1. **Basics of Instrumentation**

   1.1. Definition of measurement and its significance
   1.2. Methods of measurement: Direct methods, Indirect methods
   1.3. Scope and necessity of instruments
   1.4. Elements of a Generalized Measurement system
      1.4.1. Primary sensing element
      1.4.2. Variable conversion element
      1.4.3. Data presentation element
   1.5. Instrumentation Systems
      1.5.1. Types of instrumentation systems
      1.5.2. Intelligent instrumentation system
      1.5.3. Dump instrumentation system
   1.6. Classification of Instruments
      1.6.1. Absolute instruments
      1.6.2. Secondary instruments.
   1.7. Functions of instruments
      1.7.1. Indicating function
      1.7.2. Recording function

2. Introduction of Transducers

2.1. Definition of sensors & transducers.
2.2. Difference between sensor & transducer.
2.3. Definition and classification of transducers, selection criteria, characteristics
2.4. Construction, working principle, selection criteria, disadvantage, limitation and application of
  2.4.1. Transducers based upon hall effect
  2.4.2. Techogenerator
2.5. Piezoelectric Transducer
2.6. Ultrasonic Transducer
2.7. Linear variable differential transformer

3. **Performance Characteristics and Selection Criteria of Instruments**

3.1. Performance characteristics
  3.1.1. Static characteristics of instruments-accuracy, precision, linearity, resolution, sensitivity, hysteresis, drift, dead time, loading effects.
  3.1.2. Dynamic characteristics-time constant, response time, natural frequency, damping coefficient.
3.2. Selection criteria of instruments.
3.3. Calibration.
3.4. Definition and importance of calibration.
3.5. Process of calibration.

4. **Display and Recording Devices**

4.1. Need of Recorders in Instrumentation system
4.2. Classification of Recorders
  XY, Strip chart recorder, magnetic tape recorder
4.3. Digital display units
  4.3.1. Light Emitting Diode (LED)
  4.3.2. Liquid Crystal Display (LCD)
  4.3.3. Segmental displays
  4.3.4. Dot matrices
  4.3.5. Fluorescent Displays

5. Errors in Measurement

5.1. Limiting errors
5.2. Relative limiting error
5.3. Known error
5.4. Types of errors and their sources
  5.4.1. Gross error
  5.4.2. Systematic error
  5.4.3. Instrumental error
  5.4.4. Environmental error
  5.4.5. Observational error
  5.4.6. Random error

5.5. Normal distribution of errors

COURSE OUTCOME

After completion of the course the student will be able to:

- operate Recorders and Display units.
- calibrate various Industrial and Laboratory instruments.
- Illustrate basics of Sensors and Transducers.
- correct various errors in measurement.

RECOMMENDED BOOKS

1. RK Jain, "Mechanical and Industrial Measurement", Khanna Publishers, New Delhi Eleventh edition.
2. AK Sawhney, "Electrical and Electronic Measurement and Instrumentation", Dhanpat Rai and Co., New Delhi, Nineteenth Edition.
3. Joseph J. Carr, "Elements of Electronic Instrumentation and Measurement", Pearson Education, Third Edition.
4. K. Lal Kishore, "Electronic Instrumentation and Measurement", Pearson Education, Second Edition.
5. JB Gupta, "Electrical and Electronic Measurement and Instrumentation", S.K Kataria and Sons Publishers, New Delhi, 2013.
6. E.O. Doeblin, "Measurement Systems", Mc. Graw Hill Education Publisher, Sixth Edition.
7. Donald P. Eckrman, "Industrial Instrumentation" CBS Publication, First Edition.

UNIT WISE TIME AND MARKS DISTRIBUTION

Unit	Time (Hours)	Marks(%age)
1	6	10
2	12	30
3	8	15
4	12	25
5	10	20
Total	**48**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN INSTRUMENTATION & CONTROL ENGINEERING	
Course Code: **ICPC 202**	Course Title: **FUNDAMENTAL OF INSTRUMENTATION ENGINEERING LAB**
Semester: **2ND**	Credits: **1**
Periods Per Week :**2 (L: 0, T: 0, P: 2)**	

COURSE OBJECTIVE:

The objective of the course is to impart the knowledge of basic principles involved in instrumentation systems. The student will learn the measurement concept, building blocks of instrumentation system, various types and characteristics of instruments, displaying variables besides instrument selection criteria. The student will also learn about errors in measurements. These concepts will help the student in forming a solid foundation for higher learning in the area of Instrumentation engineering.

LIST OF PRACTICALS:

1. Familiarization and demonstration of Liquid Crystal Display.
2. Identification of various types of Instruments.
3. Demonstration and study of different types of recorder.
4. To assemble seven segment display using LEDs.
5. Detection and removal of Systematic error in an Instrument.
6. Identification of various types of Sensors and transducers.
7. Familiarization and use of Fluorescent display.
8. Study of piezoelectric transducer.
9. Measurement of displacement using LVDT.

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN INSTRUMENTATION & CONTROL ENGINEERING	
Course Code: **ICPC 203**	Course Title: **INSTRUMENTATION WORKSHOP**
Semester: **2ND**	Credits: **2**
Periods Per Week :4 **(L: 0, T: 0, P: 4)**	

COURSE OBJECTIVE: Instrumentation workshop practices are included in the curriculum in order to provide hands-on experience about use of different basic instruments used in domestic as well as industrial purpose. This subject aims at developing general manual and machining skills in the students. In addition, the development of a sense of safety at work place, team working and development of right attitude are the other objectives.

PRACTICAL EXERCISES

1. Study of electrical safety measures and protective devices
2. Study, demonstration and identification of common electrical materials with standard ratings and specifications such as wires, cables, switches, MCB & ELCB, fuses, cleats, clamps and allied items, tools and accessories.
3. Identification and familiarization with the following tools used in instrumentation workshop such as Tweezers, Screw drivers (different sizes), Insulated Pliers, Cutter, Sniper, Screw Driver (Star Screw Driver), L- Keys, Soldering Iron, soldering wire, flux .
4. Identification and familiarization with various types of plugs, sockets, connectors suitable for general purpose audio video use. Connectors, Banana plugs, sockets and similar male and female connectors and terminal strips.
5. Familiarization and demonstration of various types of switches such as: normal/miniature toggle, slide, push button piano key, rotary, SPST, SPDT, DPST, DPDT.
6. Identification, familiarization and uses of various type of cell and batteries.
7. Identification, familiarization and uses of commonly used components; active and passive components; colour code and types of resistor and potentiometers, Diode, Transistor, LED, LDR etc.
8. Measure value of given resistor & compare it with theoretical value obtained using colour code.
9. Planning and performing of connection to single phase domestic electrical appliances using Phase, Neutral and Earth wires.
10. To perform the installation of electrical earthing for domestic purpose.
11. Prepare an extension board using fuse, switches, sockets, fan regulator, indicator

etc. for single phase connections.

12. To perform connection of two LED bulbs as per staircase wiring.
13. Measurement of current by using ammeter (both analog and digital type)
14. Measurement of voltage by voltmeter (both analog and digital type)
15. Connecting various components to perform single phase parallel and series circuit connections.
16. To perform single phase Inverter Connections for domestic purpose
17. Connection of 2HP, three phase motor with DOL starter.
18. Solder components e.g. resistor, capacitor, diodes, transistors on a general-purpose PCB.
19. De-soldering practice with de-soldering pump and with de-soldering wick.
20. To measure inner & outer diameter using Vernier calipers.
21. To measure thickness of the metallic sheet with micrometer.
22. Repair a LED Bulb.
23. Convert a simple LED bulb into automatic LED Bulb.
24. To troubleshoot the circuit board of phone charger.
25. To perform installation and connection of Solar P.V. Cells.
26. Controlling the timing of turning ON/OFF a solar light with the help of LDR /Photocell and a timer.
27. To perform dismantling and reassembling of auto electric iron.
28. To perform dismantling and reassembling of desert cooler.
29. Troubleshooting of electric device like heater or kettle.
30. To perform the installation of a water overflow alarm and to troubleshoot it, in case of any problem.

CURRICULUM

FOR

SECOND SEMESTER

DIPLOMA IN

LEATHER TECHNOLOGY

SUBJECT STUDY SCHEME (2nd Sem: Leather Technology)

Course Code	Subjects	Time in Hours				CREDITS		
		Theory	Tutorial	Practical	Total	Theory	Practical	Total
BS201	Applied Mathematics-II	3	1	--------	4	4	--------	4
ES202	Introduction to Computers and Information Technology	---	---	4	4	----	2	2
LTPC201	Leather Machinery	3	--------	--------	3	3	--------	3
BS202	Applied Chemistry	3	--------	----	3	3	---	3
BS203	Applied Chemistry Lab	------	--------	2	2	----	1	1
LTPC202	Basics of Leather	3	--------	------	3	3	-----	3
LTPC203	Basics of Leather Lab	-----	--------	4	4	-----	2	2
LTPC204	Leather Biotechnology and Microbiology	3	--	--	3	3	--	3
LTPC205	Leather Biotechnology and Microbiology Lab	--	--	2	2	--	1	1
	Total	15	1	12	28*	16	6	22

* Note: Remaining hours in a week shall be utilized for sports and other activities like debates, seminar etc.

PROGRAM: THREE YEAR DIPLOMA IN ENGINEERING AND TECHNOLOGY *	
Course Code: **BS201**	Course Title: **Applied Mathematics-II**
Semester: **2nd**	Credit: **4**
Periods Per Week: **4 (L: 03, T: 01, P: 0)**	

(* Common to Architecture Assistantship, Automobile, Civil, Civil (PHE), QSCM, Computer, Electrical, E&C, Medical Electronics, Food Technology, I&C, Leather Technology, Mechanical, Textile Technology, Wood Technology and IT)

COURSE OBJECTIVE:

This course is designed to develop an understanding of basic mathematical and statistical tools which include matrices, determinants, integral calculus and coordinate geometry and the applications of such tools in the field of engineering and technology

COURSE CONTENT

1. Integral Calculus

1.1 Integration as inverse operation of differentiation

1.2 Simple integration by substitution, by parts and by partial fractions (for Linear factors only)

1.3 Evaluation of definite integrals (simple problems)-

Evaluation of $\int_0^{\pi/2} \text{Sin}^n x.\, dx$, $\int_0^{\pi/2} \text{Cos}^n x\, dx$, $\int_0^{\pi/2} \text{Sin}^m x\ \text{Cos}^n x\, dx$

Using formulae without proof (m and n being positive integers only)

2. Coordinate Geometry

2.1 Equation of straight line in various standard forms (without proof), intersection of two straight lines, angle between two lines. Parallel and perpendicular lines, perpendicular distance formula.

2.2 General equation of a circle and its characteristics. To find the equation of a circle, given: Centre and radius, three points lying on it and coordinates of end points of a diameter.

2.3 Definition of conics (Parabola, Ellipse, Hyperbola) their standard equations without proof. Basic problems on conics when their foci, directrices or vertices are given.

3 Matrices and Determinants

3.1 Definition of matrix and its types.

3.2 Addition, subtraction and multiplication of matrices.

3.3 Expansion of Determinants.

4 Statistics

4.1 Measures of Central Tendency: Mean, Median, Mode

4.2 Measures of Dispersion: Mean deviation, Standard deviation

4.3 Basic Concepts of Probability.

COURSE OUTCOME

After the completion of the course the student will be able to:

- evaluate both indefinite and definite integrals by various methods
- identify various points in a 2-D space along with formulation of equations and graphs for different types of lines, circles, ellipses, parabolas etc.
- find the sum, difference and product of two or more matrices,
- evaluate determinants and their relations to matrices
- find the mean, median, mode and other measures of central tendency.
- solve basic problems on probability.

RECOMMENDED BOOKS:

1. R.D Sharma, Applied Mathematics-II.
2. H.K Das, Applied Mathematics.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 40th Edition, 2007.
4. S.S. Sabharwal, Sunita Jain, Eagle Parkashan, Applied Mathematics, Vol. I & II, Jalandhar.
5. Comprehensive Mathematics, Vol. I & II by Laxmi Publications, Delhi.
6. Reena Garg & Chandrika Prasad, Advanced Engineering Mathematics, Khanna Publishing House, New Delhi
7. Applied Mathematics-II, Eagle Publications.

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	16	35
2	10	20
3	12	25
4	10	20
Total	**48**	**100**

PROGRAM THREE YEAR DIPLOMA IN ENGINEERING AND TECHNOLOGY	
Course Code: **ES202**	Course Title: **Introduction to Computers and Information Technology**
Semester:**2nd**	Credit: **2**
Periods Per Week: **4 (L: 0 T: 0 P: 4)**	

(* Common to Architecture Assistantship, Automobile, Civil, Civil(PHE), QSCM, Computer , Electrical , E&C,Medical Electronics, Food Technology, Garment Technology, I&C, Leather Technology, Mechanical, Textile Design, Textile Technology, Travel and Tourism, MLT, Wood Technology and IT)

COURSE OBJECTIVE

Information technology has great influence on all aspects of our life. Primary purpose of using computer is to make the life easier. 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 tools of MS Office/Open Office using internet etc. form the broad competency profile of diploma holders. This exposure will enable the students to enter their professions with confidence, live in a harmonious way and contribute to the productivity.

COURSE CONTENT

1. **Basics of Information Technology**
   - 1.1. Its concept and scope, applications of IT, ethics and future with information technology.
   - 1.2. Impact of computer and IT in society.
   - 1.3. Computer application in office, book publishing, data analysis, accounting, investment, inventory control, graphics, air and railway ticket reservation, robotics, military, banks, Insurance financial transactions and many more.

2. **Basic Components of Computer System**
   - 2.1. Block diagram of a computer System and Processing of Data.
   - 2.2. Demonstration of computer system viz., Hardware, Software
   - 2.3. Concept of Memory and its various types, Primary and secondary memories (RAM, ROM, Storage Devices etc).

3. **Internet and its Applications**
   - 3.1. Introduction to Internet, its basic working.
   - 3.2. Concept of Email, Social Media, Cloud Computing.
   - 3.3. Basic ideas about IP Address, DNS, URL, Server, Web Browse, LAN etc.

4. Use of Various Basic Data Processing Software

4.1. Word Processing (Microsoft Word & Google Docs.)

4.1.1. File Management:

4.1.1.1. Opening, creating and saving a document, locating files, copying contents in some different file(s).

4.1.2. Editing a document:

4.1.2.1. Entering text, Cut, copy, paste using tool- bars

4.1.3. Formatting a document:

4.1.3.1. Using different fonts, changing font size and colour, changing the appearance through bold/ italic/ underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods

4.1.3.2. Aligning of text in a document, justification of document, Inserting bullets and numbering

4.1.3.3. Formatting paragraph, inserting page breaks and column breaks, line spacing

4.1.3.4. Use of headers, footers: Inserting footnote, end note, use of comments

4.1.3.5. Inserting date, time, special symbols, importing graphic images, drawing tools

4.1.4. Tables and Borders:

4.1.4.1. Creating a table,

4.1.4.2. Formatting cells,

4.1.4.3. Use of different border styles, shading in tables,

4.1.4.4. Merging of cells, partition of cells, inserting and deleting a row in a table

4.1.5. Print preview, zoom, page set up, printing options

4.1.6. Using Find, Replace options

4.2. Microsoft-Excel and Google Sheets

4.2.1. Introduction to Spreadsheet Application-Workbook and Worksheets

4.2.2. Working with data and formulas:

4.2.2.1. Addition, subtraction, division, multiplication, percentage and autosum.

4.2.2.2. Format data, create chart, printing chart, save worksheet, creating and formatting of charts and graphs

4.3. Presentation (Microsoft-PowerPoint and Google Slides)

4.3.1. Introduction to PowerPoint - How to start PowerPoint - Working environment: concept of toolbars, slide layout, templates etc. - Opening a new/existing presentation - Different views for viewing slides in a presentation: normal, slide sorter etc.

4.3.2. Addition, deletion and saving of slides.

4.3.3. Insertion of multimedia elements - Adding text boxes, importing pictures, movies and sound, tables and charts etc.

4.3.4. Formatting slides - Text formatting, changing slide layout, changing slide color scheme - Changing background, Applying design template.

4.3.5. Viewing the presentation using slide navigator

COURSE OUTCOME

After the completion of the course the student will be able to:

- Identify the different hardware components and functional units of a Computer system.
- Explain basic concepts and working of internet.
- Create and format word documents by using different word processing software.
- Prepare the spread sheets and the presentation of data in different ways.
- Prepare power point presentations.

RECOMMENDED BOOKS:

1. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd-Jungpura, New Delhi
2. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
3. Fundamentals of Information Technology by Leon and Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
4. Basics of Information Technology, by Ishan Publications, Ambala
5. Information Technology for Management by Henery Lucas, 7th edition, Tata McGraw Hill Education Pvt Ltd, New Delhi

UNIT WISE TIME AND MARKSDISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	06	10
2	13	20
3	13	20
4	32	50
Total	**64**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN LEATHER TECHNOLOGY	
Course Code: - **LTPC201**	Course Title**: Leather Machinery**
Semester: - **2nd**	**C**redits:- **3**
Periods Per Week:- **(L: 3, T: 0, P: 0)**	

COURSE OBJECTIVE:

The Leather Technologists working in the industries or elsewhere requires the knowledge of the Safety precautions in the operation of Leather machines and their Maintenance. A Leather Technologist requires knowledge of Technical specification and working principal of various leather machines.

COURSE CONTENT

1. LOCATION OF TANNERY (6 Hours)

Selection of site-Infrastructural facilities, Layout of tannery- Different sections, Construction of pits, Provision of sewage, Planning for good ventilation, lighting-Requirement of good quality of water, piping system- Construction of overhead tank-Provision for water lines for the process Implant safety- Electrification of plant/ tannery- Internal transportation system- Internal communication system.

2. **TANNERY MACHINES-I (8 Hours)**

Construction & Working Principles, Sketches, General maintenance, Repair-Specifications & Operations of the following Machines: Paddle, structure, measurement-Drum, capacity, relation between RPM & Dia - Fleshing machine Scudding machine-Suspender & Handler for vegetable tanning- Advanced Drums- Y drum, sample drum, Samming machine- Splitting machine- Shaving machine- Setting machine-Vacuum Dryer- Toggling Unit- Drying chamber- Drying conveyor with hangers- Vibratory staking machine (MOLISSA).

3. **TANNERY MACHINES-II (8 Hours)**

Construction & Working Principles, Sketches, General maintenance, Repair-Specifications & Operations of the following Machines: Slocomb staking machine-Buffing & Snuffing machine- Dust removing machine-Spray booth with spray guns (for hand spray)- Auto spray machine with conveyor, spray patterns- Hydraulic press with plates- Roller coater with conveyor- Curtain coater with conveyor- Glazing machine Area

measuring machine, pin wheel, digital- Gloria type of embossing machine- boarding machine- Ironing machine.

4. **FOOTWEAR MACHINES-I (10 Hours)**

Construction & Working Principles, Sketches, General maintenance, Repair-Specifications & Operations of the following Machines: Arm Type clicking machine-Travelling head press- NC die-less cutting system- Strap cutting machine- Leather splitting machine- Transfer stamping machine- Skiving machine- Seam pressing & Taping machine- Vamp pre-forming machine- Pre forming machine to make shoe lace holes. Edge folding machine- Thermo cementing & folding machine with reinforcing tape- Zig-zag sewing machine- Flat-bad sewing machine (1 or 2 needle)-Post bad sewing machine (1 or 2 needle).

5. **FOOTWEAR MACHINES-II (10 Hours)**

Construction & Working Principles, Sketches, General maintenance, Repair-Specifications & Operations of the following Machines: Machine to sew imitation moccasin- Eyeleting machine- Insole molding machine- Back part molding machine-Machine for conditioning the entire Upper- Toe forming machine- Pulling over & Lasting machine for cemented and other application- Pulling over and lasting machine for Goodyear application- Thermoplastic seat & side laster for cemented application- lasted shoe pounding machine- Heat setting to ironing and conditioning shoe and boot lasted on last- Sole press-Chill setter with conveyor.

6. **LEATHER GOODS & GARMENTS MACHINE (6 Hours)**

Construction & Working Principles, Sketches, General maintenance, Repair-Specifications & Operations of the following Machines: Button holing machine- Bar taking machine- Pocket welting- Electronic pattern sewing machine (Computerized) - Octagonal knife cutting machine- Basting machine- Cylinder bed sewing machine-Decorative stitching machine- Fusing Machine- Thread Burners-Piping machine Brushing & Finishing machine.

COURSE OUTCOME

After the completion of this course, the student will be able to

- Choose suitable site for the establishment of tannery/ leather product plant.
- Explain the Operation & Working Principle of advanced tannery machines
- Explain the Operation, working principle and technical specifications of various simple footwear machines and various advanced footwear machines
- Explain the Operation, working principle and technical specifications of various leather goods and garment machines

Reference Books:-

1. Theory and practice of Leather manufacture –K.T. Sarkar.
2. Principles of leather manufacture - S.S. Dutta.
3. Leather Technicians Hand Book - J.H. Sharphouse.
4. The Chemistry & Technology of Leather – Vol.-II – O. Flaherty, William Roddy, T. Robert, M. Lollar. – E. Robert Krieger Publishing Company, Newyork

UNIT WISE TIME AND MARKS DISTRIBUTION

UNIT No.	Time Allotted (Hrs)	Marks Allotted (%)
1	06	10
2	08	18
3	08	18
4	10	22
5	10	22
6	06	10
Total	**48**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN LEATHER TECHNOLOGY	
Course Code: - **BS202**	Course Title: - **Applied Chemistry**
Semester: - **2nd**	Credits: - 3
Periods Per Week: - **(L: 3, T: 0, P: 0)**	

COURSE OBJECTIVE:

The Leather Technologists working in the industries or elsewhere requires the knowledge of basics of general chemistry, inorganic chemistry, organic chemistry and the chemistry of various leather processing operations.

COURSE CONTENT

1. **GENERAL CHEMISTRY**

Atom – Definition, characteristics of sub-atomic particles (protons, electrons, neutrons) mass, charge, scientists who invented), various atomic models (Thomson's, Rutherford's), Atomic number, Mass number, Isotopes, Isobars and Electronic configuration.

2. CO-ORDINATION COMPOUNDS

Types of salts – (normal, acidic, basic, mixed, double and complex) with examples. Co-ordination compounds - Types of double and complex salts- Werner's Theory of co-ordination - Co-ordination no., co-ordination sphere, legends – Definition - Sedgwick's Theory - Concepts of EAN (Effective Atomic number) and calculation - Valence Bond Theory

3. **ORGANIC CHEMISTRY**

Introduction of organic chemistry - Classification of organic compounds - Hydrocarbons – Saturated and Unsaturated –Purification of organic compounds (crystallisation) distillation and sublimation-Detection of elements- Nomenclature – IUPAC- Isomerism - Definition, Types - Structural [chain, position, functional, metamerism) and Stereo (Optical and Geometrical) with examples. Introduction to aliphatic compounds, Alkynes(General formula, Preparation, properties and uses-methane, ethane), Alkenes (General formula, Preparation, properties and uses of ethane), Alkynes (General formula, Preparation, properties and usesof ethane), Different functional groups, classification, characteristics, examples and uses of Alcohols, Aldehydes, Ketones, Carboxylic acids, Esters, Amines (methylamine). Introduction to aromatic compounds – Coal tar distillation, Differentiate between aliphatic and aromatic compounds-Preparation, properties and uses of Benzene, Preparation, properties and uses of Phenol.

4. **POLYMERS**

Polymerisation, degree of Polymerisation, Classification of Polymers, Preparation properties and uses of some commercially important polymers (P.V.C, Teflon, nylon 6,6 Bakelite, polythene)

COURSE OUTCOME

After completing this course, the student will be able to:

- explain the basic structure of atom and describe the various atomic models.
- explain the chemistry of co-ordination compounds related with Leather Technology
- describe in detail the concept of organic compounds, their classification, nomenclature etc.
- illustrate the importance and applications of Polymers in the leather

Reference Books: -

1. Principals of Inorganic chemistry – B.R. Puri, L.K. Sharma
2. A Text Book of chemistry (Vol – I & II) - Prof.S. Desikachar
3. Advanced Organic Chemistry- Prof. B S Bahl, Arun Bahl and G D Tuli
4. College Chemistry (Vol – I & II) - Indira
5. Conceptual Chemistry (Vol I & II) – Dr. SK Jain and Dr. Shailesh K Jain

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	06	10
2	12	25
3	22	50
4	08	15
Total	**48**	**100**

PROGRAM: **THREE YEARS DIPLOMA PROGRAMME IN LEATHER TECHNOLOGY**	
Course Code: **BS203**	Course Title: **Applied Chemistry Lab**
Semester: - **2nd**	Credits :**1**
Periods Per Week: 2 (L: 0, T: 0, P: 2)	

COURSE OBJECTIVE:

The objective of this Lab course is to learn the basic equipment used in the chemistry lab, qualitative and quantitative analysis of organic compounds in the chemistry lab.

LIST OF EXPERIMENTS:

1. Identification of apparatus used in the Lab
2. Detection of presence of Carboxylic group in a sample of organic compound
3. Detection of presence of Carboxyl group in a sample of organic compound
4. Detection of functional group of aldehyde.
5. Detection of functional groups of carbohydrates
6. Detection of functional group of ketone
7. Detection of amino group.

PROGRAM: **THREE YEARS DIPLOMA PROGRAMME IN LEATHER TECHNOLOGY**	
Course Code: **LTPC202**	Course Title: **Basics of Leather**
Semester: **2nd**	Credits: 3
Periods Per Week: **(L: 3, T: 0, P: 0)**	

COURSE OBJECTIVE:

The students have to understand/ learn about the various kinds/ types of Hides/Skins and their grain characteristics. The students should have requisite knowledge regarding the methods of preservation by means of Temporary / Permanent and the process of manufacturing of Leather from raw to finish.

COURSE CONTENT

UNIT-I Introduction

History of Leather manufacture, Classification and grading of hides and skins.

UNIT-II Anatomical structure of hides and skins.

Structure of Hides and skins & Characteristics - Grain pattern of different Hides and skins - Chemical constituents of Raw Hides and skins –

UNIT-III Proteins

Nature and types of proteins, physical and chemical composition of skin, proteins,

UNIT – IV Preservation of Hides And Skins.

Flaying Techniques - Study of livestock population in India - Putrefaction Mechanism - Curing – Theory - Effect of Bacteria and Mould growth on Rawhides and skins - Wet Salting, brining, Dry salting - Salt less preservation techniques - Defects of hides and skins – Ante mortem and post mortem –

UNIT–V Tannery Operations.

Tannery operations – classification - Unit operations of Leather processing –Sequential Operations in Chrome Tanning & Vegetable Tanning – Hardness of Water - Types of Hardness – Water treatment techniques - Effect of hard water on Tanning process.

UNIT- VI Chemistry Of Pre-Tanning Process.

Soaking - Objectives and chemicals used - Wetting agents- theory - Effect of temperature , pH - Enzymatic soaking - Liming - Objectives and chemicals used - Various methods of liming - Bacterial action on lime liquor - Chemistry operations - Lime yard operation - Deliming - Objectives – Chemicals used - Chemistry of Deliming - Drenching –Chemistry - Difference between Deliming and Drenching - Completion of Deliming - Bating - Objectives - Important factors of bating - Proteolytic enzymes - Pickling - Objective - Depickling - Objective - Degreasing – Objective - Methods of degreasing.

UNIT- VII Chrome Tanning

Introduction to Cr Tanning - Basicity - Chemistry of chrome salts - Werner's theory of coordination complex of Cr compounds - Anionic, cationic, neutral Cr complex – Olation, oxalation, polymerization - Single and double bath process of chrome tanning - Self basified Cr liquor– Masking

UNIT- VIII Vegetable Tanning

Veg. Tannins - Introduction – Classification - Tannins and Non-Tannins - Astringency - Definition - Factors determining astringency

COURSE OUTCOME

After the completion of the course, the student will be able to:

- identify the various raw materials of leather and its chemical constituents
- describe the necessity & urgency of Curing.
- Classify the various tannery operations and describe the importance of water in tanneries
- Illustrate the importance of pre-tanning operations with suitable applications.
- Explain the basic chemistry & application of Cr-tanning & Vegetable tannning used in leather processing.
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RECOMMENDED BOOKS: -

1) Theory and practice of Leather manufacture –K.T. Sarkar.

2) Principles of leather manufacture - S.S. Dutta.

3) Leather Technicians Hand Book - J.H.Sharphouse

UNIT WISE TIME AND MARKS DISTRIBUTION

Unit No.	Time Allotted (Hrs)	Marks Allotted (%)
1	04	08
2	04	08
3	06	12
4	06	10
5	07	18
6	09	20
7	06	12
8	06	12
Total	**48**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN LEATHER TECHNOLOGY	
Course Code: LTPC203	**Course Title: Basics of Leather Lab**
Semester: - 2nd	**Credits :2**
Periods Per Week: 4(L: 0, T: 0, P: 4)	

COURSE OBJECTIVE:

Understand & observe the various raw materials, various Pre-tanning operations and Wet Blue processing with proper safety measures.

LIST OF PRACTICALS:

1. Grading of raw hides and skins as per commercial practice.
2. Tannery practice: Beam house and chrome tanning operations only.
3. Wet blue making.
4. Visit to hide market and flaying centers
5. Visit to tanneries.
6. Visit to laboratories, CLRI, FDDI.
7. Visit to various chemical trading agencies.

PROGRAM: **THREE YEARS DIPLOMA PROGRAMME IN LEATHER TECHNOLOGY**	
Course Code: **LTPC204**	Course Title: **Leather Biotechnology and Microbiology**
Semester: **2nd**	Credits: 3
Periods Per Week: **(L: 3, T: 0, P: 0)**	

COURSE OBJECTIVE:

Diploma holders in Leather Technology are supposed to scientifically examine / study hides and study and this requires microscopic observations. Diploma holders can effectively analyse raw materials only if they are equipped with practical and working knowledge, bacteriology, enzymes and moulds. Diploma holders in leather hall have to understand the application of biotechnology in leather industry

COURSE CONTENT

1. **MICROSCOPY**

Concepts of microscopy - Types of microscope - Light – Bright field, dark field, fluorescent, Phase contrast - Electron Microscopy - X-ray/UV ray microscope - Study and Set up of Compound microscope - Defects and rectifications - Slide preparation, fixing, embedding, sectioning, staining& mounting - Fiber structure and assessment - Orientation and optimal condition of fiber structure - Fiber structural changes takes place during pre-tanning, tanning, post tanning process - Microscopical Assessment of sole And Various finished leathers - Microstructure of Buff, cow, goat and sheep - Grain pattern of different hides/skins - Collagen study by electron microscope technique.

2. **BACTERIOLOGY**

Fundamentals of Bacteriology - Morphological Characteristics of Bacteria - Classification of Bacteria - Staining of Bacteria and its classification - Biochemical Properties of Bacteria - Growth cycle of bacteria and nutrition - Physical conditions required for growth - Effect of environmental factors on bacterial growth - Preparation of various culture media - Sterilization, inoculation, Bacterial count - Control of bacterial growth - Bacterial action on raw hides and skins and in different stages of leather manufacture - And in finished leather - Bacteriological evidence of pollution - Study of Bactericides.

3. **MYCOLOGY & ENTOMOLOGY**

Morphological structure of fungi, classification - Species of moulds associated during different stages of leather manufacture - Damage caused by moulds to tan liquors and to leathers - Effect of mould growth during processing of hides/skins, finished leather, leather goods and during transportation - Moulds

and their differences from bacteria -Effect of environmental factors on mould growth - Testing and prevention of mould growth - Parasitic diseases of livestock - Effect on leather quality - Demodectic- Sarcoptic and psoroptic mange mites, warble flies, ticks and lice.

4. ENZYMOLOGY

Enzymes- Definition, classification and characterization - Chemical and physical properties of enzymes - Chemistry of enzymes- nature and mechanism - Enzymes in leather processing - Uses of enzymes - Proteolytic enzymes- classification, reactive groups and their functions - Assay, characterization - Enzyme kinetics - Immobilized enzymes - Amylase, lipase, protease- production of microbial enzymes - Fermentation – types - Conditions affecting enzyme activity- Enzyme synthesis - Enzyme preparation, regulation & mechanism.

COURSE OUTCOME

After the completion of the course, the student will be able to:

- Identify the various instruments & their applications in Microscopy.
- recognize the effect of Microorganisms in various stages of Leather Processing.
- identify the damages caused by Moulds & Insects
- enumerate and explain the various applications of Enzymes in leather processing.

BOOKS AND REFERENCES

1) Microbiology- Pelczar/ Chan/ Krieg
2) Principles of Biochemistry – Leninger
3) Enzyme Technology in beam house production- Puvanakrishnan&Dhar
4) Fundamental Principles of bacteriology – Salle,A.J
5) Mackie and McCartney's handbook of bacteriology- MackieT.J
6) Practical Bacteriology- Tanner.F.W.
7) Biochemistry – Voet & Voet – John Wiley & Sons Publication.

UNIT WISE TIME AND MARKS DISTRIBUTION

UNIT	TIME (Hrs)	MARKS (%age)
1	14	30
2	14	30
3	10	20
4	10	20
Total	**48**	**100**

PROGRAM: **THREE YEARS DIPLOMA PROGRAMME IN LEATHER TECHNOLOGY**	
Course Code: **LTPC205**	Course Title: **Leather Biotechnology and Microbiology Lab**
Semester: **2nd**	Credits: 1
Periods Per Week: **(L: 0, T: 0, P: 2)**	

COURSE OBJECTIVE:

To Learn / study about the Microorganisms like Bacteria, Mould, etc. & the defects caused to the Leather.

LIST OF PRACTICALS

1. Study of optical part of a compound microscope. Setting up of compound microscope.
2. Identification of hides and skins of different species from their anatomical structure
3. Identification of hides and skins of different species from their grain pattern.
4. Preparation of Microscopical slides by paraffin wax and freezing method
5. Preparation of different culture media
6. Staining of Bacteria.
7. Isolation and identification of pure culture
8. Enumeration of bacteria in skins or in tannery liquors
9. Isolation and identification of fungi in leather
10. Identification of defects caused on hides, skins and leather

CURRICULUM

FOR

SECOND SEMESTER

DIPLOMA IN

MECHANICAL ENGINEERING

SUBJECT STUDY SCHEME (2nd Sem: Mechanical Engineering)

Course Code	Subjects	Time in Hours				CREDITS		
		Theory	Tutorial	Practical	Total	Theory	Practical	Total
BS201	Applied Mathematics-II	3	1	--------	4	4	--------	4
ES202	Introduction to Computers and Information Technology	---	---	4	4	----	2	2
ES207	Applied Mechanics	4	1	-----	5	5		5
ES208	Applied Mechanics Lab	----	------	2	2	---	1	1
MEPC205	Mechanical Engineering Drawing	--------	--------	4	4	--------	2	2
MEPC206	Material Science and Metallurgy	3	---	---	3	3		3
MEPC207	Material Science and Metallurgy Lab	----	------	2	2	---	1	1
MEPC208	Manufacturing Technology-I	3	----	---	3	3		3
MEPC209	Manufacturing Technology-I Lab	----	------	2	2	---	1	1
	Total	13	2	14	29*	15	7	22

* * Note: The remaining 1 hour in a week shall be utilized for sports and other activities like debates, seminar etc.

PROGRAM: THREE YEAR DIPLOMA IN ENGINEERING AND TECHNOLOGY *	
Course Code: **BS201**	Course Title: **Applied Mathematics-II**
Semester: **2nd**	Credit: **4**
Periods Per Week: **4 (L: 03, T: 01, P: 0)**	

(* Common to Architecture Assistantship, Automobile, Civil, Civil(PHE), QSCM,Computer , Electrical , E&C,Medical Electronics, Food Technology, I&C,Leather Technology, Mechanical,Textile Technology, Wood Technology and IT)

COURSE OBJECTIVE:

This course is designed to develop an understanding of basic mathematical and statistical tools which include matrices, determinants, integral calculus and coordinate geometry and the applications of such tools in the field of engineering and technology

COURSE CONTENT

1. Integral Calculus

1.1 Integration as inverse operation of differentiation

1.2 Simple integration by substitution, by parts and by partial fractions (for Linear factors only)

1.3 Evaluation of definite integrals (simple problems)-

Evaluation of $\int_0^{\pi/2} \sin^n x\, dx$, $\int_0^{\pi/2} \cos^n x\, dx$, $\int_0^{\pi/2} \sin^m x \cos^n x\, dx$

Using formulae without proof (m and n being positive integers only)

2. Coordinate Geometry

2.1 Equation of straight line in various standard forms (without proof), intersection of two straight lines, angle between two lines. Parallel and perpendicular lines, perpendicular distance formula.

2.2 General equation of a circle and its characteristics. To find the equation of a circle, given: Centre and radius, three points lying on it and coordinates of end points of a diameter.

2.3 Definition of conics (Parabola, Ellipse, Hyperbola) their standard equations without proof. Basic problems on conics when their foci, directrices or vertices are given.

3 Matrices and Determinants

3.1 Definition of matrix and its types.

3.2 Addition, subtraction and multiplication of matrices.

3.3 Expansion of Determinants.

4 Statistics

4.1 Measures of Central Tendency: Mean, Median, Mode

4.2 Measures of Dispersion: Mean deviation, Standard deviation

4.3 Basic Concepts of Probability.

COURSE OUTCOME

After the completion of the course the student will be able to:

- evaluate both indefinite and definite integrals by various methods
- identify various points in a 2-D space along with formulation of equations and graphs for different types of lines, circles, ellipses, parabolas etc.
- find the sum, difference and product of two or more matrices,
- evaluate determinants and their relations to matrices
- find the mean, median, mode and other measures of central tendency.
- solve basic problems on probability.

RECOMMENDED BOOKS:

1. R.D Sharma, Applied Mathematics-II.
2. H.K Das, Applied Mathematics.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 40th Edition, 2007.
4. S.S. Sabharwal, Sunita Jain, Eagle Parkashan, Applied Mathematics, Vol. I & II, Jalandhar.
5. Comprehensive Mathematics, Vol. I & II by Laxmi Publications, Delhi.
6. Reena Garg & Chandrika Prasad, Advanced Engineering Mathematics, Khanna Publishing House, New Delhi
7. Applied Mathematics-II, Eagle Publications.

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	16	35
2	10	20
3	12	25
4	10	20
Total	**48**	**100**

PROGRAM THREE YEAR DIPLOMA IN ENGINEERING AND TECHNOLOGY	
Course Code: **ES202**	Course Title: **Introduction to Computers and Information Technology**
Semester:**2nd**	Credit: **2**
Periods Per Week: **4 (L: 0 T: 0 P: 4)**	

(* Common to Architecture Assistantship, Automobile, Civil, Civil(PHE), QSCM,Computer , Electrical , E&C,Medical Electronics, Food Technology, Garment Technology, I&C,Leather Technology, Mechanical, Textile Design, Textile Technology, Travel and Tourism, MLT, Wood Technology and IT)

COURSE OBJECTIVE

Information technology has great influence on all aspects of our life. Primary purpose of using computer is to make the life easier. 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 tools of MS Office/Open Office using internet etc. form the broad competency profile of diploma holders. This exposure will enable the students to enter their professions with confidence, live in a harmonious way and contribute to the productivity.

COURSE CONTENT

1. **Basics of Information Technology**
   - 1.1. Its concept and scope, applications of IT, ethics and future with information technology.
   - 1.2. Impact of computer and IT in society.
   - 1.3. Computer application in office, book publishing, data analysis, accounting, investment, inventory control, graphics, air and railway ticket reservation, robotics, military, banks, Insurance financial transactions and many more.

2. **Basic Components of Computer System**
   - 2.1. Block diagram of a computer System and Processing of Data.
   - 2.2. Demonstration of computer system viz., Hardware, Software
   - 2.3. Concept of Memory and its various types, Primary and secondary memories (RAM, ROM, Storage Devices etc).

3. **Internet and its Applications**
   - 3.1. Introduction to Internet, its basic working.
   - 3.2. Concept of Email, Social Media, Cloud Computing.
   - 3.3. Basic ideas about IP Address, DNS, URL, Server, Web Browser,LAN etc.

4. Use of Various Basic Data Processing Softwares

4.1. Word Processing (Microsoft Word & Google Docs.)

4.1.1. File Management:

4.1.1.1. Opening, creating and saving a document, locating files, copying contents in some different file(s).

4.1.2. Editing a document:

4.1.2.1. Entering text, Cut, copy, paste using tool- bars

4.1.3. Formatting a document:

4.1.3.1. Using different fonts, changing font size and colour, changing the appearance through bold/ italic/ underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods

4.1.3.2. Aligning of text in a document, justification of document,Inserting bullets and numbering

4.1.3.3. Formatting paragraph, inserting page breaks and column breaks, line spacing

4.1.3.4. Use of headers, footers: Inserting footnote, end note, use of comments

4.1.3.5. Inserting date, time, special symbols, importing graphic images, drawing tools

4.1.4. Tables and Borders:

4.1.4.1. Creating a table,

4.1.4.2. Formatting cells,

4.1.4.3. Use of different border styles, shading in tables,

4.1.4.4. Merging of cells, partition of cells, inserting and deleting a row in a table

4.1.5. Print preview, zoom, page set up, printing options

4.1.6. Using Find, Replace options

4.2. Microsoft-Excel and Google Sheets

4.2.1. Introduction to Spreadsheet Application-Workbook and Worksheets

4.2.2. Working with data and formulas:

4.2.2.1. Addition, subtraction, division, multiplication, percentage and autosum.

4.2.2.2. Format data, create chart, printing chart, save worksheet, creating and formatting of charts and graphs

4.3. Presentation (Microsoft-PowerPoint and Google Slides)

4.3.1. Introduction to PowerPoint - How to start PowerPoint - Working environment: concept of toolbars, slide layout, templates etc. - Opening a new/existing presentation - Different views for viewing slides in a presentation: normal, slide sorter etc.

4.3.2. Addition, deletion and saving of slides.

4.3.3. Insertion of multimedia elements - Adding text boxes, importing pictures, movies and sound, tables and charts etc.

4.3.4. Formatting slides - Text formatting, changing slide layout, changing slide color scheme - Changing background, Applying design template.

4.3.5. Viewing the presentation using slide navigator

COURSE OUTCOME

After the completion of the course the student will be able to:

- Identify the different hardware components and functional units of a Computer system.
- Explain basic concepts and working of internet.
- Create and format word documents by using different word processing software.
- Prepare the spread sheets and the presentation of data in different ways.
- Prepare power point presentations.

RECOMMENDED BOOKS:

1. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd-Jungpura, New Delhi
2. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
3. Fundamentals of Information Technology by Leon and Leon;Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
4. Basics of Information Technology, by Ishan Publications, Ambala
5. Information Technology for Management by Henery Lucas, 7th edition, Tata McGraw Hill Education Pvt Ltd, New Delhi

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	06	10
2	13	20
3	13	20
4	32	50
Total	**64**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN MECHANICAL ENGINEERING	
Course Code: **ES207**	Course Title: **APPLIED MECHANICS***
Semester: 2nd	Credits: **05**
Periods Per Week :5 **(L: 4, T: 1, P:0)**	

(* Common to Automobile, Civil, Civil (PHE), QSCM, Mechanical, Wood Technology,)

COURSE OBJECTIVE:

The objectives of the course are to determine the resultant of various forces and to compute support reactions using equilibrium conditions for various structures and to understand the significance of friction in equilibrium problems, basic machine rules and their applications in different engineering problems

COURSE CONTENT

1. Basics of mechanics and force system

1.1. Significance and relevance of Mechanics, Applied mechanics, Statics, Dynamics
1.2. Space, time, mass, particle, flexible body and rigid body. Scalar and vector quantity, Units of measurement (SI units) - Fundamental units and derived units.
1.3. Force – unit, representation as a vector and by Bow's notation, characteristics and effects of a force, Principle of transmissibility of force, Force system and its classification.
1.4. Resolution of a force - Orthogonal components of a force, moment of a force, Varignon's Theorem
1.5. Composition of forces – Resultant, analytical method for determination of resultant for concurrent, non-concurrent and parallel co-planar force systems – Law of triangle, parallelogram and polygon of forces

2. Equilibrium

2.1. Equilibrium and Equilibrant, Free body and Free body diagram, Analytical and graphical methods of analysing equilibrium
2.2. Lami's Theorem – statement and explanation, Application for various engineering problems.
2.3. Types of beam, supports (simple, hinged, roller and fixed) and loads acting on beam (vertical and inclined point load, uniformly distributed load, couple)
2.4. Beam reaction for cantilever, simply supported beam with or without overhang subjected to combination of Point load and uniformly distributed load.
2.5. Beam reaction graphically for a simply supported beam subjected to vertical point loads only.

3. Friction

3.1. Friction and its relevance in engineering, types and laws of friction, limiting equilibrium, limiting friction, co-efficient of friction, angle of friction, angle of

repose, relation between co-efficient of friction and angle of friction.

3.2. Equilibrium of bodies on level surface subjected to force parallel and inclined to plane.

3.3. Equilibrium of bodies on inclined plane subjected to force parallel to the plane only.

4. Centroid and centre of gravity

4.1. Centroid of geometrical plane figures (square, rectangle, triangle, circle, semi-circle, quarter circle)

4.2. Centroid of composite figures composed of not more than three geometrical figures

4.3. Centre of Gravity of simple solids (Cube, cuboid, cone, cylinder, sphere, hemisphere)

4.4. Centre of Gravity of composite solids composed of not more than two simple solids

5. Simple lifting machine

5.1. Simple lifting machine, load, effort, mechanical advantage, applications and advantages.

5.2. Velocity ratio, efficiency of machines, law of machines.

5.3. Ideal machine, friction in machine, maximum Mechanical advantage and efficiency, reversible and non-reversible machines, conditions for reversibility

5.4. Velocity ratios of Simple axle and wheel, Differential axle and wheel, Worm and worm wheel, Single purchase and double purchase crab winch, Simple screw jack, Weston's differential pulley block, geared pulley block.

COURSE OUTCOME

After completing this course, the student will be able to:

- Identify the force systems for given conditions by applying the basics of mechanics.
- Determine unknown force(s) of different engineering systems.
- Apply the principles of friction in various conditions for useful purposes.
- Find the centroid and centre of gravity of various components in engineering systems.
- Calculate mechanical advantage, velocity ratio and efficiency of simple lifting machine

RECOMMENDED BOOKS

1. D.S. Bedi, Engineering Mechanics, Khanna Publications, New Delhi.
2. Khurmi, R.S., Applied Mechanics, S. Chand & Co. New Delhi.
3. Bansal R K, A text book of Engineering Mechanics, Laxmi Publications.
4. Ramamrutham, Engineering Mechanics, S. Chand & Co. New Delhi.
5. Dhade, Jamadar &Walawelkar, Fundamental of Applied Mechanics, Pune VidhyarthiGruh.
6. Ram, H. D.; Chauhan, A. K., Foundations and Applications of Applied Mechanics, Cambridge University Press.
7. Meriam, J. L., Kraige, L.G., Engineering Mechanics- Statics, Vol. I, Wiley Publication, New Delhi
8. Applied Mechanics by Er. Arun Bangotra, Eagle Prakashan

UNIT WISE TIME AND MARKS DISTRIBUTION

Unit	Time (Hours)	Marks(%age)
1	17	25
2	15	22
3	10	17
4	11	18
5	11	18
Total	**64**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN MECHANICAL ENGINEERING	
Course Code: **ES208***	Course Title: **APPLIED MECHANICS LAB***
Semester: 2ND	Credits: **01**
Periods Per Week :**2 (L: 0, T: 0, P:2)**	

(* Common to Automobile, Civil, Civil (PHE), QSCM, Mechanical and Wood Technology)

COURSE OBJECTIVES:

The objectives of the course are to determine the resultant of various forces and to compute support reactions using equilibrium conditions for various structures and to understand the significance of friction in equilibrium problems, basic machine rules and their application in different engineering problems

LIST OF PRACTICAL TO BE PERFORMED:

1. To study various equipment related to Engineering Mechanics.
2. To find the M.A., V.R., Efficiency and law of machine for Differential Axle and Wheel.
3. To find the M.A., V.R., Efficiency and law of machine for Simple Screw Jack.
4. Derive Law of machine using Worm and worm wheel.
5. Derive Law of machine using Single purchase crab.
6. Derive Law of machine using double purchase crab.
7. Derive Law of machine using Weston's differential or wormed geared pulley block.
8. Verification of Polygon Law of Forces using gravesand apparatus
9. Determine resultant of concurrent force system graphically.
10. Determine resultant of parallel force system graphically.
11. Verify Lami's theorem.
12. Study forces in various members of Jib crane.
13. Determine support reactions for simply supported beam.
14. To obtain support reactions of beam using graphical method.
15. Determine coefficient of friction for motion on horizontal and inclined plane.
16. Determine centroid of geometrical plane figures.

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN MECHANICAL ENGINEERING	
Course Code: **MEPC205**	Course Title: **Mechanical Engineering Drawing**
Semester: **2ND**	Credits: **2**
Periods Per Week :**4 (L: 0, T: 0, P: 4)**	

COURSE OBJECTIVE:

The objectives of the course are to make the students understand and interpret drawings of machine Components so as to prepare assembly drawings and to familiarize the students with Indian Standards on drawing practices and standard components

COURSE CONTENT

1. **Symbols and Conventions**

1.1. Mechanical Engineering Symbols/ Conventions
1.2. Electrical Engineering Symbols/Conventions.

2. Screw Threads

2.1. Types of Threads- Internal and External Threads, Right hand and Left hand threads (actual and conventional representation)
2.2. Different forms of Screw Threads- V-Threads (B.S.W Threads, American National and Metric thread)
2.3. Square Thread (Square, Acme, Buttress and Knuckle Thread)

3. Nuts and Bolts

3.1. Detailed Drawing of Hexagonal Nut and Hexagonal Bolt.
3.2. Assembly Drawing of Hexagonal Nut and Bolt with washer.
3.3. Detailed Drawing of Square Nut and Square Bolt.
3.4. Assembly Drawing of Square Nut and Bolt with washer.

4. Rivets and Riveted Joints

4.1. Various types of Rivet Heads.
4.2. Types of Riveted joints
a) Lap joint- Single Riveted, Double Riveted (Chain and Zig Zag)
b) Butt joint- Single Riveted, Single cover Butt joint and Double riveted double cover butt joint (Chain and Zig Zag)

5. Keys, Cotters and Coupling. (Free Hand Sketch)

5.1. Various types of keys and cotters.
5.2. Various types of Joints :-
a) Spigot and Socket Joint
b) Gib and Cotter Joint

c) Knuckle Joint

5.3. Pipe Joints:- Expansion Pipe Joint. (Assembly Drawing)
Flanged Pipe and Right-angled bend joint. (Assembly Drawing)
Spigot and Socket Joint

5.4. Coupling:- Flange Coupling (protected and non-protected)
Universal coupling and Oldham Coupling

6. Auto CAD

6.1. Various types of Modify Commands.
6.2. Dimensioning and placing text in drawing area.
6.3. Drawing of objects which were drawn by free hand Sketching in Unit 5.
6.4. Sectioning and hatching .
6.5. Concept of Layers and Work on Multiple Layers.

COURSE OUTCOME

After completing this course, the student will be able to:

- Draw the assembly drawings of nut, bolt, rivets, keys and cotter and couplings.
- Identify various CAD commands and use them to draw various machine components.

RECOMMENDED BOOKS

1. Elementary Engineering Drawing (in first angle projection) by ND Bhatt, Charotar Publishing House
2. A Text Book of Engineering Drawing by Surjit Singh Published by Dhanpat Rai and Co. Delhi
3. Engineering Drawing by PS Gill; published by SK kataria and Sons, New Delhi
4. Machine Drawing by RB Gupta published by Satya Prakashan, New Delhi.

UNIT WISE TIME AND MARKS DISTRIBUTION

Unit	Time (Hours)	Marks(%age)
1	03	05
2	05	10
3	12	15
4	12	15
5	14	25
6	18	30
Total	**64**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN MECHANICAL ENGINEERING	
Course Code: **MEPC206**	Course Title: **MATERIAL SCIENCE AND METTALURGY**
Semester: **2ND**	Credits: **3**
Periods Per Week :**3 (L: 3, T: 0, P: 0)**	

COURSE OBJECTIVES:

The objective of the course is enable the candidate to comprehend atomic bonding and crystal formations, to learn the characteristics of various kinds of ferrous metals and alloys, and to better understand the characteristics of various non-ferrous metal and alloy types; moreover, to comprehend various metallic failures, learn about material testing.

COURSE CONTENT

1. Crystal structures and Bonds:

1.1. Unit cell and space lattice: Crystal system: The seven basic crystal systems; Crystal structure for metallic elements: BCC, FCC and HCP; Coordination number for Simple Cubic, BCC and FCC; Atomic radius: definition, atomic radius for Simple Cubic, BCC and FCC; Atomic Packing Factor for Simple Cubic, BCC, FCC and HCP; Simple problems on finding number of atoms for a unit cell.

1.2. Bonds in solids: Classification - primary or chemical bond, secondary or molecular bond; Types of primary bonds: Ionic, Covalent and Metallic Bonds; Types of secondary bonds: Dispersion bond, Dipole bond and Hydrogen bond.

2. Phase diagrams, Ferrous metals and its Alloys:

2.1. Isomorphs, eutectic and eutectoid systems; Iron-Carbon binary diagram; Iron and Carbon Steels; flow sheet for production of iron and steel;

2.2. Iron ores – Pig iron: classification, composition and effects of impurities on iron; Cast Iron: classification, composition, properties and uses;

2.3. Wrought Iron: properties, uses/applications of wrought Iron; comparison of cast iron, wrought iron and mild steel and high carbon steel; standard commercial grades of steel as per BIS and AISI;

2.4. Alloy Steels – purpose of alloying; effects of alloying elements –

2.5. Important alloy steels: Silicon steel, High Speed Steel (HSS), heat resisting steel, spring steel, Stainless Steel (SS): types of SS,

2.6. Applications of SS – magnet steel – composition, properties and

3. Non-ferrous metals and its Alloys:

3.1. Properties and uses of aluminium, copper, tin, lead, zinc, magnesium and nickel;

3.2. Copper alloys: Brasses, bronzes – composition, properties and uses;

3.3. Aluminium alloys: Duralumin, hindalium, magnelium – composition, properties and uses;

3.4. Nickel alloys: Inconel, Monel, nicPerome – composition, properties and uses.
3.5. Anti-friction/Bearing alloys: Various types of bearing bronzes - Standard commercial grades as per BIS/ASME.

4. Failure analysis & Testing of Materials:

4.1. Introduction to failure analysis; Fracture: ductile fracture, brittle fracture; cleavage; notch sensitivity; fatigue; endurance limit; characteristics of fatigue fracture; variables affecting fatigue life; creep; creep curve; creep fracture;
4.2. Destructive testing: Tensile testing; compression testing; Hardness testing: Brinell, Rockwell; bend test; torsion test; fatigue test; creep test.
4.3. Non-destructive testing: Visual Inspection; magnetic particle inspection; liquid penetrant test; ultrasonic inspection; radiography.

5. Theory of Heat Treatment:

5.1. Purpose of heat treatment, Solid solutions and its types,
5.2. Iron Carbon diagram, Formation and decomposition of Austenite, Martensitic Transformation – Simplified Transformation Cooling Curves
5.3. Various heat treatment processes hardening, tempering, annealing, normalizing, Case hardening and surface hardening,
5.4. Types of heat treatment furnaces required for above operations (only basic Idea)

COURSE OUTCOME

After the completion of the course the student will be able to :

- Explain about crystal structures and atomic bonds.
- Describe about classification of ferrous metals and their properties.
- Explain about non-ferrous metals, cutting tool materials and composites along with their properties.
- Understand various metallic failures and can conduct destructive and nondestructive testing of materials.

RECOMMENDED BOOKS

1. A Text Book of Material Science & Metallurgy – O.P. Khanna, Dhanpath Rai and Sons, New Delhi.
2. Material Science & Engineering – R.K. Rajput, S.K. Kataria& Sons, New Delhi.
3. Material Science – R.S. Khurmi, S. Chand & Co. Ltd., New Delhi.

UNIT WISE TIME AND MARKS DISTRIBUTION

Unit	Time (Hours)	Marks(%age)
1	12	26
2	12	24
3	12	18
4	08	16
5	08	16
Total	**48**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN MECHANICAL ENGINEERING	
Course Code: **MEPC207**	Course Title: **MATERIAL SCIENCE AND METTALURGY LAB**
Semester: **2ND**	Credits: **1**
Periods Per Week :**2 (L: 0, T: 0, P: 2)**	

COURSE OBJECTIVE:

The objective of the course is enable the candidate the practical aspects of atomic bonding and crystal formations, to learn the characteristics of various kinds of ferrous metals and alloys, and to better understand the characteristics of various non-ferrous metal and alloy types; moreover, to comprehend various metallic failures, learn about material testing.

LIST OF PRACTICALS:

1. Classification of about 25 specimens of materials/machine parts into
   (i) Metals and non metals
   (ii) Metals and alloys
   (iii) Ferrous and non ferrous metals
   (iv) Ferrous and non ferrous alloys

2. Given a set of specimen of metals and alloys (copper, brass, aluminium, cast iron, HSS, Gun metal); identify and indicate the various properties possessed by them.

3. a) Study of heat treatment furnace.
   b) Study of a thermocouple/pyrometer.

4. Study of a metallurgical microscope and a specimen polishing machine.

5. To prepare specimens of following materials for microscopic examination and to examine the microstructure of the specimens of following materials:
   i) Brass
   ii) Copper
   iii) Grey
   iv) Malleable
   v) Low carbon steel
   vi) High carbon steel
   vii) HSS

6. To anneal a given specimen and find out difference in hardness as a result of annealing.

7. To normalize a given specimen and to find out the difference in hardness as a result of normalizing.

8. To harden and temper a specimen and to find out the difference in hardness due to Tempering.

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN MECHANICAL ENGINEERING	
Course Code: **MEPC208**	Course Title: **MANUFACTURING TECHNOLOGY-I**
Semester: **2ND**	Credits: **3**
Periods Per Week: 3 **(L: 3, T: 0, P: 0)**	

COURSE OBJECTIVE:

The objective of this course is to familiarize the students with various fabrication and manufacturing techniques like welding, casting and molding, forging and forming, besides enable them to understand production techniques for metal powder.

COURSE CONTENT

1. Foundry Technology

1.1. Patterns: Definition – types of pattern – solid piece – split piece – loose piece – match plate – sweep – skeleton – segmental – shell – pattern materials – pattern allowances.

1.2. Moulding: Moulding sand – constituents – types – properties of moulding sand – moulding sand preparation – moulding tools – moulding boxes – types of Moulds – green sand mould – dry sand mould – loam sand mould – methods of Moulding – Moulding machines – Jolting – Squeezing – sand slinger Construction and working principle.

1.3. Cores: Essential qualities of core – materials – core sand preparation – core binders – core boxes – CO2 process core making – types of core.

1.4. Metallurgy: Introduction – Iron-carbon diagram. Melting furnaces: Blast furnace – Cupola furnace – Crucible furnace – types – Pit furnace – Coke fired – Oil fired – Electric furnace – types – Direct arc – Indirect arc – Induction furnace –working principles

2. Casting:

2.1. Shell mould casting – Investment casting – Pressure die casting – Hot chamber die casting – Cold chamber die casting – Gravity die casting – Centrifugal casting – Continuous casting.

2.2. Defects in casting – causes and remedies.

3. Welding Technology

3.1. Arc Welding: Definition – arc welding equipment – electrode types – filler and flux materials – arc welding methods – Metal arc – Metal Inert gas (MIG) – Tungsten inert gas (TIG) - Submerged arc - Electro slag welding – Resistance welding – Spot welding – Butt welding – Seam welding – Plasma arc welding – Thermit welding – Electron beam welding – Laser beam welding – Friction welding – Ultrasonic welding – Induction welding – working principle – applications – Advantages and disadvantages.

3.2. Gas welding: Oxy-acetylene welding – advantages – limitations – gas welding equipment –three types of flames – welding techniques – filler rods. – Flame cutting – soldering – brazing – difference between soldering and brazing.

3.3. Types of welded joints –Selection of welding rod and type of flame for gas welding of

ferrous metals- merits and demerits of welded joints – Inspection and testing of welded joints – destructive and non-destructive types of tests – magnetic particle test – radiographic and ultrasonic test - defects in welding – causes and remedies.

4. Forming Technology

4.1. Forging: Hot working, cold working – advantages of hot working and cold working – hot working operations – rolling, forging, smith forging, drop forging, upset forging, press forging – roll forging.

4.2. Press Working: Types of presses – mechanical and hydraulic presses – press tools and accessories – press working operations – bending operations – angle bending – channel bending – curling – drawing – shearing operations – blanking, piercing, trimming – notching – lancing.

5. Powder Metallurgy:

5.1. Methods of manufacturing metal powders – atomization, reduction and electrolysis deposition – compacting – sintering – sizing – infiltration – mechanical properties of parts made by powder metallurgy – design rules for the power metallurgy process.

COURSE OUTCOME

After completion of the course the student will be able to :

- Demonstrate understanding of casting process.
- Illustrate principles of forming processes.
- Demonstrate applications of various types of welding processes.
- Explain the concepts of rolling, forming and forging.
- Illustrate the concept of powder metallurgy.

RECOMMENDED BOOKS

1. Elements of Workshop Technology Volume I & II, Hajra Chowdry& Bhatt Acharaya, Media Promoters,
2. Introduction of Basic Manufacturing Processes and Workshop Technology, Rajender singh, New age International (P) Ltd. New Delhi
3. Manufacturing Process Begeman, Tata McGraw Hill, New Delhi.
4. Workshop Technology- Volume I, II, & III, WAJ Chapman Viva Books Pvt. Ltd., New Delhi.
5. Workshop Technology by BS Raghuvanshi: Dhanpat Rai and Sons Delhi
6. Elements of Workshop Technology by SK Choudhry and Hajra: Asia Publishing House

UNIT WISE TIME AND MARKS DISTRIBUTION

Unit	Time (Hours)	Marks(%age)
1	14	30

2	05	12
3	16	30
4	08	16
5	05	12
Total	**48**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN MECHANICAL ENGINEERING	
Course Code: **MEPC209**	Course Title: **MANUFACTURING TECHNOLOGY-I LAB**
Semester: **2ND**	Credits: 1
Periods Per Week : 2 **(L: 0, T: 0, P: 2)**	

COURSE OBJECTIVE:

The objective of this course is to familizize the candidates with the various casting, moulding, furnace, and casting process kinds, along with the design and operation of various welding techniques, besides to enable to comprehend various shaping processes and production techniques for metal powder.

LIST OF PRACTICALS

1. General introduction to hand tools used in foundry, welding and pattern making and smithy shop.

2. Welding Shop

Job 1. Preparing gas welding joint in vertical position joining M.S. Plates
Job 2. Exercise on gas cutting of mild steel plate with oxy-acetylene gas torch.
Job 3. Exercise on gas welding of cast iron and brass part or component.
Job 4. Exercise on preparation of T Joint by arc welding
Job 5. Exercise on spot welding/seam welding
Job 6. Exercise on MIG and TIG welding

3. Pattern making

Job 1. Preparation of solid/single piece pattern.
Job 2. Preparation of two piece/split pattern
Job 3. Preparation of a pattern on wooden lathe
Job 4. Preparation of a self cored pattern
Job 5. Preparation of a core box.

4. Foundry Shop

Job 1. Preparation of mould with solid pattern on floor.
Job 2. Preparation of floor mould of solid pattern using cope.
Job 3. Preparation of floor mould of split pattern in cope and drag of moulding box.
Job 4. Moulding and casting of a solid pattern of aluminum
Job 5. Preparing a mould of step pulley and also preparing core for the same.
Job 6. A visit to cast iron foundry should be arranged to have first hand knowledge of cast iron melting pouring and casting.
Job 7. Testing of moisture contents and strength of moulding sand.

5. Forging Shop/Machine Shop

Job 1. Preparation of single ended spanner by hand/machine forging.
Job 2. Preparation of simple die
Job 3. Turning and facing operations on Lathe Machine.
Job 4. External and Internal thread cutting on a lathe machine
Job 5. Demonstration of Knurling operation

CURRICULUM

FOR

SECOND SEMESTER

DIPLOMA IN

MEDICAL LAB TECHNOLOGY

SUBJECT STUDY SCHEME (2nd Semester: MEDICAL LAB TECHNOLOGY)

Course Code	Subjects	Time in Hours				CREDITS		
		Theory	Tutorial	Practical	Total	Theory	Practical	Total
ES202	Introduction to Computers and Information Technology	---	---	4	4	----	2	2
MLPC201	Clinical Pathology	2	-------		2	2	--	2
MLPC202	Clinical Pathology LAB			4	4		2	2
MLPC203	Anatomy and Physiology-II	2	-------		2	2	--	2
MLPC204	Anatomy and Physiology-II LAB			2	2		1	1
MLPC205	Clinical Microbiology-II	3	-------		3	3	---	3
MLPC206	Clinical Microbiology-II LAB	---	----	2	2		1	1
MLPC207	Clinical Hematology-II	2	-------		2	2	---	2
MLPC208	Clinical Hematology-II LAB			2	2		1	1
MLPC209	Clinical Biochemistry-II	3	-------		3	3	---	3
MLPC210	Clinical Biochemistry-II LAB			2	2		1	1
BS211	Environmental Science	2	--	--	2	2	--	2
	Total	14	---	16	30	14	8	22

PROGRAM THREE YEAR DIPLOMA IN MEDICAL LAB TECHNOLOGY	
Course Code: **ES202**	Course Title: **Introduction to Computers and Information Technology**
Semester:**2nd**	Credit: **2**
Periods Per Week: **4 (L: 0 T: 0 P: 4)**	

(* Common to Architecture Assistantship, Automobile, Civil, Civil(PHE), QSCM,Computer , Electrical , E&C,Medical Electronics, Food Technology, Garment Technology, I&C,Leather Technology, Mechanical, Textile Design, Textile Technology, Travel and Tourism, MLT, Wood Technology and IT)

COURSE OBJECTIVE

Information technology has great influence on all aspects of our life. Primary purpose of using computer is to make the life easier. 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 tools of MS Office/Open Office using internet etc. form the broad competency profile of diploma holders. This exposure will enable the students to enter their professions with confidence, live in a harmonious way and contribute to the productivity.

COURSE CONTENT

1. **Basics of Information Technology**
   - 1.1. Its concept and scope, applications of IT, ethics and future with information technology.
   - 1.2. Impact of computer and IT in society.
   - 1.3. Computer application in office, book publishing, data analysis, accounting, investment, inventory control, graphics, air and railway ticket reservation, robotics, military, banks, Insurance financial transactions and many more.

2. **Basic Components of Computer System**
   - 2.1. Block diagram of a computer System and Processing of Data.
   - 2.2. Demonstration of computer system viz., Hardware, Software
   - 2.3. Concept of Memory and its various types, Primary and secondary memories (RAM, ROM, Storage Devices etc).

3. **Internet and its Applications**
   - 3.1. Introduction to Internet, its basic working.
   - 3.2. Concept of Email, Social Media, Cloud Computing.
   - 3.3. Basic ideas about IP Address, DNS, URL, Server, Web Browser,LAN etc.

4. Use of Various Basic Data Processing Softwares

4.1. Word Processing (Microsoft Word & Google Docs.)

4.1.1. File Management:

4.1.1.1. Opening, creating and saving a document, locating files, copying contents in some different file(s).

4.1.2. Editing a document:

4.1.2.1. Entering text, Cut, copy, paste using tool- bars

4.1.3. Formatting a document:

4.1.3.1. Using different fonts, changing font size and colour, changing the appearance through bold/ italic/ underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods

4.1.3.2. Aligning of text in a document, justification of document,Inserting bullets and numbering

4.1.3.3. Formatting paragraph, inserting page breaks and column breaks, line spacing

4.1.3.4. Use of headers, footers: Inserting footnote, end note, use of comments

4.1.3.5. Inserting date, time, special symbols, importing graphic images, drawing tools

4.1.4. Tables and Borders:

4.1.4.1. Creating a table,

4.1.4.2. Formatting cells,

4.1.4.3. Use of different border styles, shading in tables,

4.1.4.4. Merging of cells, partition of cells, inserting and deleting a row in a table

4.1.5. Print preview, zoom, page set up, printing options

4.1.6. Using Find, Replace options

4.2. Microsoft-Excel and Google Sheets

4.2.1. Introduction to Spreadsheet Application-Workbook and Worksheets

4.2.2. Working with data and formulas:

4.2.2.1. Addition, subtraction, division, multiplication, percentage and autosum.

4.2.2.2. Format data, create chart, printing chart, save worksheet, creating and formatting of charts and graphs

4.3. Presentation (Microsoft-PowerPoint and Google Slides)

4.3.1. Introduction to PowerPoint - How to start PowerPoint - Working environment: concept of toolbars, slide layout, templates etc. - Opening a new/existing presentation - Different views for viewing slides in a presentation: normal, slide sorter etc.

4.3.2. Addition, deletion and saving of slides.

4.3.3. Insertion of multimedia elements - Adding text boxes, importing pictures, movies and sound, tables and charts etc.

4.3.4. Formatting slides - Text formatting, changing slide layout, changing slide color scheme - Changing background, Applying design template.

4.3.5. Viewing the presentation using slide navigator

COURSE OUTCOME

After the completion of the course the student will be able to:

- Identify the different hardware components and functional units of a Computer system.
- Explain basic concepts and working of internet.
- Create and format word documents by using different word processing software.
- Prepare the spread sheets and the presentation of data in different ways.
- Prepare power point presentations.

RECOMMENDED BOOKS:

1. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd-Jungpura, New Delhi
2. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
3. Fundamentals of Information Technology by Leon and Leon;Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
4. Basics of Information Technology, by Ishan Publications, Ambala
5. Information Technology for Management by Henery Lucas, 7th edition, Tata McGraw Hill Education Pvt Ltd, New Delhi

UNIT WISE TIME AND MARKSDISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	06	10
2	13	20
3	13	20
4	32	50
Total	**64**	**100**

PROGRAM: THREE YEAR DIPLOMA PROGRAM IN MEDICAL LAB TECHNOLOGY	
Course code: MLPC201	**Course Title: Clinical Pathology**
Semester: 2ND	**Credits: 02**
Periods per Week: 2(L: 2 T: 0 P: 0)	

COURSE OBJECTIVE:

The students are imparted basic training of theoretical and practical aspects in the field of clinical Pathology. The students are made to learn the technique of collection of clinical samples and their processing along with recording of data. The student will also obtain the basic knowledge of routine Clinical pathology investigations which are performed in different Clinical conditions with clear understanding.

COURSE CONTENTS

1. Collection and preservation of samples for various investigations (04hrs)

1.1. Blood
1.2. Urine
1.3. Stool
1.4. Sputum
1.5. Other Body Fluids

2. Laboratory glass and plastic ware (02hrs)

2.1. Cleaning and care of laboratory glass and plastic ware
2.2. Different cleaning agents (soaps, detergents, chromic acid)
2.3. Methods of cleaning and storage

3. Urine Analysis (08hrs)

3.1. Composition of urine
3.2. Physical examination
3.3. Chemical examination
3.4. Microscopic examination
3.5. Urine for HCG (Pregnancy Test)

4. Stool Analysis (06hrs)

4.1. Collection/Transportation
4.2. Chemical examination of stool
4.3. Microscopic Examination (For Ova/Cyst)

5. Semen Analysis (02hrs)

5.1. Physical examination
5.2. Chemical examination
5.3. Microscopic examination

6. Biological Fluids (Routine analysis) (10hrs)

6.1. CSF
6.2. Synovial fluid
6.3. Peritoneal fluid
6.4. Pleural fluid
6.5. Sputum for AFB

COURSE OUTCOME

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

- Collect, transport and preserve the various clinical samples for different investigations.
- Prepare the various cleaning agents
- Perform routine urine examination
- Perform routine Feces examination
- Perform physical and Microscopic examination of semen
- Process various biological fluids

RECOMMENDED BOOKS

1. Textbook of Medical Laboratory Technology by Praful B Godkar; Bhalani Publishing House, Mumbai
2. District Laboratory Practice in Tropical Countries by Monica Chesbrough
3. Text Book of Medical Laboratory Technology by KL Mukherjee Vol I, II and III; Tata McGraw Hill Publishers, New Delhi
4. Medical Laboratory Science Theory and Practical by J Ochei and A Kolhatkar, Tata McGraw Hill Publishing Company Ltd., New Delhi 2000 Ed.
5. Parasitology by KD Chatterjee; Chatterjee Medical Publishers, Kolkatta
6. Pledical Parasitology by Arora & Arora

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time allotted(Hrs)	Marks allotted(%)
1	4	13
2	2	6
3	8	31
4	6	19
5	2	6
6	10	25
Total	**32**	**100**

PROGRAM: THREE YEAR DIPLOMA PROGRAM IN MEDICAL LAB TECHNOLOGY	
Course code: MLPC202	**Course Title: Clinical Pathology Lab**
Semester: 2ND	**Credits: 02**
Periods per Week: 4(L: 0 T: 0 P: 4)	

COURSE OBJECTIVE:

The students are imparted basic training of theoretical and practical aspects in the field of clinical Pathology. The students are made to learn the technique of collection of clinical samples and their processing along with recording of data. The student will also obtain the

basic knowledge of routine Clinical pathology investigations which are performed in different Clinical conditions with clear understanding.

LIST OF PRACTICALS (64 hrs)

1. Collection of blood, urine and stool.
2. Cleaning of glassware/plastic ware
3. Chemical Analysis of urine (qualitative) for sugar, proteins, ketone bodies, bile pigments, bile salts and urobilinogen.
4. Microscopic examination of urinary sediments
5. Occult blood test for Urine and stool specimen
6. Microscopic examination of stool for ova and cyst
7. Semen Examination

PROGRAM: THREE YEAR DIPLOMA PROGRAM IN MEDICAL LAB TECHNOLOGY	
Course code: MLPC203	**Course Title: Anatomy and Physiology-II**
Semester: 2ND	**Credits: 02**
Periods per Week: 2 (L: 2 T: 0 P: 0)	

COURSE OBJECTIVE:

After studying this subject, the students shall be able to understand various Systems of body and their physiological functions along with anatomical positions.

COURSE CONTENTS

1. **Nervous system** **(8 hrs)**

   1.1 Central nervous system (brain and spinal cord)
   1.2 Peripheral nervous system (cranial and spinal nerves)
   1.3 The sense organs (eye, ear, tongue and nose); structure and functions

2. **Muscular system** **(4 hrs)**

   2.1 Brief description of skeletal, smooth and cardiac muscles
   2.2 Muscle fatigue

3. Circulatory system **(8 hrs)**

   3.1 Composition and functions of blood
   3.2 Anatomy and physiology of Heart
   3.3 Circulation of blood, Cardiac Cycle and Conducting System of Heart
   3.4 The blood pressure
   3.5 Arteries and veins
   3.6 Lymph and lymphatic system

4. Endocrine system **(5 hrs)**

   4.1 Description of each endocrine gland its secretions and their effect on the body

5. Reproductive System **(7 hrs)**

   5.1 Male and female reproductive system
   5.2 The ovarian cycle and ovulation
   5.3 Fertilization

COURSE OUTCOME

After the completion of course, the student will be able to:

- Explain the various parts of Nervous system, its Anatomy and function.
- describe the Anatomy and functions of Muscular System
- list the organs of Circulatory System, and their anatomy & functions.

- Describe the functions of endocrine system and anatomy and functions of various Endocrine Glands.
- Explain the reproductive system both male and female, list the various parts of Reproductive system, their anatomy & functions.

RECOMMENDED BOOKS

1. Anatomy and Physiology by Pears; JP Brothers, New Delhi
2. Anatomy and Physiology by Sears; ELBS, London
3. Basic Anatomy and Physiology by N Murugesh; Sathya Publishers, Madurai
4. Ross and Wilson Anatomy and Physiology by Anne Waugh and Kathleen JW Wilson; Churchill Living Stone; London

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time allotted(Hrs)	Marks allotted(%)
1	08	24
2	04	13
3	08	28
4	05	15
5	07	20
Total	**32**	**100**

PROGRAM: THREE YEAR DIPLOMA PROGRAM IN MEDICAL LAB TECHNOLOGY	
Course code: MLPC204	**Course Title: Anatomy and Physiology-II LAB**
Semester: 2nd	**Credits: 01**
Periods per Week: 2 (L: 0 T: 0 P: 2)	

COURSE OBJECTIVE:

After studying this subject, the students shall be able to understand various Systems of body and their physiological functions along with anatomical positions.

LIST OF PRACTICALS (32 Hrs)

1. Prepare the stained blood film and microscopic study of blood cells.
2. Monitor blood pressure.
3. Demonstration of various parts of nervous, circulatory and reproductive system through models and charts.
4. Study of various parts of nervous system (brain and spinal cord) (demonstration from model)
5. Study of structure of eye and ear (demonstration from models)
6. Study of structural differences between skeletal, smooth and cardiac muscles (permanent mounts) through demonstration.
7. Study of various parts of circulatory system through demonstration.
8. Examination of stained blood film for blood cells
9. Estimation of blood pressure
10. Study of various parts of reproductive system (male and female demonstration from models and charts)

PROGRAM: THREE YEAR DIPLOMA PROGRAM IN MEDICAL LAB TECHNOLOGY	
Course Code: MLPC205	**Course Title: Clinical Microbiology-II**
Semester: 2ND	**Credits: 3**
Periods per Week: 3(L: 3 T: 0 P: 0)	

COURSE OBJECTIVE:

The students undergoing training of medical laboratory technology learn the knowledge of basic morphology, staining, culture, biochemical characteristics and Identification of pathogenic bacteria and their Antimicrobial sensitivity. In addition they are also made aware about the infection, disease and Lab Diagnosis of infectious diseases.

COURSE CONTENTS

1. Bacteriology (10 hrs)

1.1. General characteristics and Identification of bacteria
  1.1.1. Culture/Colony characteristics
  1.1.2. Microscopic examination/staining
  1.1.3. Motility demonstration methods
1.2. Biochemical tests
  1.2.1. Carbohydrate utilization tests (Glucose, Lactose, sucrose, Manitol)
  1.2.2. Catalase, Oxidase, Coagulase (Rapid Bio-chemicals)
  1.2.3. IMViC Reactions

2. **Characteristics and identification of :- (22hrs)**
2.1. Staphylococci
2.2. Streptococci and pneumococci
2.3. Enterobacteriacae - I (E coli, Klebsiella, Enterobacter)
2.4. Enterobacteriacae – II (Salmonella, Shigella, Proteus).
2.5. Pseudomonas
2.6. Neisseria
2.7. Mycobacterium tuberculosis

3. Bacterial pathogenicity (4 hrs)

3.1. Definition of pathogenicity, pathogenesis and virulence
3.2. Sources of infection
  3.2.1. Mode of spread of infection
  3.2.2. Types of infection

4. Nosocomial infection (02hrs)

4.1. Introduction
4.2. Source and control of nosocomial infection

5. Antibiotic sensitivity (02hrs)

5.1. Disc Diffusion method – principle, procedure and precautions.

6. **Laboratory Diagnosis of Infectious Diseases (04hrs)**
   - 6.1. Urinary Tract Infection (UTI)
   - 6.2. Enteric Fever
   - 6.3. Wound Infections

7. **Advancement /Automation in clinical microbiology (04hrs)**
   - 7.1. Automatic culture system (BacTec and MGIT)
   - 7.2. Molecular Techniques
   - 7.3. PCR with various modifications
   - 7.4. CBNAAT (Gene Xpert)

COURSE OUTCOME

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

Unit-1
- Perform the various culture techniques and identification of the isolate.

Unit -2:
- Identify the various pathogenic bacteria by performing various types of tests.

Unit-3:
- Explain disease and infection, their mode of spread and prevention.

Unit-4:
- identify the source and control of nosocomial infection.
- Know the source and control of nosocomial infection with better knowledge.

Unit-5:
- Perform the antibiotic susceptibility test and interpret the results.

Unit-6:
- Process the samples for Lab Diagnosis of Various Infectious diseases with better understanding of their clinical importance.

Unit-7:
- Work on the latest advanced instruments/techniques.

INSTRUCTIONAL STRATEGY

The teacher should lay stress on general characteristics of bacteria, morphological features, and nomenclature of bacterial for common use. The students should be made familiar with common names of bacteria and stress on correct use of bacterial pronunciation and spellings. The students should be taught with illustrations/audio-visual aids.

RECOMMENDED BOOKS

1. Textbook of Medical Microbiology by Satish Gupta; JP Brothers, New Delhi
2. Practical Book of Medical Microbiology by Satish Gupta; JP Brothers, New Delhi
3. An Introduction to Medical Laboratory Technology by FJ Baker; Butterworth – Heinemann; Oxford

4. Textbook of Medical Laboratory Technology by Praful B Godkar; Bhalani Publishing House, Mumbai
5. Medical Laboratory Technology by Kanai Lal Mukherjee; Tata McGraw Hill, New Delhi
6. Medical Laboratory Manual for Tropical Countries Vol. I and II by Monica Cheesbrough; Cambridge University Press; UK
7. Text Book of Microbiology by Ananthanarayan and Paniker; Orient Longman, Hyderabad
8. Text book of Medical Microbiology by Cruckshiank Vol. I
9. Textbook of Medical Microbiology by Greenwood, ELBS
10. Medical Laboratory Science by Jockie and Kolhatkar, Tata McGraw Hill.
11. Text book of Microbiology by A. Chakraborty

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time allotted (Hrs)	Marks allotted (%)
1	10	23
2	22	44
3	04	08
4	02	04
5	02	04
6	04	08
7.	04	09
Total	**48**	**100**

PROGRAM: THREE YEAR DIPLOMA PROGRAM IN MEDICAL LAB TECHNOLOGY	
Course Code: MLPC206	**Course Title: Clinical Microbiology-II LAB**
Semester: 2ND	**Credits: 1**
Periods per Week: 2(L: 0 T: 0 P: 2)	

COURSE OBJECTIVE:

The students undergoing training of medical laboratory technology learn the knowledge of basic morphology, staining, culture, biochemical characteristics and Identification of pathogenic bacteria and their Antimicrobial sensitivity. In addition they are also made aware about the infection, disease and Lab Diagnosis of infectious diseases.

LIST OF PRACTICALS (32 Hrs)

1. Collection, transportation of clinical samples, processing including culture of following clinical samples for identification of pathogens – Urine, Stool, Sputum, Throat swabs, Pus and Pus swabs, Blood, Skin, Eye and Ear swabs and CSF.
2. Identification of pure bacterial cultures of common pathogens.
3. Antimicrobial susceptibility testing by Stokes disc diffusion method
4. Biochemical testing Catalase, Oxidase, Coagulase, Indole, MR, VP and Citrate (IMViC).
5. Carbohydrate utilization tests.

PROGRAM: THREE YEAR DIPLOMA PROGRAM IN MEDICAL LAB TECHNOLOGY	
Course Code: MLPC207	**Course Title: Clinical Hematology-II**
Semester: 2ND	**Credits: 2**
Periods per Week: 2(L: 2 T: 0 P: 0)	

COURSE OBJECTIVE:

The training in hematology is imparted to enable the students to know the principle of tests, methodology of routine as well as advanced procedures being carried out in the laboratory by using routine as well as automatic instruments.

COURSE CONTENTS

1. Hemocytometry (8 hrs)

1.1. Various counting chambers
1.2. Methods of counting of RBC, WBC and platelets
1.3. Calculation and reference values.
1.4. Errors involved in hemocytometry and means to minimize them

2. Differential leucocyte counting (DLC) (07 hrs)

2.1. Preparation and staining of blood film
2.2. Performance of DLC
2.3. Normal values and significance of DLC

3. Hemoglobinometry (6hrs)

3.1. Hemoglobin formation and function
3.2. Types of hemoglobin
3.3. Various methods of estimation with specific reference to cyanmethemoglobin method

4. Blood Cell Morphology (5 hrs)

4.1 Study of blood cell morphology in health and disease conditions (Peripheral blood film)

5. Erythrocyte sedimentation rate (ESR) and Packed cell volume (PCV) (4 hrs)

5.1 Introduction
5.2 Various methods their merits and demerits
5.3 Factors involved in ESR
5.4 Interpretation of results

6. **Automation in hematology (2 hrs)**

6.1 Introduction and types

COURSE OUTCOME

After the completion of the course, the student will be able to :

Unit-1

- Perform complete blood cell counts with proper technical skills.

Unit -2

- Perform DLC and its interpretation

Unit-3

- Perform Hemoglobin by various methods.

Unit-4

- Comment on PBF after recognizing the various methods.

Unit-5

- Perform ESR and PCV test by various methods.

Unit-6

- Operate various automatic blood cell counters with their working principles.

RECOMMENDED BOOKS

1. Medical Laboratory Technology Vol. 1 by KL Mukherjee; Tata McGraw Hill Publishers, New Delhi
2. An Introduction to Medical Laboratory Technology by FJ Baker; Butterworth Heinemann, Oxford
3. Medical Laboratory Manual for Tropical Countries by Monica Cheesbrough; Cambridge University Press, UK
4. Textbook of Medical Laboratory Technology by Praful B Godkar; Bhalani Publishing House, Mumbai
5. Practical Haematology by JV Decei; ELBS with Curchill Living Stone; UK
6. Medical Laboratory Science Theory and Practical by J Ochei and A Kolhatkar, Tata McGraw Hill Publishing Company Ltd., New Delhi 2000 Ed.

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time allotted (Hrs)	Marks Allotted (%)
1	08	30
2	07	20
3	06	20
4	05	14
5	04	12
7	02	04
Total	**32**	**100**

PROGRAM: THREE YEAR DIPLOMA PROGRAM IN MEDICAL LAB TECHNOLOGY	
Course Code: MLPC208	**Course Title: Clinical Hematology-II-LAB**
Semester: 2ND	**Credits: 1**
Periods per Week: 2(L: 0 T: 0 P: 2)	

COURSE OBJECTIVE:

The training in hematology is imparted to enable the students to know the principle of tests, methodology of routine as well as advanced procedures being carried out in the laboratory by using routine as well as automatic instruments.

LIST OF PRACTICALS (32 Hrs)

1. Preparation of peripheral blood film.
2. Preparation and standardization of stains (leishman and giemsa)
3. Preparation of thick and thin blood smear
4. Hemoglobin Estimation by Sahli's method and Cyanmethaemoglobin method
5. Counting of RBC, WBC and Platelets.
6. Study of morphology of normal RBC, WBC and Platelets with the help of stained slide
7. To study abnormal morphology of RBC,WBC and Platelets with the help of stained slide

PROGRAM: THREE YEAR DIPLOMA PROGRAM IN MEDICAL LAB TECHNOLOGY	
Course Code: MLPC209	**Course Title: Clinical Biochemistry-II**
Semester: 2ND	**Credits: 03**
Periods per Week: 3 (L: 3 T: 0 P: 0)	

COURSE OBJECTIVE:

The students are imparted basic training of theoretical and practical aspects in the field of clinical biochemistry. The students are made to learn the techniques of collection of clinical samples and their processing along with recording of data. The student will also obtain the basic knowledge of chemistry and metabolism of various metabolites which are routinely estimated in different diseases so that a clear understanding of the different tests is obtained. The students are also given basic training in safety measures, quality control and automation.

COURSE CONTENTS

1. **Serum Bilirubin** **(10 hrs)**

   1.1. Formation and excretion of bilirubin
   1.2. Formation of bile pigments
   1.3. Conjugated and unconjugated bilirubin
   1.4. Principle and procedures of serum bilirubin estimation (Direct & Indirect)
   1.5. Reference values
   1.6. Clinical importance

2. **SGOT, SGPT, GGT and ALP** **(9 hrs)**

   2.1. Principle and procedures of estimation
   2.2. Reference values
   2.3. Clinical importance

3. **Serum proteins** **(7 hrs)**

   3.1 Different methods of estimation including principles and procedures
   3.1 Reference values
   3.2 Clinical importance

4. **Lipid Profile** **(15 hrs)**

   4.1. Formation of cholesterol
   4.2. High density and low density cholesterol
   4.3. Principles and procedures of estimation
   4.4. Reference value
   4.5. Clinical importance
   4.6. Triglycerides, principle and procedure of estimation
   4.7. Importance of various ratios of HDL, LDL and VLDL

5. **Automation in Biochemistry** **(7 hrs)**

   5.1. Various types of Auto analyzers

COURSE OUTCOME

After the completion of the course the student will be able to:

- Explain the formation and excretion of Bilirubin.
- Explain the principle and clinical importance of various liver enzyme tests
- Explain the principle and clinical importance of protein estimation
- Explain the principle of various methods of lipid estimation along with its clinical importance and procedure.
- Operate various types of analyzers along with the explanation of their working principles.

INSTRUCTIONAL STRATEGY

Teachers should lay emphasis on concepts and principles while covering the subject contents. In the practical work, the students should be given opportunity to do practical work individually but under supervision.

RECOMMENDED BOOKS

1. A Procedure Manual for Routine Diagnostic Tests Vol. I, II and III by KL Mukherjee; Tata McGraw Hill Publishers, New Delhi
2. Practical Clinical Biochemistry by H. Varley; Heinmann Publishers, Oxford
3. A Text Book of Medical Laboratory Technology by P Godkar; Bhalani Publishers, Mumbai
4. Medical Laboratory Science, Theory and Practice by J Ochaie and A Kolhatkar, Tata McGraw Hill

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time allotted (Hrs)	Marks Allotted (%)
1	10	25
2	09	20
3	07	10
4	15	35
5	07	10
Total	**48**	**100**

PROGRAM: THREE YEAR DIPLOMA PROGRAM IN MEDICAL LAB TECHNOLOGY	
Course Code: MLPC210	**Course Title: Clinical Biochemistry-II LAB**
Semester: 2ND	**Credits: 01**
Periods per Week: 2 (L: 0 T: 0 P: 2)	

COURSE OBJECTIVE:

The students are imparted basic training of theoretical and practical aspects in the field of clinical biochemistry. The students are made to learn the techniques of collection of clinical samples and their processing along with recording of data. The student will also obtain the basic knowledge of chemistry and metabolism of various metabolites which are routinely estimated in different diseases so that a clear understanding of the different tests is obtained. The students are also given basic training in safety measures, quality control and automation.

LIST OF PRACTICALS (32 Hrs)

1. Serum bilirubin estimation (Direct and Indirect)
2. SGOT estimation
3. SGPT estimation
4. ALP estimation
5. Total cholesterol estimation
6. Triglyceride estimation
7. Estimation of HDL and calculation of VLDL and LDL

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN MEDICAL LAB TECHNOLOGY	
Course Code: BS211	**Course Title: ENVIRONMENTAL SCIENCE**
Semester: 2nd	**Credits: 2**
Periods Per Week: 2(L: 2, T: 0, P:0)	

COURSE OBJECTIVE

The three main goals of environmental science are: to learn how the natural world works, to understand how humans interact with the environment, and to find ways to deal with environmental problems and live more sustainably.

COURSE CONTENT

1. Ecosystem

1.1 Structure of ecosystem, Biotic & Abiotic components

1.2 Food chain and food web

1.3 Aquatic (Lentic and Lotic) and terrestrial ecosystem

1.4 Carbon, Nitrogen, Sulphur, Phosphorus cycle.

1.5 Global warming -Causes, effects, process, Green House Effect, Ozone depletion

2. Air and Noise Pollution

2.1 Definition of pollution and pollutant, Natural and manmade sources of air pollution

2.2 Air Pollutants: Types, Particulate Pollutants: Effects and control

2.3 Gaseous Pollution Control: Absorber, Catalytic Converter, Effects of air pollution due to Refrigerants, I.C., Boiler

2.4 Noise pollution: sources of pollution, measurement of pollution level, Effects of Noise pollution, Noise pollution (Regulation and Control) Rules.

3. Water and Soil Pollution

3.1 Sources of water pollution, Types of water pollutants, Characteristics of water pollutants Turbidity, pH, total suspended solids, total solids BOD and COD: Definition, calculation

3.2 Waste Water Treatment: Primary methods: sedimentation, froth floatation, Secondary methods: Activated sludge treatment, Trickling filter, Bioreactor, Tertiary Method: Membrane separation technology, RO (reverse osmosis)

3.3 Causes, Effects and Preventive measures of Soil Pollution: Causes-Excessive use of Fertilizers, Pesticides and Insecticides, Irrigation, E-Waste.

4. Solid Waste Management, ISO 14000 and Environmental Management

4.1 Solid waste generation- Sources and characteristics of: Municipal solid waste, E-waste, biomedical waste.

4.2 Metallic wastes and Non-Metallic wastes (lubricants, plastics, rubber) from industries.

4.3 Collection and disposal: MSW (3R, principles, energy recovery, sanitary landfill), Hazardous waste

4.4 Air quality act 2004, air pollution control act 1981 and water pollution and control act 1996.

4.5 Structure and role of Central and state pollution control board.

4.6 Concept of Carbon Credit, Carbon Footprint.

4.7 ISO14000: Implementation in industries, Benefits.

COURSE OUTCOME

After completion of the course the student be able to:

- Appreciate concepts and methods from ecological and physical sciences and their application in environmental problem solving.
- Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.
- work and produce most efficient, economical and eco-friendly finished products.
- Solve various engineering problems applying ecosystem to produce eco – friendly products.
- Use relevant air and noise control method to solve domestic and industrial problems.
- Use relevant water and soil control method to solve domestic and industrial problems.
- Solve local solid and e-waste problems.

RECOMMENDED BOOKS

1. S.C. Sharma & M.P. Poonia, Environmental Studies,Khanna Publishing House,NewDelhi
2. Arceivala, Soli Asolekar, Shyam, Waste Water Treatment for Pollution Control and Reuse, Mc-Graw Hill Education India Pvt. Ltd., New York, 2007, ISBN:978-07-062099-
3. Nazaroff, William, Cohen, Lisa, Environmental Engineering Science, Willy, New York, 2000
4. O.P. Gupta, Elements of Environmental Pollution Control, Khanna Publishing House, New Delhi

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	6	16
2	8	20
3	8	24
4	10	40
Total	**32**	**100**

CURRICULUM

FOR

SECOND SEMESTER

DIPLOMA IN

OFFICE MANAGEMENT AND

COMPUTER APPLICATIONS

(SUBJECT STUDY SCHEME : 2nd Sem OFFICE MANAGEMENT AND COMPUTER APPLICATIONS)

Course Code	Subjects	Time in Hours				CREDITS		
		Theory	Tutorial	Practical	Total	Theory	Practical	Total
HS203	Language and Communication Skill-II	3	-------	--	3	3	---	3
HS204	Language and Communication Skill-II LAB	----	----	2	2	----	1	1
OMPC201	Business Correspondence -II	5	-------	--------	5	5	---	5
OMPC202	Desktop Publishing – II	-------	-------	6	6	-------	3	3
OMPC203	Basics of Stenography	----	-----	6	6	---	3	3
OMPC204	Office Management-II	4	--	---	4	4	---	4
OMPC205	Office Management-II LAB	---	---	2	2	---	1	1
BS211	Environmental Science	2	--	--	2	2	--	2
	Total	14	------	16	30	14	8	22

PROGRAM THREE YEAR DIPLOMA IN OFFICE MANAGEMENT AND COMPUTER APPLICATIONS	
Course Code **: HS 203**	Course Title**: Language & Communication Skills – II**
Semester**: 2ND**	Credits**: 03**
Periods per Week**: 3 (L: 3 T: 0 P:0)**	

COURSE OBJECTIVE:

The objective of this course is to develop effective communication skills and also to inculcate soft skills among the students in professional and inter-personal communications facilitating their all-round development of personality. At the end of the course, the student will be able to develop comprehension skills, Professional etiquettes; improve vocabulary; use proper grammar; acquire writing skills and explore various aspects of soft skills.

COURSE CONTENT

Unit 1: Short stories and Poetry (08hrs)

1.1 Section A: - Short Stories
- Three Questions : Leo Tolstoy
- The last leaf : O Henry

1.2. Section B:-Poems
- The Psalm of life : H.W. Longfellow
- Say Not Struggle Naught Availeth : A.H. Clough

Unit 2: Essentials of Grammar (10hrs)

2.1. Basics of grammar (Parts of speech)
2.2. Subject -Verb Agreement
2.3. Tenses
2.4. Voice (Active and Passive)
2.5. One word substitution
2.6. Correct /Incorrect sentences

Unit 3. Techniques of Writing. (10hrs)

3.1. Comprehension of an Unseen Passage
3.2. Paragraph Writing
3.3. Circulars
3.4. Memos

Unit 4: Soft Skills (12hrs)

4.1. Intrapersonal and Interpersonal skills - Meaning and Importance.
4.2. Self-Management Skills

- Goal setting- Meaning, Importance, types and ways to achieve goals.
- Time Management- Meaning, benefits and strategies to improve time management.
- Self-motivation -Meaning and Importance.
- Stress management -.Meaning, Causes and Techniques of stress management.
- Positive Thinking
- Problem-solving- Meaning, Steps and importance.
- Decision Making - Meaning, process/stages and Importance of decision making

4.3. Team work and Leadership skills -Concept of Teams; Building effective teams; Concept of Leadership and honing Leadership skills.

Unit 5: Etiquettes (08hrs)

5.1. Etiquettes - Meaning, Types and Importance

5.2. Professional etiquettes- ABC (Appearance, Behavior, Communication) of Professional Etiquettes, Importance of Professional etiquettes.

- Office Etiquette - Meaning, Importance and Tips.
- Meeting etiquettes - Meaning, Importance and Tips.
- Telephone etiquettes.

COURSE OUTCOME

After the completion of the course the student will be able to:

Unit 1:

- Read, analyze, and interpret works of literature.
- Make themselves proficient in literary contexts.
- Learn different words in the text which in turn will enhance their language (Vocabulary).

Unit 2:

- Identify the different parts of speech and their usage in the sentence.
- Know about the application of various grammatical items like Subject-Verb Agreement, Tenses, and Voice etc.
- Enrich his/her vocabulary and enhance grammar accuracy.

Unit 3:

- Comprehend the passage and able to answer the linked questions.
- Plan, organize and present ideas coherently on a given topic.
- Compose circulars and memos which in turn will enhance their writing skill.

Unit 4:

- Set goals, manage time and stress, solve problems and organize oneself effectively.
- Know about self-motivation and its importance.
- be a team player and develop leadership skills.

Unit 5:

- Demonstrate personal and professional etiquettes.

RECOMMENDED BOOKS:

1. Kulbhushan Kumar," Effective Communication Skills", Khanna Publishing House, New Delhi (Revised Edition 2018)
2. M. Ashraf Rizvi,"Effective Technical Communication". Mc-Graw Hill: Delhi, 2002.

3. Sanjay Kumar and PushpLata, "Communication Skills "Oxford University Press, 2011
4. Meenakshi Raman &Sangeeta Sharma, "Technical Communication: Principle and Practice". New Delhi:OUP, 2011.
5. Francis Peter S.J.,"Soft Skills and Professional Communication"
6. K.R. Lakshminarayana& T. Murugavel, "Managing Soft Skills", Scitech Publications. 2009
7. NK Aggarwal and FT Wood, "English Grammar, Composition and Usage".Macmillan Publishers India Ltd; New Delhi.
8. Dr. Alex, "Soft skills"
9. Gopalaswamy Ramesh and MahadevanRamesh,"The Ace of Soft Skills: Attitude, Communication and Etiquette for Success". Pearson

UNIT WISE TIME AND MARKS DISTRIBUTION

UNIT	TIME (Hrs)	MARKS (%age)
1	08	20
2	10	20
3	10	20
4	12	25
5	08	15
TOTAL	**48**	**100**

PROGRAM THREE YEAR DIPLOMA IN PROGRAM THREE YEAR DIPLOMA IN OFFICE MANAGEMENT AND COMPUTER APPLICATIONS	
Course Code **: HS204**	Course Title**: Language & Communication Skills – II LAB**
Semester**: 2ND**	Credits**: 01**
Periods per Week**: 2 (L: 0 T: 0 P:2)**	

COURSE OBJECTIVE:

Language is the most commonly used medium of self-expression in all spheres of human life personal, social and professional. A student must have a fair knowledge of English language and skills to communicate effectively to handle the future jobs in industry. The objective of this course is to develop effective communication skills and also to inculcate soft skills among the students in professional and inter-personal communications facilitating their all-round development of personality. At the end of the course, the student will be able to develop comprehension skills, Professional etiquettes; improve vocabulary; use proper grammar; acquire writing skills and explore various aspects of soft skills. It is expected that each polytechnic will establish a communication skill laboratory for conducting practical's mentioned in the curriculum.

LIST OF PRACTICALS:

1. Ice breaking Activity and JAM session
2. Developing conversational ability - Describing yourself, Describing objects around you, Describing People.
3. Situational Dialogues- Role Play- Expressions in various situations- Self introduction and introducing others- Greetings- Taking Leave - Apologies- Requests etc.
4. Listening with Comprehension-Listening to recorded lectures, poems, interviews, speeches, documentaries etc. - Taking notes while listening
5. Professional etiquettes- Netiquette, Telephone Etiquette, Introduction and first impression, Business meeting etiquette, Dressing and Dinning Etiquette.
6. Reading articles from newspaper, magazines, journals etc.
7. Public speaking - Extempore and Impromptu Speech
8. Grammar - Words often misspelt - confused/ misused; Common errors in pronunciation; Idiomatic expressions.
9. Professional Skills- Drafting Job Application Letter, CV/ Resume; Interview skills.
10. Demonstrating the do's and don'ts of facing the interview.

PROGRAM : THREE YEARS DIPLOMA PROGRAM IN OFFICE MANAGEMENT AND COMPUTER APPLICATIONS	
Course Code : OMPC201	**Course Title: Business Correspondence-II**
Semester : 2ND	**Credits: 5**
Periods per week: 5 (L 5, T 0, P 0)	

COURSE OBJECTIVE

A diploma holder in Office Management and Computer Applications has to work in the different organizations. To handle his/her job well, knowledge about techniques of correspondence is a must. In fact he/she has to acquire the skills of effective correspondence as he/she has to manage the office and has to provide help to his/her seniors and chief executives.

COURSE CONTENT

1. Sales Letters (16hrs)

1.1. Introduction of new product
1.2. Promotion of a product.
1.3. Publicity of business.
1.4. Special offers/discount etc.

2. Circulars (10hrs)

2.1. Change of address.
2.2. Opening of new branches.
2.3. Introduction of a partner.
2.4. Retirement of partner.

3. Official Correspondence (20hrs)

3.1. Introduction.
3.2. Noting in files
3.3. Official letters
3.4. Demi Official letters
3.5. Office Orders
3.6. Memorandum/memo letters
3.7. Notification
3.8. Endorsement
3.9. Inter departmental Communication.
3.10. Office Circulars

4. Bank Correspondence (10hrs)

4.1. Inquiry regarding opening of an account

4.2. Ask the bank to stop the payment
4.3. Advice of consignment
4.4. Overdraft facilities
4.5. Loss of cheque book
4.6. Transfer and standing instructions
4.7. Dishonor of cheques, Reasons, Letters from customers
4.8. Bank forms and Bank terms

5. Insurance letters (10hrs)

5.1. Introduction, letter inquiring about premium rate.
5.2. Reply from insurance company
5.3. Claims
5.4. Series of letter between insurer and insurance company regarding the settlement of claims.

COURSE OUTCOME

After completion of the course the student will be able to:

- Draft different sales letters, circulars and official letters.
- Introduce, promote and publicize new product and give special offers on it.
- Correspond with banks and insurance companies

RECOMMENDED BOOKS

1. Commercial Correspondence by Mazumdar
2. Essentials of Business Communication by Rajendra Pal and J.S.Ko-rlahali; sultan Chand and Sons, New Delhi.
3. A guide to Business Correspondence by A.N. Kapoor; Sultan Chand and Sons
4. Business Correspondence and Report Writing by R.C. Sharma and Krishan Mohan; Tata McGraw Hill, Reprint 1997 26
5. Manual of office Management and correspondence by B.N. Tandon, sultan Chand and Sons, New Delhi.
6. Business Communication by Sinha,Galgotia, New Delhi
7. Manual of commercial correspondence by Hume and Baley, Wheeler Publishing.
8. Modern Business correspondence by L.Gartside Pitman publication.
9. Principals and Practice of Commercial correspondence by L.F.Nelson and James Stephson, Wheeler publication
10. Business communication a problem solving approach by Ray W. Poe Rose Mary T. Fruenling, Mc Graw Hill Book and Company.

UNIT WISE TIME AND MARKS DISTRIBUTION

UNIT	Time (Hrs)	Marks (%age)
1	16	20
2	12	15
3	28	35
4	12	15
5	12	15
Total	**80**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAM IN OFFICE MANAGEMENT AND COMPUTER APPLICATIONS	
COURSE CODE:OMPC202	**COURSE TITLE: Desktop Publishing-II**
SEMESTER: 2ND	**CREDITS: 03**
PERIODS PER WEEK :6 (L 0: T 0: P 6)	

COURSE OBJECTIVE:

The objective of the course is that a student is trained on publication softwares like Adobe PageMaker to create, edit, format different publication using Publication Software. The student learns to edit, manipulate and enhance graphics or images to improve their overall appearance using Adobe Photoshop. They will go through the application CorelDraw to edit vector graphics. The student will learn and experience to create works such as posters, flyers, brochures, magazines, newspapers, and books. They also learn one bilingual software to create publications or documents in regional language.

COURSE CONTENTS:

1. Digitization of Documents (06hrs)

1.1. Install and setup scanner and scan the documents and images.
1.2. Install scanner and driver.
1.3. Scan picture, line drawing and document and store it as a digital file.
1.4. Adjust different scanner properties.
1.5. Make Optical Character Recognition document.

2. Adobe PageMaker (27hrs)

2.1. Create, format and edit different publication using publication software Adobe PageMaker.
2.2. Familiarize with basic screen component of PageMaker.
2.3. Create, saving PageMaker document.
2.4. Identify tool box and practice different tools.
2.5. Formatting character and paragraph like changing in font style, size, tab stop, indent,leading, kerning, and tracking by using character view of control pallet within story layout.
2.6. Create a Table by using Table Editor.
2.7. Use colour palette and create, edit and remove colours from the palette.
2.8. Insert importable file within document and also establish a link.
2.9. Insert/ draw graphics, crop it and wrapping text around graphics.
2.10. Introduce master page and insert page number, column guide using master page.
2.11. Export a graphic/ text from PageMaker to other format.
2.12. Create a book containing table of contents, index, and page number.
2.13. Print the publication by choosing odd pages, even pages using laser printer.

3. Adobe photoshop (20hrs)

3.1. Create, format, edit and develop images using Adobe Photoshop software.

3.2. Configure Application software – Photoshop.
3.3. Identify interface, palettes and tool bars.
3.4. Create and edit bitmap images.
3.5. Crop and transform images by appropriate tools.
3.6. Retouch a damaged photograph by using layers.
3.7. Make multiple passport size photographs by using Action button.
3.8. Prepare a cut-out of a given photograph and change its background and colours.

4. Corel Draw. (20hrs)

4.1. Draw, edit, format and develop graphics design using Corel draw application software.
4.2. Configure Application software – Corel Draw
4.3. Identify interface, palettes and tool bars.
4.4. Draw an illustration/ sketch using different tools
4.5. Design the sketch of 'cup and plate.'
4.6. Design an advertisement using Artistic text and extrude tools.
4.7. Design the cover page of a given magazine.
4.8. Design a suitable logo for 'Skill Development.'
4.9. Print all the above work outcomes.

5. Regional Software(Inpage /any hindi typing software) (11hrs)

5.1. Create, edit and format different types of publication using bilingual software.
5.2. Configure and demonstrate toggle keys to:
5.3. Switch between scripts
5.4. Switch between keyboard overlays
5.5. Design an advertisement in any regional language script.
5.6. Print the above work outcome.

6. Advertisement Project. (12hrs)

6.1. Create a Media Item using learned tools viz,
  6.1.1. Adobe Page Maker
  6.1.2. Adobe Photoshop.
  6.1.3. Corel Draw
  6.1.4. Bilingual Software
6.2. Create electronic and print form of a Media Item.

COURSE OUTCOME

After the completion of the course the student will be able to:

Unit-1

- install, scan and make necessary changes in formats using scanner

Unit-2

- create a book, export created Publication & Print the publication.

Unit-3

- Create, edit and modify an element, retouch a damaged photograph & prepare a cut-out of a given photograph.

Unit-4

- create, edit and modify a vector graphics, reconstruct layout graphics, create logos & prepare print and e-Copy of media.

Unit-5

- use bilingual software to create ads and export it for pre-processing.

Unit-6

- print the publication/ document/ images/ graphics and publish it.

RECOMMENDED BOOKS:

1. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
2. DTP Course Book, by Vishnu p. Singh, Asian Book
3. PageMaker 7.0 Training Guide by Shashank Jain, BPB Publication, New Delhi
4. Photoshop CS6 Training Guide by Satish Jain, BPB Publication, New Delhi
5. Corel Draw Training Guide by Satish Jain/M.Geetha, BPB Publication, New Delhi
6. Ebook: https://www.bharatskills.gov.in/pdf/E_Books/DTPO2semEngTT.pdf

UNIT WISE TIME AND MARKS DISTRIBUTION

UNIT	Time (Hrs)	Marks (%age)
1	06	08
2	27	27
3	20	20
4	20	20
5	11	10
6	12	15
Total	96	100

PROGRAM: THREE YEARS DIPLOMA PROGRAM IN OFFICE MANAGEMENT AND COMPUTER APPLICATIONS	
COURSE CODE:OMPC203	**COURSE TITLE: Basics of Stenography**
SEMESTER: 2ND	**CREDITS: 03**
PERIODS PER WEEK: 6 (L 0: T 0: P 6)	

COURSE OBJECTIVE:-

To make the students understand the concept of strokes so that secret message has limited unauthorized access.

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COURSE CONTENT:-

Unit 1:Introduction of Stenography

- The Consonants
- Exponents
- Continuants
- Nasals
- Liquids
- Coalescent
- Aspirates

Unit 2:The Vowels

- Vowel Sounds
- Vowel Signs
- Vowel Places
- Value of Vowel Sign
- Vowel Preceding and Following Strokes

Unit 3: Intervening vowel and Position

- Intervening Vowel
- Position of Outline
- Grammalogues

Unit 4:Alternative Signs for R and H

- Consonant R
- Consonant H

Unit 5: Diphthongs

- Detailed Diphthongs
- Joined Diphthongs
- Triphones
- Abbreviated W

Unit 6: Pharseography

- Phrase
- Tick the
- Grammalogues

COURSE OUTCOME:

After the completion of the course the student will be able

- Know basic concept of different strokes.
- Learn vowel with sound and placing
- write alternative forms of R and H and phrases

RECOMMENDED BOOKS:

1. Shorthand book by Pitman

UNIT WISE MARKS DISTRIBUTION

UNIT	Marks (%age)
1	25
2	20
3	15
4	10
5	20
6	10
Total	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAM IN OFFICE MANAGEMENT AND COMPUTER APPLICATIONS	
COURSE CODE:OMPC204	COURSE TITLE: Office Management-II
SEMESTER: 2ND	CREDITS: 04
PERIODS PER WEEK: 4 (L 4: T 0: P 0)	

COURSE OBJECTIVE:

To make the students understand the concept and principles of office method and procedures and develop skills in performing various office-operations. This subject on office management aims at making the students well conversant with services provided by a modern office and help them to perform efficiently and effectively.

COURSE CONTENTS:

UNIT1: RECORD MANAGEMENT

1.1 Meaning and Importance
1.2 Filing and filing equipment
1.3 Record retention

UNIT 2: OFFICE MANUAL AND REPORT

2.1 Introduction need and source of manual
2.2 Types, Advantages of manual
2.3 Introduction, function, classification of report
2.4 Basic principle of writing report
2.5Specimen of report

UNIT 3: OFFICE PERSONNEL RELATION AND WELFARE

3.1Human relation in office management, employee's communication with method
3.2Moral, staff welfare, safety arrangements,health and grievance of employees
3.3Professional ethics and principles

UNIT 4: QUOTATION /Tender/Work Order

4.1 Drafting of quotation
4.2 Tender notice
4.3 Work estimate /order

UNIT 5: E –OFFICE

5.1 E-File
5.2 PIS (Personnel Information System)
5.3 Payroll

COURSE OUTCOME:

After the completion of the course the student will be able to

- **Keep record in office, write manuals and write reports**

- **Make inter-intra relations with basic ethics.**
- **draft a quotation , tender notice , work/estimation order**
- **work on eoffice.**

RECOMMENDED BOOKS:

1. Office Management by Shashi Gupta and Sushil Nayyar, Kalyani Publications.
2. Office Management by P.K Gupta.
3. Office Management by Ghosh and Agarwal.
4. Office Management by Gupta, Bansal, Jain, Malik.
5. Office Management and practices by R. KSharma, Shashi Kr. Gupta and Sushil Nayyar

UNIT WISE TIME AND MARKS DISTRIBUTION

UNIT	Time (Hrs)	Marks (%age)
1	10	15
2	14	22
3	16	25
4	10	15
5	14	23
Total	**64**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAM IN OFFICE MANAGEMENT AND COMPUTER APPLICATIONS	
COURSE CODE:OMPC205	**COURSE TITLE: Office Management-II LAB**
SEMESTER: 2ND	**CREDITS: 01**
PERIODS PER WEEK: 2 (L 0: T 0: P 2)	

COURSE OBJECTIVE:

The objective of the course is that the student implements the knowledge of Theoretical aspects of the Office Management & Procedures by doing/performing the practical work.

LIST OF PRACTICALS:

1. How to do filing in office.
2. Manual and report writing.
3. Methods of communication both oral and written used in office.
4. Drafting of Quotation and estimation.
5. Payroll, PIS (Personnel Information System), e-file

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN OFFICE MANAGEMENT AND COMPUTER APPLICATIONS	
Course Code: **BS211**	Course Title: ENVIRONMENTAL SCIENCE
Semester: 2nd	Credits: 2
Periods Per Week: **2(L: 2, T: 0, P:0)**	

COURSE OBJECTIVE

The three main goals of environmental science are: to learn how the natural world works, to understand how humans interact with the environment, and to find ways to deal with environmental problems and live more sustainably.

COURSE CONTENT

1. Ecosystem

1.1 Structure of ecosystem, Biotic & Abiotic components

1.2 Food chain and food web

1.3 Aquatic (Lentic and Lotic) and terrestrial ecosystem

1.4 Carbon, Nitrogen, Sulphur, Phosphorus cycle.

1.5 Global warming -Causes, effects, process, Green House Effect, Ozone depletion

2. Air and Noise Pollution

2.1 Definition of pollution and pollutant, Natural and manmade sources of air pollution

2.2 Air Pollutants: Types, Particulate Pollutants: Effects and control

2.3 Gaseous Pollution Control: Absorber, Catalytic Converter, Effects of air pollution due to Refrigerants, I.C., Boiler

2.4 Noise pollution: sources of pollution, measurement of pollution level, Effects of Noise pollution, Noise pollution (Regulation and Control) Rules.

3. Water and Soil Pollution (

3.1 Sources of water pollution, Types of water pollutants, Characteristics of water pollutants Turbidity, pH, total suspended solids, total solids BOD and COD: Definition, calculation

3.2 Waste Water Treatment: Primary methods: sedimentation, froth floatation, Secondary methods: Activated sludge treatment, Trickling filter, Bioreactor, Tertiary Method: Membrane separation technology, RO (reverse osmosis)

3.3 Causes, Effects and Preventive measures of Soil Pollution: Causes-Excessive use of Fertilizers, Pesticides and Insecticides, Irrigation, E-Waste.

4. Solid Waste Management, ISO 14000 and Environmental Management

4.1 Solid waste generation- Sources and characteristics of: Municipal solid waste, E-waste, biomedical waste.

4.2 Metallic wastes and Non-Metallic wastes (lubricants, plastics, rubber) from industries.

4.3 Collection and disposal: MSW (3R, principles, energy recovery, sanitary landfill), Hazardous waste

4.4 Air quality act 2004, air pollution control act 1981 and water pollution and control act 1996.

4.5 Structure and role of Central and state pollution control board.

4.6 Concept of Carbon Credit, Carbon Footprint.

4.7 ISO14000: Implementation in industries, Benefits.

COURSE OUTCOME

After completion of the course the student be able to:

- Appreciate concepts and methods from ecological and physical sciences and their application in environmental problem solving.
- Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.
- work and produce most efficient, economical and eco-friendly finished products.
- Solve various engineering problems applying ecosystem to produce eco – friendly products.
- Use relevant air and noise control method to solve domestic and industrial problems.
- Use relevant water and soil control method to solve domestic and industrial problems.
- Solve local solid and e-waste problems.

RECOMMENDED BOOKS

1. S.C. Sharma & M.P. Poonia, Environmental Studies,Khanna Publishing House,NewDelhi
2. Arceivala, Soli Asolekar, Shyam, Waste Water Treatment for Pollution Control and Reuse, Mc-Graw Hill Education India Pvt. Ltd., New York, 2007, ISBN:978-07-062099-
3. Nazaroff, William, Cohen, Lisa, Environmental Engineering Science, Willy, New York, 2000
4. O.P. Gupta, Elements of Environmental Pollution Control, Khanna Publishing House, New Delhi

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	06	16
2	08	20
3	08	24
4	10	40
Total	**32**	**100**

CURRICULUM
FOR
SECOND SEMESTER
DIPLOMA IN
TEXTILE DESIGN

SUBJECT STUDY SCHEME(2ND SEMESTER :TEXTILE DESIGN)

Course Code	Subjects	Time in Hours				CREDITS		
		Theory	Tutorial	Practical	Total	Theory	Practical	Total
ES202	Introduction to Computers and Information Technology	---	---	4	4	----	2	2
HS205	Soft Skills & Personality Development	3	--------	---	3	3	----	3
HS206	Soft Skills & Personality Development	-----	------	2	2	-----	1	1
TDPC201	Textile Processes – II	4	--------	--------	4	4	--------	4
TDPC202	Art Appreciation in Indian Traditional Textile Design	3	--------	-----	3	3	-----	3
TDPC203	Art Appreciation in Indian Traditional Textile Design Drawing Work	-----	-----	4	4	-----	2	2
TDPC204	Structural Fabric Design-I	3	--------	----	3	3	-----	3
TDPC205	Structural Fabric Design-I Lab	----	-----	2	2	----	1	1
TDPC206	Drawing and Rendering	--------	--------	4	4	--------	2	2
	Total	13	---	16	29*	13	08	21

Note:

I. ***For students of Batch 2022-23 only****, the* following two subjects from the curriculum of 1st Semester (Eng.& Tech.) shall also be taught as part of the 2nd Sem Curriculum.

a) Subject Code: BS103 (Chemistry & Environmental Science), LTP (300) with 03 hours per week and number of Credits as 03

b) Subject Code: BS108(Chemistry Lab), LTP (001) with 02 hours per week and number of credits as 01.

The time for the same needs to be managed by conduct of special and extra classes for the said batch.

II. ***For Students of Batch 2023-24 and Onwards***, the following two subjects shall be taught as part of 1st Sem Curriculum only in addition to the specified curriculum, resulting the total credits of 1st Sem as 23 instead of 19.

a) Subject Code: BS103 (Chemistry & Environmental Science), LTP(300) with 03 hours per week and number of credits as 03

b) Subject Code: BS108(Chemistry Lab), LTP(001) with 02 hours per week *and number of credits as 01.*

PROGRAM THREE YEAR DIPLOMA IN ENGINEERING AND TECHNOLOGY	
Course Code: **ES202**	Course Title: **Introduction to Computers and Information Technology**
Semester:**2nd**	Credit: **2**
Periods Per Week: **4 (L: 0 T: 0 P: 4)**	

(* Common to Architecture Assistantship, Automobile, Civil, Civil(PHE), QSCM,Computer , Electrical , E&C,Medical Electronics, Food Technology, Garment Technology, I&C,Leather Technology, Mechanical, Textile Design, Textile Technology, Travel and Tourism, MLT, Wood Technology and IT)

COURSE OBJECTIVE

Information technology has great influence on all aspects of our life. Primary purpose of using computer is to make the life easier. 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 tools of MS Office/Open Office using internet etc. form the broad competency profile of diploma holders. This exposure will enable the students to enter their professions with confidence, live in a harmonious way and contribute to the productivity.

COURSE CONTENT

1. **Basics of Information Technology**
   - 1.1. Its concept and scope, applications of IT, ethics and future with information technology.
   - 1.2. Impact of computer and IT in society.
   - 1.3. Computer application in office, book publishing, data analysis, accounting, investment, inventory control, graphics, air and railway ticket reservation, robotics, military, banks, Insurance financial transactions and many more.

2. **Basic Components of Computer System**
   - 2.1. Block diagram of a computer System and Processing of Data.
   - 2.2. Demonstration of computer system viz., Hardware, Software
   - 2.3. Concept of Memory and its various types, Primary and secondary memories (RAM, ROM, Storage Devices etc).

3. **Internet and its Applications**
   - 3.1. Introduction to Internet, its basic working.
   - 3.2. Concept of Email, Social Media, Cloud Computing.
   - 3.3. Basic ideas about IP Address, DNS, URL, Server, Web Browser,LAN etc.

4. Use of Various Basic Data Processing Softwares

4.1. Word Processing (Microsoft Word & Google Docs.)

4.1.1. File Management:

4.1.1.1. Opening, creating and saving a document, locating files, copying contents in some different file(s).

4.1.2. Editing a document:

4.1.2.1. Entering text, Cut, copy, paste using tool- bars

4.1.3. Formatting a document:

4.1.3.1. Using different fonts, changing font size and colour, changing the appearance through bold/ italic/ underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods

4.1.3.2. Aligning of text in a document, justification of document,Inserting bullets and numbering

4.1.3.3. Formatting paragraph, inserting page breaks and column breaks, line spacing

4.1.3.4. Use of headers, footers: Inserting footnote, end note, use of comments

4.1.3.5. Inserting date, time, special symbols, importing graphic images, drawing tools

4.1.4. Tables and Borders:

4.1.4.1. Creating a table,

4.1.4.2. Formatting cells,

4.1.4.3. Use of different border styles, shading in tables,

4.1.4.4. Merging of cells, partition of cells, inserting and deleting a row in a table

4.1.5. Print preview, zoom, page set up, printing options

4.1.6. Using Find, Replace options

4.2. Microsoft-Excel and Google Sheets

4.2.1. Introduction to Spreadsheet Application-Workbook and Worksheets

4.2.2. Working with data and formulas:

4.2.2.1. Addition, subtraction, division, multiplication, percentage and autosum.

4.2.2.2. Format data, create chart, printing chart, save worksheet, creating and formatting of charts and graphs

4.3. Presentation (Microsoft-PowerPoint and Google Slides)

4.3.1. Introduction to PowerPoint - How to start PowerPoint - Working environment: concept of toolbars, slide layout, templates etc. - Opening a new/existing presentation - Different views for viewing slides in a presentation: normal, slide sorter etc.

4.3.2. Addition, deletion and saving of slides.

4.3.3. Insertion of multimedia elements - Adding text boxes, importing pictures, movies and sound, tables and charts etc.

4.3.4. Formatting slides - Text formatting, changing slide layout, changing slide color scheme - Changing background, Applying design template.

4.3.5. Viewing the presentation using slide navigator

COURSE OUTCOME

After the completion of the course the student will be able to:

- Identify the different hardware components and functional units of a Computer system.
- Explain basic concepts and working of internet.
- Create and format word documents by using different word processing software.
- Prepare the spread sheets and the presentation of data in different ways.
- Prepare power point presentations.

RECOMMENDED BOOKS:

1. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd-Jungpura, New Delhi
2. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
3. Fundamentals of Information Technology by Leon and Leon;Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
4. Basics of Information Technology, by Ishan Publications, Ambala
5. Information Technology for Management by Henery Lucas, 7th edition, Tata McGraw Hill Education Pvt Ltd, New Delhi

UNIT WISE TIME AND MARKSDISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	06	10
2	13	20
3	13	20
4	32	50
Total	**64**	**100**

PROGRAM : THREE YEARS DIPLOMA PROGRAM IN TEXTILE DESIGN	
Course Code : HS 205	Course Title : Soft Skills and Personality Development
Semester : 2ND	Credits: **3**
Periods per week: **(L: 3 T: 0 P: 0)**	

COURSE OBJECTIVE: Soft skills, unlike hard skills that are technical, tangible, measurable, quantifiable and assessable, are practical, imperceptible and subtle qualitative traits that determine the efficacy of human communication at professional and personal levels. While hard skills acquisition can be correlated with one's intelligence quotient (IQ), soft skills development are intricately linked with one's emotional quotient (EQ) and spiritual quotient (SQ). Hard skills can aid an individual secure a position, yet soft skills help the person retain it, achieve excellence and fulfill self-actualization needs. Using academic as well as popular books, the course offers soft skills by integrating them at personal, professional, interpersonal and management levels.

COURSE CONTENT

Unit 1 **(15 hours)**
Personal Skills

Self-Assessment; Identifying Strength & Limitations; Habits, Will-Power and Drives; Developing Self-Esteem and Building Self-Confidence, Significance of Self-Discipline
Understanding Perceptions, Attitudes and Personality Types.
Mind-Set: Growth and Fixed; Values and Beliefs
Motivation and Achieving Excellence; Self-Actualization Need Goal Setting, Life and Career Planning; Constructive Thinking

Unit 2 **(18 Hours)**
Professional Skills

Communicating Clearly: Understanding and Overcoming barriers; Cross gender/Cross Cultural communication, Strategic communication.
Active Listening
Persuasive Speaking and Presentation Skills
Conducting Meetings, Writing Minutes, Sending Memos and Notices
Etiquette: Effective E-mail Communication; Telephone Etiquette
Body Language in Group Discussion and Interview

Unit 3 **(10 Hours)**
Interpersonal Skills

Enhancing Empathy, Showing Sympathy and Dealing with Antipathy; Gaining Trust and Developing Emotional Bonding
Ethics and Etiquettes (Social and Official Settings); Respecting Privacy; Civic Sense and Care for the Environment
Negotiating, Decision-Making, Conflict-Resolution, Five Styles

Emotional Literacy; Assertiveness versus Aggressiveness; Learning to Say "No."; Learning to Appreciate and Give Praise; Presenting Bad News
Humor, Jokes and Anecdotes in Effective Communication

Unit 4 **(5 hours)**
Management Skills

Managing Time and Beating Procrastination
Managing People: Leading and Working with Team (Co-ordination and Co-operation); Developing Accountability, Commitment and Responsibility; Behaving Conscientiously
Managing Stress and Maintaining Positive Outlook
Managing Health, Boosting Memory, Enhancing Study Skills
Managing Money and Love; Balancing Personal and Professional Life

Course Outcome
After the completion of the course, the student will be able to:

- Develop Self Confidence
- Learn attitudes and personality types
- Learn communication skills and etiquettes of communication
- know about interpersonal skills and management skills

REFERENCES

1. Personality Development and Soft Skills,Barun k. Mitra, Oxford Press
2. Business Communication, Shalini Kalia, ShailjaAgarwal,Wiley India
3. Cornerstone Developing Soft Skills, Sheffield, Pearson
4. Managing Soft Skills for Personality Development -edited by B.N Ghosh, McGraw Hill India
5. Soft Skills An Integrated Approach to Maximize Personality, Gajendra S.Chauchan, Sangeeta Sharma, Wiley In

UNIT WISE TIME AND MARKS DISTRIBUTION

UNIT NO	TIME (HOURS)	MARKS
01	15	25
02	18	30
03	10	25
04	05	20
TOTAL	**48**	**100**

PROGRAM : THREE YEARS DIPLOMA PROGRAM IN TEXTILE DESIGN	
Course Code : HS 206	Course Title : Soft Skills and Personality Development LAB
Semester : 2ND	Credits: **1**
Periods per week: **2(L: 0 T: 0 P: 2)**	

COURSE OBJECTIVE: Soft skills, unlike hard skills that are technical, tangible, measurable, quantifiable and assessable, are practical, imperceptible and subtle qualitative traits that determine the efficacy of human communication at professional and personal levels. While hard skills acquisition can be correlated with one's intelligence quotient (IQ), soft skills development are intricately linked with one's emotional quotient (EQ) and spiritual quotient (SQ). Hard skills can aid an individual secure a position, yet soft skills help the person retain it, achieve excellence and fulfill self-actualization needs. Using academic as well as popular books, the course offers soft skills by integrating them at personal, professional, interpersonal and management levels.

LIST OF PRACTICALS

1. Thinking Skills Correcting Common Errors in day to day conversation
2. Making picture and improving diagram to English word
2. Field Diary and lab record
3. Ice Breaking Activity and Just A Minute Session
4. Speaking from observation and reading
6. Greetings -Apologies, request, social and professional Etiquette Telephone etiquettes
7. Indexing, Footnotes and bibliographic procedure
8. Vocabulary building
9. Report Making
10. Comprehensions

PROGRAM: THREE YEARS DIPLOMA PROGRAM IN TEXTILE DESIGNING	
Course Code: TDPC201	Course Title: TEXTILE PROCESS – II
Semester: 2ND	Credits:**4**
Periodsperweek:**4(L: 4 T: 0 P: 0)**	

COURSE OBJECTIVE: The students of textile design are supposed to have introductory knowledge and skill related to various fibers, yarns and fabrics. Learn source of different natural and manmade fibers. Students should know the polymerization. This subject will give knowledge of different yarns and non-woven fabric.

COURSE CONTENT

Unit 1
Definition of manmade fibres. Relative merits and demerits of manmade fibres and natural fibres. Introduction to Polymerization, Monomer, Polymer, Polymer Chain, Degree of Polymerization, Addition and Condensation Polymerization

Unit 2
Basic production systems of the man-made fibre. Melt spinning, solution dry spinning and solution wet spinning. Objectives of drawing, Objectives of heat setting, Objectives of Spin Finish, Relative merits and demerits of melt ,dry and wet spinning processes.

Unit 3
Flow sheet of manufacturing of Polyester, Nylon, Acrylic, Viscose Rayon, Polypropylene.

Unit 4
Twist, Insertion of twist, S and Z twist. Introduction to yarn packages, type of package in spinning and doubling. Introduction to Non-woven fabrics, different types of non- woven fabrics.

Unit 5
Knowledge of standard yarns, bulked yarn, core yarn, high tenacity yarn, lustre yarn, tyre cord yarn, carpet yarn, stretch yarn, twist-de-twist yarn, spiral yarn, grindle yarn, hosiery yarn

COURSE OUTCOME

After completion of the course the student will be able to

- Execute the process of man-made fibre production.
- Perform man-made fibre spinning, drawing and heat setting.
- Convert fibre into yarn by twist.
- Manufacture non-woven fabrics

RECOMMENDEDBOOKS

1. EPG Gohl and L D Vilensky, "Textile Science by C B S Publisher & Distributors,2nd edition,1984.
2. Bernard P. Corbman, "Fibre to Fabric " by McGraw Hill Education, 6thedition,1985.
3. Parul Bhatnagar, "Elementary Textile" by Abhishek Publisher, Chandigarh, 1st edition2015
4. Max M. Houck, "Identification of textile fibers" by Wood head Publishing India in Textile, 1st edition 2009.
5. Kaplan, "Textile fibers" Abhishek Publisher, Chandigarh,1stedition,2019

WEBSITES

1. https://onlinecourses.nptel.ac.in/
2. https://swayam.gov.in/

UNITWISE TIME AND MARKS DISTRIBUTION

UNIT NO	TIME (HOURS)	MARKS
01	13	20
02	16	25
03	13	20
04	12	20
05	10	15
TOTAL	**64**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAM IN TEXTILE DESIGNING	
Course Code: **TDPC202**	Course Title : **Art Appreciation In Indian Traditional Textile Design**
Semester:**2ND**	Credits:**3**
Periodsperweek:**3(L: 3T: 0P: 0)**	

COURSE OBJECTIVE: Historical backgrounds of Indian traditional textiles i.e. woven, dyed, printed and embroidered and their development of design, fabric uses and technical details are very important for textile design students. This subject will give exposure of methods, center of production, motifs and styles of Indian traditional textiles. It will give knowledge about color and textures of various traditional textiles.

COURSE CONTENT

Unit 1 **(10 Hours)**

Study of Indian embroidered textiles with reference to textiles with reference to

1.1 Historical significance
1.2 Construction techniques
1.3 Styles
1.4 Textures, colour and qAMotifs
1.5 Centres of production
  i. Different Kashmir embroidery
  ii. Punjabi Phulkari
  iii. UP Chikan Kari

Unit 2 **(10 Hours)**

Study of Indian embroidered textiles with reference to textiles with reference to

2.1 Historical significance
2.2 Construction techniques
2.3 Styles
2.4 Textures, colour and Motifs
2.5 Centres of production
  i. Karnataka Kasuti
  ii. Brocades Banaras
  iii. Baluchar

Unit 3 **(13 Hours)**

Study of Woven textiles with reference to:

3.1 Historical significance
3.2 Construction techniques (Including raw materials)
3.3 Styles, colour and motifs

3.4 Centres of production

i. Tangail

ii. Jamdani

Unit 4 **(05 Hours)**

Study of printed and painted textiles with reference to:

4.1 Historical significance

4.2 Printing Techniques

4.3 Styles, colour and dyes and motifs

4.4 Centres of production

i. Kalamkari

ii. Madhubani

Unit 5 **(10 Hours)**

Study of resist dyed textiles with reference to:

5.1 Historical significance

5.2 Dyeing techniques

5.3 Styles, colour and Motifs

5.4 Centres of Production

i) Ikat , Patola

ii)Bandhani of Rajasthan and Gujarat

COURSE OUTCOME

After completion of the course the student will be able to

- Construct designs of different Kashmir embroidery, Punjab Phulkari, Kasuti embroidery, Brocade and Baluchar.
- Construct designs of woven textiles tangail and Jamdani
- Create designs of Kalamkari art and Madhubani
- Create designs of resist dyed textiles

RECOMMENDED BOOKS

1. Chetna Desai Ikat, "Textile of India" by Chronicle books, 1st edition, 1988.
2. Sukla Das, "Fabric Art heritage of India" by Abhinav Publication, 1st edition, 1992.
3. Veronica Murphy, "Tie Dyed Textile of India" by Rizzoli Publishers, 1st edition, 1991.
4. John Gillow, "Traditional Indian Textiles" by Thames and Hudson, 1st edition, 1991.
5. Kyoto Shoin, "Textile Art of India" by Kokyohatanaka Collections, 1st edition, 1993.

UNIT WISE TIME AND MARKS DISTRIBUTION

UNIT NO	TIME (HOURS)	MARKS
01	10	20
02	10	15
03	13	35
04	05	15
05	10	15
TOTAL	**48**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAM IN TEXTILE DESIGNING	
Course Code: **TDPC203**	Course Title: **Art Appreciation In Indian Traditional Textile Design Drawing Work**
Semester:**2ND**	Credits:**2**
Periodsperweek:4**(L: 0T: 0P: 4)**	

COURSE OBJECTIVE: Historical backgrounds of Indian traditional textiles i.e. woven, dyed, printed and embroidered and their development of design, fabric uses and technical details are very important for textile design students. This subject will give exposure of methods, center of production, motifs and styles of Indian traditional textiles. It will give knowledge about color and textures of various traditional textiles.

LIST OF PRACTICALS

1. Replication of Kashmir embroidery design and presentation of assignments.
2. Replication of Punjabi phulakri and presentation of assignments.
3. Replication of chikankari and presentation of assignments.
4. Replication of kasuti of Karanatka embroidery and presentation of assignments.
5. Replication of Banaras brocades and presentation of assignments.
6. Replication of Baluchar embroidery and presentation of assignments.
7. Replication of Tangail, Jamdani woven textiles and presentation of assignments.
8. Replication of and kalamkari and presentation of assignments.
9. Replication of madhubani and presentation of assignments.
10. Replication of ikat and presentation of assignments.
11. Replication of patola and presentation of assignments.
12. Replication of bandhani of Rajasthan and Gujrat and presentation of assignments.

PROGRAM: THREE YEARS DIPLOMA PROGRAM IN TEXTILE DESIGNING	
Course Code: **TDPC204**	Course Title: **Structural Fabric Design -I**
Semester:**2ND**	Credits:**3**
Periodsperweek:**3(L: 3T: 0P: 0)**	

COURSE OBJECTIVE: Skill regarding various basic weaves designs, their drafting and lifting plan constructions and properties of basic weaves is required in the students. They are expected to know the derivatives of basic weaves. The subject will provide knowledge of different methods of weaves employment to acquire competency for production of basic and advance woven designs.

COURSE CONTENT

Unit 1 **(10 hours)**

Introduction to fabric structure, explanation of woven structures and other fabric structures for example knitted, non-woven, bonded. Definition of warp and weft, ends and picks, design, repeat of a design, draft, lifting or peg plan and denting order. Design representation on graph paper. Types of drafts and their uses in the manufacture of various fabrics.

Unit 2 **(10 hours)**

Construction of plain weave and its derivatives in the form of simple matt or Hopsack and ribbed structure. Ornamentation of plain weave by different methods Construction of Twill weaves and their derivatives - Regular twills, pointed twills, Broken twills, Combined twills, Low twills and high twills.

Unit 3 **(05 hours)**

Characteristics and uses of satin and sateen weaves, construction of regular and irregular satin and sateen. Diamond weaves and their construction, Simple honey comb, brighten honey comb, huckaback, sponge and similar weaves.

Unit 4 **(13 hours)**

Mock lenos weave and distorted thread effects. Construction of bed ford cord and wadded bed ford. Welts and piques, plain pique backed pique, backed fabrics, warp and weft backed fabrics, wadded warp and weft backed fabrics their beaming and drafting procedure.

Unit 5 **(10 hours)**

Double cloth- self stitched double cloth, reversible self-stitched double cloths, selection of suitable stitching position, wadded double cloths. Center stitched double cloths-center warp stitching, center weft stitching.

COURSE OUTCOME

After completion of the course the student be able to

- Construct woven, knitted and non-woven structures and warp and weft in fabrics
- Construct Plain weave, Twill Weave, satin Weave, Mockleno Weave, Bedford cord weave
- Construct backed fabrics and Double cloth

RECOMMENDEDBOOKS:

1. Z J Grosicki, "Watson's AdvanceTextileDesign"byWoodheadPublication,4th edition 1913.
2. Z J Grosicki, "Watson's Textile Design and Colour by Woodhead Publication,9th edition1912.
3. N Gokarneshan, "Fabric Structure and Design" by New age International, 2nd edition2004.
4. Doris Goerner, "Woven Structures and Design by" British Textile Technology Group WIRA House, Leeds (UK), 5th edition, 1988.
5. M G Mahadevan, "Textile Spinning Weaving and Designing by Abhishek Publications, Chandigarh, 1st edition 2001.
6. Shenton Jan " Woven Textile Design by Laurence KingPublishing,1stedition,2014

UNIT WISE TIME AND MARKS DISTRIBUTION

UNIT NO	TIME (HOURS)	MARKS
01	10	20
02	10	20
03	05	20
04	13	25
05	10	15
TOTAL	**48**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAM IN TEXTILE DESIGNING	
Course Code: **TDPC205**	Course Title: **Structural Fabric Design-I Lab.**
Semester:**2ND**	Credits:**1**
Periods per week:2**(L: 0T: 0P: 2)**	

COURSE OBJECTIVE: Skill regarding various basic weaves designs, their drafting and lifting plan constructions and properties of basic weaves is required in the students. They are expected to know the derivatives of basic weaves. The subject will provide knowledge of different methods of weaves employment to acquire competency for production of basic and advance woven designs.

LIST OF PRACTICALS

Following weaves to be constructed on Graph Paper

1. Construction of Plain weave
   i. Rib weave - regular and irregular
   ii. Hopsack weave
2. Construction of Twill weave
   i. Warp faced twill
   ii. Weft faced twill
   iii. Reversible twill
3. Identification of fabrics structures regarding weaving, knitting.
4. Drafting and denting of warp for weaves studied in theory
5. Construction of pointed and diagonal weave, satin and sateen weaves - regular and Irregular
6. Construction of Honey comb weave and brighten honey comb
7. Construction of Huck a back weave
8. Construction of Mock leno weave
9. Drafting and denting of warp for weaves studied in theory
10. Study of effect of structure of cloth by changing denting plan
11. Study of effect of change in structure by varying lifting plan
12. Analysis of double cloth fabric.

PROGRAM: THREE YEARS DIPLOMA PROGRAM IN TEXTILE DESIGNING	
Course Code**: TDPC206**	Course Title : **Drawing And Rendering**
Semester:**2ND**	Credits:**2**
Periodsperweek:**4(L: 0T: 0P: 4)**	

COURSE OBJECTIVE: Textile design students are required to draw various forms of objects from their surroundings and nature from design point of view e.g flowers, leaves, fruits, plants, monuments etc. The translation of ideas into practice without the use of this graphic language is really beyond imagination. This subject will include outdoor sketching.

COURSE CONTENT

Unit 1

1. To draw different opaque objects and do them in the given medium by pencil shading
2. To draw different transparent objects and do them in the given medium by pencil shading
3. To draw different round shapes like (pot, kettle, ball etc) and do them in the given medium by pencil shading.
4. To draw different square shapes like (match box, duster, big and small boxes) and do them in the given medium by pencil shading.

Unit 2

1. To draw different shaped objects like glazed surface.
2. To draw different shaped objects like rough surface.
3. To study the objectives and use of different mediums.

Unit 3

1. To study different folds of drapery with any background by pencil shading.
2. To study different folds of drapery with any background by black pen and ink

Unit 4

1. To make a drawing using one's memory.

Unit 5

1. To stylize different objects studied.
2. To form a composition using different styles.

RECOMMENDED BOOKS

1. A Walter foster, "How to draw and paint" by E.D. Galgotia and sons, 4th edition, 2007.
2. A. Walter foster, "Flowers and still life" byA E.D. Galgotia and sons, 3rd edition, 2017.
3. A Walter foster, "How to draw and paint textures of animals" by E.D. Galgotia and

sons, 4th edition, 1988.

4. Barrington barber, "The fundamentals of Drawing" by Arcturus Publishing Limited, 5th edition illustrated, 2001.
5. Jasminasusak, "Drawing for beginners" by Create space Independent, 3rd edition, 2018.
6. William F Powell, "Learn to draw step by step (Drawing Tress), Books Wagon, 3rd edition, 2018.

INSTRUCTIONAL STRATEGY

This is hands on practice-based subject for development of required skills in the students. This workshop contains five units of equal weight age. Field visits must be included to museums, gardens and monuments for using various shapes, colours and textures in their designs.

CURRICULUM

FOR

SECOND SEMESTER

DIPLOMA IN

TEXTILE TECHNOLOGY

SUBJECT STUDY SCHEME(2ND SEMESTER : TEXTILE TECHNOLOGY)

Course Code	Subjects	Time in Hours				CREDITS		
		Theory	Tutorial	Practical	Total	Theory	Practical	Total
BS201	Applied Mathematics-II	3	1	--------	4	4	--------	4
ES202	Introduction to Computers and Information Technology	---	---	4	4	----	2	2
HS205	Soft Skills & Personality Development	3	--------	---	3	3	----	3
HS205	Soft Skills & Personality Development	----	----	2	2	---	1	1
TTPC201	Fundamentals of Textile Machines & Processes	3	--------	---	3	3	---	3
TTPC202	Fundamentals of Textile Machines & Processes Lab	----	----	2	2	-----	1	1
TTPC203	Fabric Structure and analysis-I	3	--------	------	3	3	------	3
TTPC204	Fabric Structure and analysis-I Lab	---	---	2	2		1	1
TTPC205	Weaving preparatory Process	3	--------	------	3	3	------	3
TTPC206	Weaving preparatory Process Lab	---	-----	2	2	---	1	1
	Total	15	1	12	28*	16	6	22

* Note: The remaining hours in a week shall be utilized for sports and other activities like debates, seminar etc.

PROGRAM: THREE YEAR DIPLOMA IN ENGINEERING AND TECHNOLOGY *	
Course Code: **BS201**	Course Title: **Applied Mathematics-II**
Semester: **2nd**	Credit: **4**
Periods Per Week: **4 (L: 03, T: 01, P: 0)**	

(* Common to Architecture Assistantship, Automobile, Civil, Civil(PHE), QSCM, Computer , Electrical , E&C, Medical Electronics, Food Technology, I&C, Leather Technology, Mechanical, Textile Technology, Wood Technology and IT)

COURSE OBJECTIVE:

This course is designed to develop an understanding of basic mathematical and statistical tools which include matrices, determinants, integral calculus and coordinate geometry and the applications of such tools in the field of engineering and technology

COURSE CONTENT

1. Integral Calculus

1.1 Integration as inverse operation of differentiation

1.2 Simple integration by substitution, by parts and by partial fractions (for Linear factors only)

1.3 Evaluation of definite integrals (simple problems)-

Evaluation of $\int_0^{\pi/2} \text{Sin}^n x.\, dx$, $\int_0^{\pi/2} \text{Cos}^n x\, dx$, $\int_0^{\pi/2} \text{Sin}^m x\ \text{Cos}^n x\, dx$

Using formulae without proof (m and n being positive integers only)

2. Coordinate Geometry

2.1 Equation of straight line in various standard forms (without proof), intersection of two straight lines, angle between two lines. Parallel and perpendicular lines, perpendicular distance formula.

2.2 General equation of a circle and its characteristics. To find the equation of a circle, given: Centre and radius, three points lying on it and coordinates of end points of a diameter.

2.3 Definition of conics (Parabola, Ellipse, Hyperbola) their standard equations without proof. Basic problems on conics when their foci, directrices or vertices are given.

3 Matrices and Determinants

3.1 Definition of matrix and its types.

3.2 Addition, subtraction and multiplication of matrices.

3.3 Expansion of Determinants.

4 Statistics

4.1 Measures of Central Tendency: Mean, Median, Mode

4.2 Measures of Dispersion: Mean deviation, Standard deviation

4.3 Basic Concepts of Probability.

COURSE OUTCOME

After the completion of the course the student will be able to:

- evaluate both indefinite and definite integrals by various methods
- identify various points in a 2-D space along with formulation of equations and graphs for different types of lines, circles, ellipses, parabolas etc.
- find the sum, difference and product of two or more matrices,
- evaluate determinants and their relations to matrices
- find the mean, median, mode and other measures of central tendency.
- solve basic problems on probability.

RECOMMENDED BOOKS:

1. R.D Sharma, Applied Mathematics-II.
2. H.K Das, Applied Mathematics.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 40th Edition, 2007.
4. S.S. Sabharwal, Sunita Jain, Eagle Parkashan, Applied Mathematics, Vol. I & II, Jalandhar.
5. Comprehensive Mathematics, Vol. I & II by Laxmi Publications, Delhi.
6. Reena Garg & Chandrika Prasad, Advanced Engineering Mathematics, Khanna Publishing House, New Delhi
7. Applied Mathematics-II, Eagle Publications.

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	16	35
2	10	20
3	12	25
4	10	20
Total	**48**	**100**

PROGRAM THREE YEAR DIPLOMA IN ENGINEERING AND TECHNOLOGY	
Course Code: **ES202**	Course Title: **Introduction to Computers and Information Technology**
Semester:**2nd**	Credit: **2**
Periods Per Week: **4 (L: 0 T: 0 P: 4)**	

(* Common to Architecture Assistantship, Automobile, Civil, Civil(PHE), QSCM, Computer , Electrical , E&C, Medical Electronics, Food Technology, Garment Technology, I&C, Leather Technology, Mechanical, Textile Design, Textile Technology, Travel and Tourism, MLT, Wood Technology and IT)

COURSE OBJECTIVE

Information technology has great influence on all aspects of our life. Primary purpose of using computer is to make the life easier. 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 tools of MS Office/Open Office using internet etc. form the broad competency profile of diploma holders. This exposure will enable the students to enter their professions with confidence, live in a harmonious way and contribute to the productivity.

COURSE CONTENT

1. **Basics of Information Technology**
   - 1.1. Its concept and scope, applications of IT, ethics and future with information technology.
   - 1.2. Impact of computer and IT in society.
   - 1.3. Computer application in office, book publishing, data analysis, accounting, investment, inventory control, graphics, air and railway ticket reservation, robotics, military, banks, Insurance financial transactions and many more.

2. **Basic Components of Computer System**
   - 2.1. Block diagram of a computer System and Processing of Data.
   - 2.2. Demonstration of computer system viz., Hardware, Software
   - 2.3. Concept of Memory and its various types, Primary and secondary memories (RAM, ROM, Storage Devices etc).

3. **Internet and its Applications**
   - 3.1. Introduction to Internet, its basic working.
   - 3.2. Concept of Email, Social Media, Cloud Computing.
   - 3.3. Basic ideas about IP Address, DNS, URL, Server, Web Browser, LAN etc.

4. Use of Various Basic Data Processing Softwares

4.1. Word Processing (Microsoft Word & Google Docs.)

4.1.1. File Management:

4.1.1.1. Opening, creating and saving a document, locating files, copying contents in some different file(s).

4.1.2. Editing a document:

4.1.2.1. Entering text, Cut, copy, paste using tool- bars

4.1.3. Formatting a document:

4.1.3.1. Using different fonts, changing font size and colour, changing the appearance through bold/ italic/ underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods

4.1.3.2. Aligning of text in a document, justification of document,Inserting bullets and numbering

4.1.3.3. Formatting paragraph, inserting page breaks and column breaks, line spacing

4.1.3.4. Use of headers, footers: Inserting footnote, end note, use of comments

4.1.3.5. Inserting date, time, special symbols, importing graphic images, drawing tools

4.1.4. Tables and Borders:

4.1.4.1. Creating a table,

4.1.4.2. Formatting cells,

4.1.4.3. Use of different border styles, shading in tables,

4.1.4.4. Merging of cells, partition of cells, inserting and deleting a row in a table

4.1.5. Print preview, zoom, page set up, printing options

4.1.6. Using Find, Replace options

4.2. Microsoft-Excel and Google Sheets

4.2.1. Introduction to Spreadsheet Application-Workbook and Worksheets

4.2.2. Working with data and formulas:

4.2.2.1. Addition, subtraction, division, multiplication, percentage and autosum.

4.2.2.2. Format data, create chart, printing chart, save worksheet, creating and formatting of charts and graphs

4.3. Presentation (Microsoft-PowerPoint and Google Slides)

4.3.1. Introduction to PowerPoint - How to start PowerPoint - Working environment: concept of toolbars, slide layout, templates etc. - Opening a new/existing presentation - Different views for viewing slides in a presentation: normal, slide sorter etc.

4.3.2. Addition, deletion and saving of slides.

4.3.3. Insertion of multimedia elements - Adding text boxes, importing pictures, movies and sound, tables and charts etc.

4.3.4. Formatting slides - Text formatting, changing slide layout, changing slide color scheme - Changing background, Applying design template.

4.3.5. Viewing the presentation using slide navigator

COURSE OUTCOME

After the completion of the course the student will be able to:

- Identify the different hardware components and functional units of a Computer system.
- Explain basic concepts and working of internet.
- Create and format word documents by using different word processing software.
- Prepare the spread sheets and the presentation of data in different ways.
- Prepare power point presentations.

RECOMMENDED BOOKS:

1. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd-Jungpura, New Delhi
2. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
3. Fundamentals of Information Technology by Leon and Leon;Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
4. Basics of Information Technology, by Ishan Publications, Ambala
5. Information Technology for Management by Henery Lucas, 7th edition, Tata McGraw Hill Education Pvt Ltd, New Delhi

UNIT WISE TIME AND MARKSDISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	06	10
2	13	20
3	13	20
4	32	50
Total	**64**	**100**

PROGRAM : THREE YEARS DIPLOMA PROGRAM IN TEXTILE TECHNOLOGY	
Course Code : HS 205	Course Title : Soft Skills and Personality Development
Semester : 2ND	Credits: **3**
Periods per week: **(L: 3 T: 0 P: 0)**	

COURSE OBJECTIVE: Soft skills, unlike hard skills that are technical, tangible, measurable, quantifiable and assessable, are practical, imperceptible and subtle qualitative traits that determine the efficacy of human communication at professional and personal levels. While hard skills acquisition can be correlated with one's intelligence quotient (IQ), soft skills development are intricately linked with one's emotional quotient (EQ) and spiritual quotient (SQ). Hard skills can aid an individual secure a position, yet soft skills help the person retain it, achieve excellence and fulfill self-actualization needs. Using academic as well as popular books, the course offers soft skills by integrating them at personal, professional, interpersonal and management levels.

COURSE CONTENT

Unit 1 **(15 hours)**
Personal Skills

Self-Assessment; Identifying Strength & Limitations; Habits, Will-Power and Drives; Developing Self-Esteem and Building Self-Confidence, Significance of Self-Discipline
Understanding Perceptions, Attitudes and Personality Types.
Mind-Set: Growth and Fixed; Values and Beliefs
Motivation and Achieving Excellence; Self-Actualization Need Goal Setting, Life and Career Planning; Constructive Thinking

Unit 2 **(18 Hours)**
Professional Skills

Communicating Clearly: Understanding and Overcoming barriers; Cross gender/Cross Cultural communication, Strategic communication.
Active Listening
Persuasive Speaking and Presentation Skills
Conducting Meetings, Writing Minutes, Sending Memos and Notices
Etiquette: Effective E-mail Communication; Telephone Etiquette
Body Language in Group Discussion and Interview

Unit 3 **(10 Hours)**
Interpersonal Skills

Enhancing Empathy, Showing Sympathy and Dealing with Antipathy; Gaining Trust and Developing Emotional Bonding
Ethics and Etiquettes (Social and Official Settings); Respecting Privacy; Civic Sense and Care for the Environment
Negotiating, Decision-Making, Conflict-Resolution, Five Styles

Emotional Literacy; Assertiveness versus Aggressiveness; Learning to Say "No."; Learning to Appreciate and Give Praise; Presenting Bad News
Humor, Jokes and Anecdotes in Effective Communication

Unit 4 **(5 hours)**
Management Skills

Managing Time and Beating Procrastination
Managing People: Leading and Working with Team (Co-ordination and Co-operation); Developing Accountability, Commitment and Responsibility; Behaving Conscientiously
Managing Stress and Maintaining Positive Outlook
Managing Health, Boosting Memory, Enhancing Study Skills
Managing Money and Love; Balancing Personal and Professional Life

Course Outcome

After completion of the course the student will be able to

- Develop Self Confidence
- Learn attitudes and personality types
- Learn communication skills and etiquettes of communication
- know about interpersonal skills and management skills

REFERENCES

1. Personality Development and Soft Skills, Barun k. Mitra, Oxford Press
2. Business Communication, Shalini Kalia, Shailja Agarwal, Wiley India
3. Cornerstone Developing Soft Skills, Sheffield, Pearson
4. Managing Soft Skills for Personality Development -edited by B.N Ghosh, McGraw Hill India
5.Soft Skills An Integrated Approach to Maximize Personality, Gajendra S.Chauchan, Sangeeta Sharma, Wiley In

UNIT WISE TIME AND MARKS DISTRIBUTION

UNIT NO	TIME (HOURS)	MARKS
01	15	25
02	18	30
03	10	25
04	05	20
TOTAL	**48**	**100**

PROGRAM : THREE YEARS DIPLOMA PROGRAM IN TEXTILE TECHONLOGY	
Course Code : HS 205	Course Title : Soft Skills and Personality Development LAB
Semester : 2ND	Credits: **1**
Periods per week: **2(L: 0 T: 0 P: 2)**	

COURSE OBJECTIVE: Soft skills, unlike hard skills that are technical, tangible, measurable, quantifiable and assessable, are practical, imperceptible and subtle qualitative traits that determine the efficacy of human communication at professional and personal levels. While hard skills acquisition can be correlated with one's intelligence quotient (IQ), soft skills development is intricately linked with one's emotional quotient (EQ) and spiritual quotient (SQ). Hard skills can aid an individual secure a position, yet soft skills help the person retain it, achieve excellence and fulfil self-actualization needs. Using academic as well as popular books, the course offers soft skills by integrating them at personal, professional, interpersonal and management levels.

LIST OF PRACTICALS

1. Thinking Skills Correcting Common Errors in day to day conversation
2. making picture and improving diagram to English word
3. Field Diary and lab record
4. Ice Breaking Activity and Just A Minute Session
5. Speaking from observation and reading
6. Greetings -Apologies, request, social and professional Etiquette Telephone etiquettes
7. Indexing, Footnotes and bibliographic procedure
8. Vocabulary building
9. Report Making
10. Comprehensions

PROGRAM : THREE YEARS DIPLOMA PROGRAM IN TEXTILE TECHNOLOGY	
Course Code : TTPC 201	Course Title : Fundamentals Of Textile Machines & Processes
Semester : 2ND	Credits: **3**
Periods per week: **3(L: 3 T: 0 P: 0)**	

COURSE OBJECTIVE: Knowledge of basic processes is very important for textile students. The process of making yarn helps both Textile Technology/Processing students separately. In case of fabric, technologist uses the knowledge of this subject further for specialized subjects, or to check the requirement of yarn accordingly. A Processing student uses it for matching dye and print on that fabric. This subject provides a brief introduction to various processes.

COURSE CONTENT

Unit 1 **(10 Hours)**

1.1 Flow Chart of Textile Processes

Flow chart of raw material, machines, process and end product for conversion of fibre into yarn. Flow chart of raw material, machines, process and end product for conversion of yarn into woven or knitted fabric, and finished fabrics.

1.2 Opening and cleaning

Objects of mixing and blending. Comparison of mixing with blending. Objects of Blow room. Sequence of modern blow room line. Objects of Carding. Main parts of carding machine.

Unit 2 **(10 Hours)**

2.1 Fibre to Yarn

Objects of Draw frame. Draft and its type. Breaker and finisher draw frame. Objects of Lap former. Objects of Comber. Linking of lap former and comber. Objects of Speed frame and Ring frame. Main parts of Ring frame. Objects of Winding. Parts of Winding machine.

Unit 3 **(08 Hours)**

3.1 Yarn to Woven Fabric

Objects of Warping. Objects of Sizing. Different Sizing ingredients and their functions. Main parts of sizing machines. Objects of Threading and Drawing-in.

Unit 4 **(10 Hours)**

4.1 Weaving

Terminology of Weaving, warp, weft. Passage of material through Loom. Parts of loom. Classifications of loom. Types of motions in loom. Primary, Secondary and auxiliary motions.

Unit 5 **(10 Hours)**

5.1 Knitting

Definitions of Knitting, weft knitting, warp knitting, stitch, course, and wale. Discuss various type of Warp v/ s weft knitting.

5.2 Numbering System

Definition of numbering system. Defining direct system with reference to tex, denier. Defining indirect system with reference to English count. Relationship between tex, denier and English count.

COURSE OUTCOME

After completion of the course the student will be able to

- Execute opening and cleaning of fibre.
- Convert fibre into yarn and yarn into fabric.
- Operate machinery of spinning and sizing process
- Perform weaving and knitting.

RECOMMENDED BOOKS

1. Gohl and Vilensky, "Textile Science" by CBS Publishers and Distributors Delhi.
2. V.A. Shanai, "Introduction to Textile Fibers" by Sevak Publications Mumbai.
3. From Fibre to Fabric" Tata Mc-Graw hill.
4. Jindal & Jindal, "Textile Raw Materials" by Abhishek Publishers Chandigarh.

WEBSITES

1. https://onlinecourses.nptel.ac.in/
2. https://swayam.gov.in/
3. https://textilelearner.net/what-is-textile-basic-textiles/

INSTRUCTIONAL STRATEGY

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

UNIT WISE TIME AND MARKS DISTRIBUTION

UNIT NO	TIME (HOURS)	MARKS
01	10	20
02	10	15
03	08	35
04	10	15
05	10	15
TOTAL	**48**	**100**
PROGRAM : THREE YEARS DIPLOMA PROGRAM IN TEXTILE TECHNOLOGY		

Course Code : **TTPC202**	Course Title : **Fundamentals Of Textile Machines & Processes LAB**
Semester : **2ND**	Credits: **1**
Periods per week: **2(L: 0 T: 0 P: 2)**	

COURSE OBJECTIVE: Knowledge of basic processes is very important for textile students. The process of making yarn helps both Textile Technology/Processing students separately. In case of fabric, technologist uses the knowledge of this subject further for specialized subjects, or to check the requirement of yarn accordingly. A Processing student uses it for matching dye and print on that fabric. This subject provides a brief introduction to various processes.

LIST OF PRACTICALS

1. Process flow chart of conversion of cotton fibre into yarn.
2. Drawing of a modern blow room line.
3. Give main parts of carding machine.
4. Give main parts of comber machine.
5. Give Drafting zone of Speed and Ring Frame.
6. Write sequence of conversion of yarn to woven fabric.
7. Passage of material through loom.
8. Passage of material through sizing machine.
9. Passage of material through flat bed knitting machine.
10. Passage of material through circular bed knitting machine.
11. Calculate the tex for a 1 km yarn weighing 50 gm.
12. Calculate the Denier of a 1 km yarn weighing 50 gm.
13. Calculate the English count of a 1 km yarn weighing 50 gm.

PROGRAM:THREE YEARS DIPLOMA PROGRAM IN TEXTILE TECHNOLOGY	
Course Code : TTPC203	Course Title: Fabric Structure and Analysis – I
Semester : 2ND	Credits: 3
Periods per week: **3 (L: 3 T: 0 P: 0)**	

COURSE OBJECTIVE: Textile Technology students have to work in weaving mills, textile testing houses and fabric quality control centers. They have to perform tasks relating to yarn requirement, design and complete order as per sample, for which knowledge/skills of fabric structure is essential. This subject will help student to understand different weaves from woven fabric samples, calculate weight of warp and weft required, weight of fabric with different dimension.

COURSE CONTENT

Unit 1 **(10 hours)**

1.1 Woven Design Fundamental

Introduction, Representation of woven design- Interlacement diagram, graphical representation of woven fabric structure. Design, weave repeat unit or repeat size. Draft, types of draft-straight, pointed, skip and satin, broken, divided, group. Peg plan or lifting plan. Sectional view and denting plan. Relationship between design, draft, lifting plan and sectional view.

1.2 Plain Weave

Introduction, characteristics and end uses of plain weave. Derivatives of plain weave- warp rib, weft rib and hopsack weave. Ornamentation of plain weave.

Unit 2 **(12 hours)**

2.1 Twill Weave

Introduction characteristics and end use of twill weave. Warp faced twill, weft face twill, right hand end and left hand end twill weave. Derivatives of twill weave- Pointed, waved, herring bone, Broken twill (By breaking at regular interval, by entering and skipping method), elongated and transposed Twill Weave. Balanced and unbalanced twill weave. Factor affecting the prominence of twill weave.

Unit 3 **(10 hours)**

3.1 Satin/ sateen Weave

Introduction characteristics and end use of satin/sateen weave. Regular satin/sateen up to 12 ends. Irregular satin/sateen up to 12 ends.

3.2 Diamond and diaper

Characteristics, end use and comparison of Diamond and diaper. Diamond and diaper design upto 16 picks.

Unit 4 **(09 hours)**

4.1 Honey comb weave

Characteristics, end use and comparison. Ordinary and Brighton honey comb weave up to 16picks. Ordinary honey comb, rectangle design example 12x14 and 14x12.

4.2 Huck-a-Back and Mock Leno

Characteristics of Huck-a – Back and mock leno. Design, end use, and comparison of Huck-a –Back and mock leno.

Unit 5 **(07 hours)**

5.1 Welt and pique- characteristics, end use and comparison, Welt structure- ordinary, weft wadded

5.2 Welt and Pique structure - characteristics, end use and comparison of Welt and pique.

5.3 Bed ford cord - characteristics, end use and comparison with welt. Plain faced bed ford cord (Regular and alternate pick principle) Wadded bed ford cord, Twill faced bed ford cord.

COURSE OUTCOME

After completion of the course the student will be able to

- Create different types of fabric structure
- Construct different types of woven structure and their drafting, lifting and denting plan
- Construct different weaves
- Execute analysis of different weaves

RECOMMENDED BOOKS

1. Z. J. Grosicki, "Watson's Textile Design & Colour" Part-I by Woodhead Publishing Limited.
2. Z. J. Grosicki, "Watson's Advanced Textile Design: Compound woven structures" by Woodhead Publishing Limited.
3. N. Gokarneshan, "Fabric structure and Design" by New age International Publisher.
4. S.S. Satsangi, "Saral Vastra Sangrachna" (Simple Fabric Structure – in Hindi) by M/S Usha Publishers, Shalimar Bagh, Delhi

SUGGESTED WEBSITES

1. https://onlinecourses.nptel.ac.in/
2. https://swayam.gov.in/
3. https://www.youtube.com/channel/UCnPu8vcBvMdV5wtPTxC4uLA
4. https://textilelearner.net/what-is-textile-basic-textiles/

UNIT WISE TIME AND MARKS DISTRIBUTION

UNIT NO	TIME (HOURS)	MARKS
01	10	20
02	12	25
03	10	20
04	09	20
05	07	15
TOTAL	**48**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAM IN TEXTILE TECHNOLOGY	
Course Code : TTPC204	Course Title: Fabric Structure and Analysis – I Lab
Semester : 2ND	Credits: 1
Periods per week: 2 **(L: 0 T: 0 P: 2)**	

COURSE OBJECTIVE: Textile Technology students have to work in weaving mills, textile testing houses and fabric quality control centers. They have to perform tasks relating to yarn requirement, design and complete order as per sample, for which knowledge/skills of fabric structure is essential. This subject will help student to understand different weaves from woven fabric samples, calculate weight of warp and weft required, weight of fabric with different dimension.

LIST OF PRACTICALS

1. Representation of woven design- Interlacement diagram, graphical representation of woven fabric structure.
2. Draw from design- draft, lifting plan and sectional view.
3. Draw design from draft, lifting plan and sectional view.
4. To study EPI & PPI using Pick glass
5. To calculate warp and weft count of yarn from given fabric
6. To study warp and weft count from fabric using Beesley balance
7. To calculate weight of warp and weft, weight per sq. meter, warp cover, weft cover and fabric cover of the given plain fabric sample (At least Two Samples).
8. To draw design draft and peg plan and warp color plan of the above sample at 7.
9. To calculate weight of warp and weft, weight per sq. meter, warp cover, weft cover and fabric cover of the given Twill fabric sample (At least Two Samples).
10. To draw design draft and peg plan and warp color plan of the above sample at 10.
11. To calculate weight of warp and weft,weight per sq. meter, warp cover, weft cover and fabric cover of the given Satin/ Sateen fabric sample.
12. To draw design draft and peg plan and warp color plan of the above Sateen/ Sateen sample.
13. To calculate weight of warp and weft, weight per sq. meter, warp cover, weft cover and fabric cover of the given diamond / diaper/ honeycomb fabric sample.
14. To draw design draft and peg plan and warp color plan of the above diamond / diaper/ honeycomb fabric sample.
15. To calculate weight of warp and weft, weight per sq. meter, warp cover, weft cover and fabric cover of the given huck- a – back fabric sample.
16. To draw design draft and peg plan and warp color plan of the above huck-a –back

PROGRAM :THREE YEARS DIPLOMA PROGRAM IN TEXTILE TECHNOLOGY	
Course Code : TTPC205	Course Title: Weaving Preparatory Process
Semester : 2ND	Credits: 3
Periods per week:3 **(L: 3 T: 0 P: 0)**	

COURSE OBJECTIVE: The selection of suitable yarns and the preparation of yarn for weaving have a considerable influence on weaving efficiency. The efficiency of loom shed is highly influenced by the weaving ability of warp and weft yarn which is incorporated by many weaving preparatory processes like Winding, Warping, Sizing and Drawing-in. This subject is to acquaint the students with these processes.

COURSE CONTENT

Unit 1 **(10 hours)**

1.1 Introduction and Warp Winding

Introduction to yarn preparation and its objectives. Sequence of process involved in the preparatory processes. Different types of yarn packages.

Objects of warp winding. Conventional Winding machine and its limitations. Construction detail and working of high speed winding machine. Different types of tensioners. Balloon-breaker and its functions. Various stop motions.

Unit 2 **(10 hours)**

2.1 Modern Winding Machine and Weft Winding

Main features and working of modern winding machines -Auto coner. Study of common faults in warp winding.

Objects of weft winding. Main features of high speed pirn winding machine. Study of common faults in pirn winding

Unit 3 **(10 hours)**

3.1 Warping

Objects of Warping. Different systems of warping and their limitations. Types of creels. Features of ordinary beam warping machine and its limitations. Features of high speed beam warping machine. Working of sectional warping machine and its limitations. Study of common faults in warping.

Unit 4 **(09 hours)**

4.1 Sizing

Objects of sizing. Various methods of sizing. Study of slasher sizing machine and passage of yarn through it. Measuring and marking motion. Method of drying sized warp, comparison of Multi-cylinder and hot air drying. Various types of sizing ingredients and their objects. Various factors on which percentage size take up depends.

Unit 5 **(09 hours)**

5.1 Drawing-in and Calculations

Introduction to drawing-in. Different methods of drawing-in. Precautions to be taken during drawing-in.

Calculation regarding creel capacity. Number of sections, width of sections for sectional warping machine. Calculation of production of Winding, Warping and Sizing machines.

COURSE OUTCOME

After completion of the course the student will be able to

- Execute process of Winding, Warping and Sizing.
- perform as quality controller in preparatory process.
- Calculate productions of different preparatory machines.

RECOMMENDED BOOKS

1. R Sen Gupta, "Yarn Preparation" Vol. I (Popular Prakashan, 1963)
2. R Sen Gupta, "Yarn Preparation" Vol. II
3. R Sen Gupta, " Weaving Calculation" (Mahajan Book Distributor,1990)
4. "Warping and Sizing" Bombay Textile Research Association.
5. "Winding" – Bombay Textile Research Association
6. "Weaving Calculation"- WIRA
7. "Sizing by Ajgaonkar" et.al

SUGGESTED WEBSITES

1. https://onlinecourses.nptel.ac.in/
2. https://swayam.gov.in/
3. https://www.youtube.com/channel/UCnPu8vcBvMdV5wtPTxC4LA
4. https://textilestudycenter.com/

UNIT WISE TIME AND MARKS DISTRIBUTION

UNIT NO	TIME (HOURS)	MARKS
01	10	20
02	10	20
03	10	20
04	09	20
05	09	20
TOTAL	**48**	**100**

PROGRAM :THREE YEARS DIPLOMA PROGRAM IN TEXTILE TECHNOLOGY	
Course Code : TTPC206	Course Title: Weaving Preparatory Process Lab
Semester : 2ND	Credits: 1
Periods per week:2 **(L:0 T: 0 P: 2)**	

COURSE OBJECTIVE: The selection of suitable yarns and the preparation of yarn for weaving have a considerable influence on weaving efficiency. The efficiency of loom shed is highly influenced by the weaving ability of warp and weft yarn which is incorporated by many weaving preparatory processes like Winding, Warping, Sizing and Drawing-in. This subject is to acquaint the students with these processes.

LIST OF PRACTICALS

1. To study the passage of material and working of high-speed winding machine.
2. To study the passage of material and working of auto-coner.
3. To study the common faults in warp-winding, their causes and remedies.
4. To study the passage of material and working of high speed pirn winding machine.
5. To compare different types of creels used in warping.
6. To compare different types of tensioner used in warping.
7. To study the passage of material through direct warping machine.
8. To study the passage of material through sectional warping machine.
9. To study common faults in warping and their remedies.
10. To study the passage of material through slasher sizing machine.
11. To study important parts of the size box.
12. To study the process of drawing-in.

CURRICULUM

FOR

SECOND SEMESTER

DIPLOMA IN

TRAVEL AND TOURISM

SUBJECT STUDY SCHEME (2nd Sem: Travel and Tourism)

Course Code	Subjects	Time in Hours				CREDITS		
		Theory	Tutorial	Practical	Total	Theory	Practical	Total
HS203	Language and Communication Skill-II	3	--------	---	3	3	--	3
HS204	Language and Communication Skill-II Lab	---	--------	2	2	---	1	1
TRPC201	Culture and Heritage	3	--------	---	3	3	---	3
TRPC202	Hospitality Services-I	2	--------	---	2	2	---	2
TRPC203	Hospitality Services-I Lab	-----	--------	4	4	--	2	2
TRPC204	Tourism Resources and Infrastructure	2	--------	---	2	2	---	2
TRPC205	Tourism Resources and Infrastructure Lab	---	-----	2	2	-----	1	1
TRPC206	History of J&K	3	--------	---	3	3	--	3
BS205	Ecology and Environment	3	--------	---	3	3	---	3
BS206	Ecology and Environment Lab	----	-------	4	4	----	2	2
	Total	16	0	12	28*	16	6	22

*Note: The remaining 2 hrs in a week shall be used in activities like sports , debates, seminars etc.

PROGRAM: THREE YEAR DIPLOMA IN TRAVEL AND TOURISM	
Course Code **: HS203**	Course Title**: Language & Communication Skills – II**
Semester**: 2ND**	Credits**: 03**
Periods per Week**: 3 (L: 3 T: 0 P:0)**	

COURSE OBJECTIVE:

Language is the most commonly used medium of self-expression in all spheres of human life personal, social and professional. A student must have a fair knowledge of English language and skills to communicate effectively to handle the future jobs in industry. The objective of this course is to develop effective communication skills and also to inculcate soft skills among the students in professional and inter-personal communications facilitating their all-round development of personality. At the end of the course, the student will be able to develop comprehension skills, Professional etiquettes; improve vocabulary; use proper grammar; acquire writing skills and explore various aspects of soft skills. It is expected that each polytechnic will establish a communication skill laboratory for conducting practical's mentioned in the curriculum.

COURSE CONTENT

Unit 1: Short stories and Poetry (08hrs)

1.1 Section A: - Short Stories
- Three Questions : Leo Tolstoy
- The last leaf : O Henry

1.2. Section B:-Poems
- The Psalm of life : H.W. Longfellow
- Say Not Struggle Naught Availeth : A.H. Clough

Unit 2: Essentials of Grammar (10hrs)

2.1. Basics of grammar (Parts of speech)
2.2. Subject -Verb Agreement
2.3. Tenses
2.4. Voice (Active and Passive)
2.5. One word substitution
2.6. Correct /Incorrect sentences

Unit 3. Techniques of Writing. (10hrs)

3.1. Comprehension of an Unseen Passage
3.2. Paragraph Writing
3.3. Circulars
3.4. Memos

Unit 4: Soft Skills (12hrs)

4.1. Intrapersonal and Interpersonal skills - Meaning and Importance.
4.2. Self-Management Skills
- Goal setting- Meaning, Importance, types and ways to achieve goals.
- Time Management- Meaning, benefits and strategies to improve time management.
- Self-motivation -Meaning and Importance.
- Stress management -.Meaning, Causes and Techniques of stress management.
- Positive Thinking
- Problem-solving- Meaning, Steps and importance.
- Decision Making - Meaning, process/stages and Importance of decision making

4.3. Team work and Leadership skills -Concept of Teams; Building effective teams; Concept of Leadership and honing Leadership skills.

Unit 5: Etiquettes (08hrs)

5.1. Etiquettes - Meaning, Types and Importance
5.2. Professional etiquettes- ABC (Appearance, Behavior, Communication) of Professional Etiquettes, Importance of Professional etiquettes.
- Office Etiquette - Meaning, Importance and Tips.
- Meeting etiquettes - Meaning, Importance and Tips.
- Telephone etiquettes.

COURSE OUTCOME

After the completion of the course the student will be able to:

Unit 1:
- Read, analyze, and interpret works of literature.
- Make themselves proficient in literary contexts.
- Learn different words in the text which in turn will enhance their language (Vocabulary).

Unit 2:
- Identify the different parts of speech and their usage in the sentence.
- Know about the application of various grammatical items like Subject-Verb Agreement, Tenses, and Voice etc.
- Enrich his/her vocabulary and enhance grammar accuracy.

Unit 3:
- Comprehend the passage and able to answer the linked questions.
- Plan, organize and present ideas coherently on a given topic.
- Compose circulars and memos which in turn will enhance their writing skill.

Unit 4:
- Set goals, manage time and stress, solve problems and organize oneself effectively.
- Know about self-motivation and its importance.
- be a team player and know how to develop leadership skills.

Unit 5:
- Demonstrate personal and professional etiquettes.

RECOMMENDED BOOKS:

1. Kulbhushan Kumar," Effective Communication Skills", Khanna Publishing House, New Delhi (Revised Edition 2018)
2. M. Ashraf Rizvi,"Effective Technical Communication". Mc-Graw Hill: Delhi, 2002.
3. Sanjay Kumar and PushpLata, "Communication Skills "Oxford University Press, 2011
4. Meenakshi Raman &Sangeeta Sharma, "Technical Communication: Principle and Practice". New Delhi:OUP, 2011.
5. Francis Peter S.J.,"Soft Skills and Professional Communication"
6. K.R. Lakshminarayana& T. Murugavel, "Managing Soft Skills", Scitech Publications. 2009
7. NK Aggarwal and FT Wood, "English Grammar, Composition and Usage".Macmillan Publishers India Ltd; New Delhi.
8. Dr. Alex, "Soft skills"
9. Gopalaswamy Ramesh and MahadevanRamesh,"The Ace of Soft Skills: Attitude, Communication and Etiquette for Success". Pearson

UNIT WISE TIME AND MARKS DISTRIBUTION

UNIT	TIME (Hrs)	MARKS (%age)
1	08	20
2	10	20
3	10	20
4	12	25
5	08	15
TOTAL	**48**	**100**

PROGRAM THREE YEAR DIPLOMA IN TRAVEL AND TOURISM	
Course Code **:HS204**	Course Title**: Language & Communication Skills – II Lab**
Semester**: 2nd**	Credits**: 01**
Periods per Week**: 2 (L: 0 T: 0 P:2)**	

COURSE OBJECTIVE:

Language is the most commonly used medium of self-expression in all spheres of human life personal, social and professional. A student must have a fair knowledge of English language and skills to communicate effectively to handle the future jobs in industry. The objective of this course is to develop effective communication skills and also to inculcate soft skills among the students in professional and inter-personal communications facilitating their all-round development of personality. At the end of the course, the student will be able to develop comprehension skills, Professional etiquettes; improve vocabulary; use proper grammar; acquire writing skills and explore various aspects of soft skills. It is expected that each polytechnic will establish a communication skill laboratory for conducting practical's mentioned in the curriculum.

LIST OF PRACTICALS:

1. Ice breaking Activity and JAM session
2. Developing conversational ability - Describing yourself, Describing objects around you, Describing People.
3. Situational Dialogues- Role Play- Expressions in various situations- Self introduction and introducing others- Greetings- Taking Leave - Apologies- Requests etc.
4. Listening with Comprehension-Listening to recorded lectures, poems, interviews, speeches, documentaries etc. - Taking notes while listening
5. Professional etiquettes- Netiquette, Telephone Etiquette, Introduction and first impression, Business meeting etiquette, Dressing and Dinning Etiquette.
6. Reading articles from newspaper, magazines, journals etc.
7. Public speaking - Extempore and Impromptu Speech
8. Grammar - Words often misspelt - confused/ misused; Common errors in pronunciation; Idiomatic expressions.
9. Professional Skills- Drafting Job Application Letter, CV/ Resume; Interview skills.
10. Demonstrating the do's and don'ts of facing the interview.

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN TRAVEL AND TOURISM	
Course Code: **TRPC201**	Course Title: **CULTURE & HERITAGE**
Semester:**2ND**	Credits:**3**
Periods per week:3**(L:3 T:0 P:0)**	

COURSE OBJECTIVE

The subject aims to cover the rich cultural heritage of the country in its myriad forms as the core tourism products and attractions of India. As a result of this course the students shall develop an understanding about culture and heritage as an intrinsic part of the tourist attractions. It will also enhance their capabilities in choosing places while designing an itinerary.

COURSE CONTENT

Unit 1. Introduction to Culture
- 1.1 Culture: Concept and meaning
- 1.2 General features of Indian culture
- 1.3 Evolution of Indian Culture
- 1.4 Customs & Traditions
- 1.5 Major religions and their popular pilgrimage sites in India

Unit 2. Components of Culture
- 2.1 Architecture and Sculpture in India
- 2.2 Music-Hindustani & Karnataka style
- 2.3 Classical dance forms-Bharatnatyam, Kuchipudi, Odisi, Kathakali, Manipuri, Kathak.
- 2.4 Folk dances-Garba, Bhangra, Bihu, Chau
- 2.5 Handicrafts of India
- 2.6 Indian Fairs and Festivals
- 2.7 Paintings, Murals

Unit 3. Culture of J&K
- 3.1 J&K - Population, languages
- 3.2 Music & dance
- 3.3 Paintings (Miniature Bhasoli paintings)
- 3.4 Temple architecture of J&K-Martand, Awantipur, Pandrethan, Naranag, Ranbhireshwar, Krimchi, Raghunath etc
- 3.5 Fairs and festivals
- 3.6 Places of pilgrimage, monuments, museums
- 3.7 Handicrafts: Arts and crafts in Kashmir-Carpet weaving, Shawl embroidery, Paper machie

Unit 4. Heritage
- 4.1 Heritage: Concept and meaning
- 4.2 Heritage Management organisations-UNESCO, ASI, INTACH (Introduction, Objectives and Functions)

4.3 UNESCO Heritage sites in India
4.4 Monuments of India under ASI
4.5 Archeological Sites of India
4.6 AMASR Act 1958

COURSE OUTCOME

After the completion of the course the student will be able to

- Explore the components and various aspects of culture, customs and traditions of Jammu and Kashmir and of India.
- Identify and know about heritage, various monuments and heritage sites of India.

RECOMMENDED BOOKS

1. Successful Tourism Management, Volume I and Volume II. Fundamentals of Tourism by Pran Nath Seth, Published by Sterling Publishers Pvt. Ltd., New Delhi, 1999.
2. Lonely Planet – India by Sarina Singh, Lonely Planet Publications, 2003.
3. Pannikkar, K.M; Essential features of Indian Culture; Bombay Bharatiya Vidya Bhavan
4. Basham, A.L ; Cultural History of India; Oxford: Clarendon..
5. Atlas of India by Ved Prakash, Prashant Gupta, Dreamland Publications, New Delhi.
6. The India of Ancient times by Sher, Syed Osman, Vikas Publishing, New Delhi
7. Vidyarthi, M.L; Indian Culture through Ages.
8. Wonder that was India-A.L. Basham, Penguin India.

UNITWISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	09	20
2	15	30
3	15	30
4	09	20
Total	**48**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN TRAVEL AND TOURISM	
Course Code: **TRPC202**	Course Title: **HOSPITALITY SERVICES - I**
Semester:**2ND**	Credits:**2**
Periods per week:2**(L:2 T:0 P:0)**	

COURSE OBJECTIVE

Hospitality plays an important role in tourism industry. The subject emphasizes on the accommodation/hospitality sector of the tourism industry. It will enable the students to understand various front office and housekeeping operations like types of accommodation, rooms, plans and reception, reservation procedures, etc. It will also help the students in performing important housekeeping operations.

COURSE CONTENT

Unit 1:Introduction to Hospitality

- 1.1 Hospitality-Definition, Concept and Meaning
- 1.2 Accommodation: Meaning, Types & forms
- 1.3 Difference between Hotel, Motel & Resort
- 1.4 Supplementary Accommodation
- 1.5 Tourism & Hospitality- interrelationship vis a vis interdependence
- 1.6 Hotels: Definition, Origin and growth
- 1.7 Organizational Structure of a Standard International Hotel
- 1.8 Classification, registration and gradation of Hotels
- 1.9 HRACC, IHA, FHRAI: Introduction, Objectives, functions
- 1.10 License, permits and regulatory guidelines for hotels

Unit 2 Front Office (FO) Operations

- 2.1 Front Office (FO) Operations
- 2.2 Functions of Front Office
- 2.3 Front office organization/Front office layout
- 2.4 Role of Front Office Manager & personnel
- 2.5 Basis of charging room rates
- 2.6 Front office terminology
- 2.7 Tourist Information
- 2.8 Reservation- Types & modes
- 2.9 Reception/registration of guests (Check-in & check-out)
- 2.10 Key handling process
- 2.11 Types of plans and Types of rooms
- 2.12 Coordination of front Office with other departments

Unit 3:Accommodation Operations (Housekeeping)

- 3.1 Introduction to housekeeping operations

3.2 Housekeeping Functions
3.3 Housekeeping organization/layout
3.4 Role and responsibility of House Keeping Manager and Personnel
3.5 Cleaning agents
3.6 Housekeeping equipment
3.7 Types of cleaning
3.8 Room cleaning operations
3.9 Lost and found procedure
3.10 Room reports
3.11 Laundry/linen room
3.12 Room supplies

COURSE OUTCOME

After the completion of the course, the student will be to:

- Describe the concept of hospitality, accommodation and its types, evolution, classification and registration of hotels.
- perform front office operations, front office layout, reservation procedure, registration procedure, departure procedure and message and key handling procedure.
- perform housekeeping operations, layout, types of cleaning, cleaning agents, room cleaning procedure and lost and found procedure.

RECOMMENDED BOOKS

1. Front Office Manual - Sudhir Andrews, Tata McGraw Hill Publications.
2. Housekeeping Manual- Sudhir Andrews, Tata McGraw Hill Publications.
3. Peter Jones: Introduction to Hospitality Operation; Cassell, New York.
4. Hotel Front Office Operations & Management; Jata Shankar Tiwari; Oxford University Press India.
5. International Tourism Management; A.K. Bhatia; Sterling Publications New Delhi.
6. Hotel housekeeping Operations & Management; G.Raghubalan; Oxford- University Press India.
7. Guide for Hotel Management; Arihant Publication
8. Introduction to Hospitality; John.R. Walker; Pearson

UNITWISE TIME AND MARKS DISTRIBUTION

Topic No.	**Time Allotted (Hrs)**	**Marks Allotted (%)**
1.	11	34
2.	11	34
3.	10	32
Total	**32**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN TRAVEL AND TOURISM	
Course Code: **TRPC203**	Course Title : **Hospitality Services - I Lab**
Semester:**2ND**	Credits:**2**
Periods per week: 4**(L:0 T:0 P:4)**	

COURSE OBJECTIVE

Hospitality plays an important role in tourism industry. The subject emphasizes on the accommodation/hospitality sector of the tourism industry. It will enable the students to understand various front office and housekeeping operations like types of accommodation, rooms, plans and reception, reservation procedures, etc. It will also help the students in performing important housekeeping operations.

LIST OF PRACTICALS

1. Telephone manners (receiving calls)

2. Taking reservations

3. Check-in and check-out procedures

4. Taking messages

5. Baggage handling procedure

6. Bed making procedure

7. Cleaning and polishing of glass, wood and various other surfaces

8. Explanation to the guest about the tourist sites in the vicinity

9.Visit to a hotel for studying Front Office Operations, Food and Beverages and

Housekeeping practices.

PROGRAM:THREE YEARS DIPLOMA PROGRAMME IN TRAVEL AND TOURISM	
Course Code: **TRPC204**	Course Title : TOURISM RESOURCES AND INFRASTRUCTURE
Semester: **2ND**	Credits**: 2**
Periods per week: **2(L:2 T:0 P:0)**	

COURSE OBJECTIVE

After undertaking this course, the students will be acquainted with the utility of various resources (natural or manmade) in tourism. This understanding will enrich the knowledge of the student about the possible destinations for various tourism activities.

COURSE CONTENT

Unit 1. Tourism Resources

- 1.1 Tourism Product: -Meaning, nature, Concept
- 1.2 Unique features of core tourism product
- 1.3 Concept of resource
- 1.4 Tourism resources: - Concept and meaning
- 1.5 Various types of tourism resources
  - 1.5.1 Natural (Physical & Biotic)
  - 1.5.2 Man-made (Socio-Cultural, Religious, Spiritual, Historical)
- 1.6 Tourism Products of India

Unit 2. Natural Tourism resources

- 2.1 Natural Tourism resources/Geographical Resources-existing use pattern vis-a-vis potential with relation to varied landforms
  - 2.1.1 Mountains-Hiking, camping, mountaineering etc.
  - 2.1.2 Water bodies: Rivers/ Lakes/Backwaters- angling, Kayaking, caneoing, Boating, River rafting etc
  - 2.1.3 Beaches and Islands-surfing, Scuba Diving, parasailing
  - 2.1.4 Forests/ Wildlife(Biosphere reserves, National parks and Sanctuaries, safari, /Bird Watching etc)
  - 2.1.5 Deserts- Desert safari, ATV riding etc.

Unit 3. Man Made tourism Resources

- 3.1 Entertainment tourism Resources
  - 3.1.1 Amusement parks
  - 3.1.2 Shopping Malls
  - 3.1.3 Museums
  - 3.1.4 Theatre and Cinema
  - 3.1.5 Casinos and Pubs

3.2 Religious Tourism Resources
- 3.2.1 Buddhist Resources: Bodh gaya, Sarnath, Sanchi and Ajanta
- 3.2.2 Islamic Resources: Delhi, Agra, Hyderabad,
- 3.2.3 Hindu Resources: Khajuraho, Mahabalipuram, Tirupati

3.3 Socio-cultural Resources
- 3.3.1 Khumbh Mela, PuriRath Yatra, Pushkar Fair

Unit 4:Tourism Infrastructure

4.1 Basic infrastructure
4.2 Differentiation between basic infrastructure and tourism infrastructure
4.3 Tourism infrastructure
4.4 Basic Tourism Products
4.5 Resident oriented products
4.6 Tourism oriented products

COURSE OUTCOME

After the completion of the course, the student will be able to
- Understand the concept and various types of tourism products
- execute the concept and various types tourism resources(Natural and manmade)
- work on basic infrastructure and tourism infrastructure

RECOMMENDED BOOKS

1. Burkart, A.J & Heinemann Medlik; Tourism: Past, Present and Future; Professional publishing London
2. Wahab, S.E; Tourism Management; Tourism international Press, London
3. A.K. Bhatia; International tourism Management; Sterling Publishers Ltd New-Delhi.
4. Mcntosh Report, W. Greldner R. Charles; Tourism: Principles, Practices and Philosophies; John Wiley And sons Publication, New York.
5. Negi, Jagmohan; Tourism & Travel: Concepts & Principles; Gitanjali Publishing House
6. Mill, R.C & Morrison; Tourism System
7. Cook, Yale, Marqua; Tourism-The business of Travel; Pearson Publications

UNITWISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	07	22
2	09	28
3	09	28
4	07	22
Total	**32**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN TRAVEL AND TOURISM	
Course Code: **TRPC205**	Course Title: TOURISM RESOURCES AND INFRASTRUCTURE LAB
Semester:**2ND**	Credits:**1**
Periods per week:2**(L:0 T:0 P:2)**	

COURSE OBJECTIVE

This course will expose the students with the utility of various ports, resources and infrastructures in tourism industry. This understanding will enrich the knowledge of the student about the possible destinations for various tourism activities.

LIST OF PRACTICALS

1. Visit to call centre
2. Visit to railway station
3. Visit to airport
4. Visit to Bus stand
5. Visit to Tourist offices
6. Visit to Historical and religious sites
7. Visit to shopping Malls
8. Adventure activities (Hiking, trekking, river rafting, paragliding etc.)

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN TRAVEL AND TOURISM	
Course Code: **TRPC206**	Course Title: **HISTORY OF JAMMU AND KASHMIR**
Semester:**2ND**	Credits:**3**
Periods per week:**3(L:3 T:0 P:0)**	

COURSE OBJECTIVE

After studying this course, the students will be able to utilize the historical knowledge about J&K during their interaction with the tourists while guiding or escorting them to various places within the territory of J&K.

COURSE CONTENT

Unit 1. Ancient History (12hrs)
- 1.1 Neolithic Age
- 1.2 History of Jammu and Kashmir before 14th century
- 1.3 Rajtarangni (Kalhana)-Brief description
- 1.4 Mauryan empire in Kashmir- Ashoka's Reign; Foundation of Sri-Nagar.
- 1.5 Kanishka's rule & 4th Buddhist Council

Unit 2. Medieval History (12hrs)
- 2.1 Budshah rule in Kashmir
- 2.2 Yousuf Shah Chek
- 2.3 Mughal rule
- 2.4 Durrani Empire (Afghan rule)
- 2.5 Sikh rule (Maharaja Ranjit Singh)
- 2.6 Anglo Sikh rule

Unit 3. Modern History (12hrs)
- 3.1 Dogra dynasty (Maharaja Gulab Singh)
- 3.2 Treaty of Lahore
- 3.3 Historical aspects of the creation of Princely State of J&K
- 3.4 Taxation policy during Dogra rule
- 3.5 Begar system
- 3.6 Law of State subject

Unit 4. Contemporary (12 hrs)
- 4.1 Political Developments in 20th century
- 4.2 Struggle for Independence
- 4.3 Instrument of accession
- 4.4 Abrogation of article 370
- 4.5 Creation of UT of J&K

COURSE OUTCOME

After the completion of the course, the student will be able to:
- Learn and know about the ancient, medieval and modern history jammu and Kashmir
- Learn about the political development of Jammu and Kashmir.

RECOMMENDED BOOKS

1. The Valley of Kashmir; Sir Walter Lawrance; Penguin
2. History of Kashmir ; Parvez Diwan; Manas Publications
3. History of Jammu & Kashmir; M. Salim Khan;
4. Hindu Rulers, Muslim Subjects; Mridu Rai
5. Kashmir 1947-Rival versions of History; Prem.Shankar. Jha; Oxford University Press
6. Article 370: A Constitutional History of Jammu & Kashmir; A.G.Noorani; Oxford University Press

UNITWISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	12	25
2	12	25
3	12	25
4	12	25
Total	**48**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN TRAVEL AND TOURISM	
Course Code: **BS205**	Course Title: **ECOLOGY AND ENVIRONMENT**
Semester:**2ND**	Credits:3
Periods per week:3**(L:3 T:0 P:0)**	

COURSE OBJECTIVE: Persons engaged in tourism related activities require the knowledge of Environment and Ecology so as to help in keeping the destinations and work places more ecofriendly for sustainable tourism.

COURSE CONTENT

1. Ecosystem

1.1 Basic concept and definition of Ecology, ecosystem, resistance and resilience, autecology, synecology, major terrestrial biomes (meaning and types).

1.2 Renewable and Non-renewable resources- concept and types

2. Global warming and climate change

2.1 Trends of Global warming and climate change.

2.2 Drivers of Global warming and climate change.

2.3 Impacts of Global warming on atmosphere, weather patterns, Sea level rise, agriculture productivity and biological response.

2.4 Ozone layer- importance, depletion and environmental impacts.

3. Biodiversity

3.1 Concept, importance and Threats

3.2 Conservation – Insitu conservation (Biosphere reserves, National Parks, wild life sanctuaries)

3.3 Exsitu conservation (Botanical Gardens, Zoological gardens, gene banks, seed and seedling banks, pollen culture, tissue culture and DNA banks)

4. Environmental Health and Human Health

4.1 Pollution- Definition, classification, solubility of pollutants, transfer of pollutants within different mediums, concept of radioactivity.

4.2 Types of pollution- Source, effects on the environment, various control measures.

5. Disaster Management

5.1 Concept, types, causes (Natural and anthropogenic factors) and losses.

5.2 Functions and responsibilities of NDMA and IMD.

6. Environment in an urban setting

6.1 Introduction to Urbanization.

6.2 Urban dwelling (Housing scenario, poverty and slums).

6.3 Importance and threat to nature in the city.

6.4 Green belts and urban forestry(concept).

COURSE OUTCOME

After completion of the course the student will be able to

- Explore about the ecosystem, global warming and climate change, biodiversity and pollutions and its impacts.
- Explain the functions and responsibilities of various disaster management.
- Illustrate the concepts and meanings of Urbanization, its importance and threat to nature in cities.

RECOMMENDED BOOKS

1. Environment and Ecology by Majid Husain and Published by GK publications.
2. Environment Ecology, biodiversity, climate change and Disaster management by RAVI P. AGRAHARI published by MC Graw Hill.
3. Environment and Ecology – A dynamic Approach by NEERAJ NACHIKETA published by G.K. Publications (P) limited.
4. Environment and Pollution- An ecological approach by RS Ambasht and PK Ambasht published by CKS publishers and distributors pvt. Ltd.
5. Ecotourism and sustainable development by Satish Chandra Nigam published by Rajat Publications
6. Ecology Environment and Tourism by L.K. Singh published by Isha books.

UNITWISE TIME AND MARKS DISTRIBUTION

Topic No.	Time allotted (Hrs)	Marks allotted (%)
1	6	10
2	10	20
3	10	20
4	10	20
5	6	15
6	6	15
Total	**80**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN TRAVEL AND TOURISM	
Course Code: **BS206**	Course Title: **ECOLOGY AND ENVIRONMENT LAB**
Semester: **2ND**	Credits:2
Periods per week:4 **(L:0 T:0 P:4)**	

COURSE OBJECTIVE:

This course will expose the students to practical knowledge of Environment and Ecology so as to help in keeping the destinations and work places more ecofriendly for sustainable tourism.

PRACTICALS:

1. Visit to National Park and sanctuaries to study the environmental impacts.
2. Visit to monuments and pilgrimage sites (like Vaishno Devi) to study the environmental impacts.
3. Visit to sewage disposal plants.
4. Organize and attend environment awareness camps and disaster management camps.

CURRICULUM

FOR

SECOND SEMESTER

DIPLOMA IN

WOOD TECHNOLOGY

SUBJECT STUDY SCHEME(2nd Sem: Wood Technology)

Course Code	Subjects	Time in Hours				CREDITS		
		Theory	Tutorial	Practical	Total	Theory	Practical	Total
BS201	Applied Mathematics-II	3	1	--------	4	4	--------	4
ES202	Introduction to Computers and Information Technology	---	---	4	4	----	2	2
WTPC201	Computer Aided Drawing – I for Wood Technology	--------	--------	4	4	--------	2	2
ES207	Applied Mechanics	4	1	--	5	5	--	5
ES208	Applied Mechanics Lab	---	---	2	2	---	1	1
WTPC202	Construction Materials and Wood Based Products	4	--------	--	4	4	---	4
WTPC203	Construction Materials and Wood Based Products Lab	---	--------	2	2	----	1	1
WTPC204	Wood Workshop Practices	--------	1	4	5	--------	3	3
	Total	11	3	16	30	13	9	22

PROGRAM: THREE YEAR DIPLOMA IN ENGINEERING AND TECHNOLOGY *	
Course Code: **BS201**	Course Title: **Applied Mathematics-II**
Semester: **2nd**	Credit: **4**
Periods Per Week: **4 (L: 03, T: 01, P: 0)**	

(* Common to Architecture Assistantship, Automobile, Civil, Civil (PHE), QSCM, Computer, Electrical, E&C, Medical Electronics, Food Technology, I&C, Leather Technology, Mechanical, Textile Technology, Wood Technology and IT)

COURSE OBJECTIVE:

This course is designed to develop an understanding of basic mathematical and statistical tools which include matrices, determinants, integral calculus and coordinate geometry and the applications of such tools in the field of engineering and technology

COURSE CONTENT

1. Integral Calculus

1.1 Integration as inverse operation of differentiation

1.2 Simple integration by substitution, by parts and by partial fractions (for Linear factors only)

1.3 Evaluation of definite integrals (simple problems)-

Evaluation of $\int_0^{\pi/2} \text{Sin}^n x.\, dx$, $\int_0^{\pi/2} \text{Cos}^n x\, dx$, $\int_0^{\pi/2} \text{Sin}^m x\ \text{Cos}^n x\, dx$

Using formulae without proof (m and n being positive integers only)

2. Coordinate Geometry

2.1 Equation of straight line in various standard forms (without proof), intersection of two straight lines, angle between two lines. Parallel and perpendicular lines, perpendicular distance formula.

2.2 General equation of a circle and its characteristics. To find the equation of a circle, given: Centre and radius, three points lying on it and coordinates of end points of a diameter.

2.3 Definition of conics (Parabola, Ellipse, Hyperbola) their standard equations without proof. Basic problems on conics when their foci, directrices or vertices are given.

3 Matrices and Determinants

3.1 Definition of matrix and its types.

3.2 Addition, subtraction and multiplication of matrices.

3.3 Expansion of Determinants.

4 Statistics

4.1 Measures of Central Tendency: Mean, Median, Mode

4.2 Measures of Dispersion: Mean deviation, Standard deviation

4.3 Basic Concepts of Probability.

COURSE OUTCOME

After the completion of the course the student will be able to:

- evaluate both indefinite and definite integrals by various methods
- identify various points in a 2-D space along with formulation of equations and graphs for different types of lines, circles, ellipses, parabolas etc.
- find the sum, difference and product of two or more matrices,
- evaluate determinants and their relations to matrices
- find the mean, median, mode and other measures of central tendency.
- solve basic problems on probability.

RECOMMENDED BOOKS:

1. R.D Sharma, Applied Mathematics-II.
2. H.K Das, Applied Mathematics.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 40th Edition, 2007.
4. S.S. Sabharwal, Sunita Jain, Eagle Parkashan, Applied Mathematics, Vol. I & II, Jalandhar.
5. Comprehensive Mathematics, Vol. I & II by Laxmi Publications, Delhi.
6. Reena Garg & Chandrika Prasad, Advanced Engineering Mathematics, Khanna Publishing House, New Delhi
7. Applied Mathematics-II, Eagle Publications.

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	16	35
2	10	20
3	12	25
4	10	20
Total	**48**	**100**

PROGRAM THREE YEAR DIPLOMA IN ENGINEERING AND TECHNOLOGY	
Course Code: **ES202**	Course Title: **Introduction to Computers and Information Technology**
Semester:**2nd**	Credit: **2**
Periods Per Week: **4 (L: 0 T: 0 P: 4)**	

(* Common to Architecture Assistantship, Automobile, Civil, Civil(PHE), QSCM, Computer , Electrical , E&C, Medical Electronics, Food Technology, Garment Technology, I&C, Leather Technology, Mechanical, Textile Design, Textile Technology, Travel and Tourism, MLT, Wood Technology and IT)

COURSE OBJECTIVE

Information technology has great influence on all aspects of our life. Primary purpose of using computer is to make the life easier. 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 tools of MS Office/Open Office using internet etc. form the broad competency profile of diploma holders. This exposure will enable the students to enter their professions with confidence, live in a harmonious way and contribute to the productivity.

COURSE CONTENT

1. **Basics of Information Technology**
   - 1.1. Its concept and scope, applications of IT, ethics and future with information technology.
   - 1.2. Impact of computer and IT in society.
   - 1.3. Computer application in office, book publishing, data analysis, accounting, investment, inventory control, graphics, air and railway ticket reservation, robotics, military, banks, Insurance financial transactions and many more.

2. **Basic Components of Computer System**
   - 2.1. Block diagram of a computer System and Processing of Data.
   - 2.2. Demonstration of computer system viz., Hardware, Software
   - 2.3. Concept of Memory and its various types, Primary and secondary memories (RAM, ROM, Storage Devices etc).

3. **Internet and its Applications**
   - 3.1. Introduction to Internet, its basic working.
   - 3.2. Concept of Email, Social Media, Cloud Computing.
   - 3.3. Basic ideas about IP Address, DNS, URL, Server, Web Browser,LAN etc.

4. Use of Various Basic Data Processing Softwares

4.1. Word Processing (Microsoft Word & Google Docs.)

4.1.1. File Management:

4.1.1.1. Opening, creating and saving a document, locating files, copying contents in some different file(s).

4.1.2. Editing a document:

4.1.2.1. Entering text, Cut, copy, paste using tool- bars

4.1.3. Formatting a document:

4.1.3.1. Using different fonts, changing font size and colour, changing the appearance through bold/ italic/ underlined, highlighting a text, changing case, using subscript and superscript, using different underline methods

4.1.3.2. Aligning of text in a document, justification of document, Inserting bullets and numbering

4.1.3.3. Formatting paragraph, inserting page breaks and column breaks, line spacing

4.1.3.4. Use of headers, footers: Inserting footnote, end note, use of comments

4.1.3.5. Inserting date, time, special symbols, importing graphic images, drawing tools

4.1.4. Tables and Borders:

4.1.4.1. Creating a table,

4.1.4.2. Formatting cells,

4.1.4.3. Use of different border styles, shading in tables,

4.1.4.4. Merging of cells, partition of cells, inserting and deleting a row in a table

4.1.5. Print preview, zoom, page set up, printing options

4.1.6. Using Find, Replace options

4.2. Microsoft-Excel and Google Sheets

4.2.1. Introduction to Spreadsheet Application-Workbook and Worksheets

4.2.2. Working with data and formulas:

4.2.2.1. Addition, subtraction, division, multiplication, percentage and autosum.

4.2.2.2. Format data, create chart, printing chart, save worksheet, creating and formatting of charts and graphs

4.3. Presentation (Microsoft-PowerPoint and Google Slides)

4.3.1. Introduction to PowerPoint - How to start PowerPoint - Working environment: concept of toolbars, slide layout, templates etc. - Opening a new/existing presentation - Different views for viewing slides in a presentation: normal, slide sorter etc.

4.3.2. Addition, deletion and saving of slides.

4.3.3. Insertion of multimedia elements - Adding text boxes, importing pictures, movies and sound, tables and charts etc.

4.3.4. Formatting slides - Text formatting, changing slide layout, changing slide color scheme - Changing background, Applying design template.

4.3.5. Viewing the presentation using slide navigator

COURSE OUTCOME

After the completion of the course the student will be able to:

- Identify the different hardware components and functional units of a Computer system.
- Explain basic concepts and working of internet.
- Create and format word documents by using different word processing software.
- Prepare the spread sheets and the presentation of data in different ways.
- Prepare power point presentations.

RECOMMENDED BOOKS:

1. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd-Jungpura, New Delhi
2. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
3. Fundamentals of Information Technology by Leon and Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
4. Basics of Information Technology, by Ishan Publications, Ambala
5. Information Technology for Management by Henery Lucas, 7th edition, Tata McGraw Hill Education Pvt Ltd, New Delhi

UNIT WISE TIME AND MARKSDISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	06	10
2	13	20
3	13	20
4	32	50
Total	**64**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN WOOD TECHNOLOGY	
Course Code: WTPC201	Course Title: **Computer Aided Drawing – I for Wood Technology**
Semester: **II**	Credits: 2
Periods Per Week: 4 **(L: 0, T: 0, P: 4)**	

COURSE OBJECTIVES:

Computer applications plays a very vital role in present day life and more so, in the professional life of diploma engineer. In order to enable the students, use the computers effectively in problem solving, this course offers applications of various computer software Auto CADD in Wood Technology.

1. Introduction
   - 1.1. Study of Interface
   - 1.2. Drawing Tools – understanding and working of commands related to
     - 1.2.1. Draw tools
     - 1.2.2. Modify tool
     - 1.2.3. Annotative tool
     - 1.2.4. Dimension tool
2. Preparation of Plan, Elevation of a 3 –seater sofa/I seater Sofa using basic CAD commands
3. Draft plan of chair/office table using Basic CAD commands
4. Draft interiors of Bed Room using Basic CAD commands.
5. Draft plan of wooden house boat of standard using appropriate software.

RECOMMENDED BOOKS

1. AutoCAD Exercises for Beginners: Designers WorkBook for Practice. By Shameer S.A
2. Introduction to AutoCAD 2D Design by Shanu Aggarwal
3. Civil Engineering Drawing by RS Malik, Asia Publishing House
4. Civil Engineering Drawing by V.B. Sikka. Katson Publishing, Ludhiana

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN WOOD TECHNOLOGY	
Course Code: **ES207***	Course Title: **APPLIED MECHANICS***
Semester: 2ND	Credits: **05**
Periods Per Week :5 **(L: 4, T: 1, P:0)**	

(* Common to Automobile, Civil, Civil (PHE), QSCM, Mechanical and Wood Technology)

COURSE OBJECTIVE:

The objectives of the course are to determine the resultant of various forces and to compute support reactions using equilibrium conditions for various structures and to understand the significance of friction in equilibrium problems, basic machine rules and their application in different engineering problems

COURSE CONTENT

1. Basics of mechanics and force system (17 Hours)

1.1. Significance and relevance of Mechanics, Applied mechanics, Statics, Dynamics
1.2. Space, time, mass, particle, flexible body and rigid body. Scalar and vector quantity, Units of measurement (SI units) - Fundamental units and derived units.
1.3. Force – unit, representation as a vector and by Bow's notation, characteristics and effects of a force, Principle of transmissibility of force, Force system and its classification.
1.4. Resolution of a force - Orthogonal components of a force, moment of a force, Varignon's Theorem
1.5. Composition of forces – Resultant, analytical method for determination of resultant for concurrent, non-concurrent and parallel co-planar force systems – Law of triangle, parallelogram and polygon of forces

2. Equilibrium (15 Hours)

2.1. Equilibrium and Equilibrant, Free body and Free body diagram, Analytical and graphical methods of analysing equilibrium
2.2. Lami's Theorem – statement and explanation, Application for various engineering problems.
2.3. Types of beam, supports (simple, hinged, roller and fixed) and loads acting on beam (vertical and inclined point load, uniformly distributed load, couple)
2.4. Beam reaction for cantilever, simply supported beam with or without overhang subjected to combination of Point load and uniformly distributed load.
2.5. Beam reaction graphically for a simply supported beam subjected to vertical point loads only.

3. Friction (10 Hours)

3.1. Friction and its relevance in engineering, types and laws of friction, limiting equilibrium, limiting friction, co-efficient of friction, angle of friction, angle of repose, relation between co-efficient of friction and angle of friction.
3.2. Equilibrium of bodies on level surface subjected to force parallel and inclined to plane.

3.3. Equilibrium of bodies on inclined plane subjected to force parallel to the plane only.

4. Centroid and centre of gravity (11 Hours)

4.1. Centroid of geometrical plane figures (square, rectangle, triangle, circle, semi-circle, quarter circle)
4.2. Centroid of composite figures composed of not more than three geometrical figures
4.3. Centre of Gravity of simple solids (Cube, cuboid, cone, cylinder, sphere, hemisphere)
4.4. Centre of Gravity of composite solids composed of not more than two simple solids

5. Simple lifting machine (11 Hours)

5.1. Simple lifting machine, load, effort, mechanical advantage, applications and advantages.
5.2. Velocity ratio, efficiency of machines, law of machines.
5.3. Ideal machine, friction in machine, maximum Mechanical advantage and efficiency, reversible and non-reversible machines, conditions for reversibility
5.4. Velocity ratios of Simple axle and wheel, Differential axle and wheel, Worm and worm wheel, Single purchase and double purchase crab winch, Simple screw jack, Weston's differential pulley block, geared pulley block.

COURSE OUTCOME

After completing this course, the student will be able to:

- Identify the force systems for given conditions by applying the basics of mechanics.
- Determine unknown force(s) of different engineering systems.
- Apply the principles of friction in various conditions for useful purposes.
- Find the centroid and centre of gravity of various components in engineering systems.
- Calculate mechanical advantage, velocity ratio and efficiency of simple lifting machine

RECOMMENDED BOOKS

1. D.S. Bedi, Engineering Mechanics, Khanna Publications, New Delhi.
2. Khurmi, R.S., Applied Mechanics, S. Chand & Co. New Delhi.
3. Bansal R K, A text book of Engineering Mechanics, Laxmi Publications.
4. Ramamrutham, Engineering Mechanics, S. Chand & Co. New Delhi.
5. Dhade, Jamadar & Walawelkar, Fundamental of Applied Mechanics, Pune VidhyarthiGruh.
6. Ram, H. D.; Chauhan, A. K., Foundations and Applications of Applied Mechanics, Cambridge University Press.
7. Meriam, J. L., Kraige, L.G., Engineering Mechanics- Statics, Vol. I, Wiley Publication, New Delhi
8. Applied Mechanics by Er. Arun Bangotra, Eagle Prakashan

UNIT WISE TIME AND MARKS DISTRIBUTION

Unit	Time (Hours)	Marks(%age)
1	17	25
2	15	22
3	10	17
4	11	18
5	11	18
Total	**64**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN WOOD TECHNOLOGY	
Course Code: **ES208***	Course Title: **APPLIED MECHANICS LAB***
Semester: 2ND	Credits: **01**
Periods Per Week :**2 (L: 0, T: 0, P:2)**	

(* Common to Automobile, Civil, Civil (PHE), QSCM, Mechanical and Wood Technology,)

COURSE OBJECTIVES:

The objectives of the course are to determine the resultant of various forces and to compute support reactions using equilibrium conditions for various structures and to understand the significance of friction in equilibrium problems, basic machine rules and their application in different engineering problems

LIST OF PRACTICAL TO BE PERFORMED:

1. To study various equipment related to Engineering Mechanics.
2. To find the M.A., V.R., Efficiency and law of machine for Differential Axle and Wheel.
3. To find the M.A., V.R., Efficiency and law of machine for Simple Screw Jack.
4. Derive Law of machine using Worm and worm wheel.
5. Derive Law of machine using Single purchase crab.
6. Derive Law of machine using double purchase crab.
7. Derive Law of machine using Weston's differential or wormed geared pulley block.
8. Verification of Polygon Law of Forces using gravesand apparatus
9. Determine resultant of concurrent force system graphically.
10. Determine resultant of parallel force system graphically.
11. Verify Lami's theorem.
12. Study forces in various members of Jib crane.
13. Determine support reactions for simply supported beam.
14. To obtain support reactions of beam using graphical method.
15. Determine coefficient of friction for motion on horizontal and inclined plane.
16. Determine centroid of geometrical plane figures.

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN WOOD TECHNOLOGY	
Course Code: **WTPC202**	Course Title: **Construction Materials & Wood Based products**
Semester: **2nd**	Credits: 4
Periods Per Week: **4 (L: 4, T: 0, P: 0)**	

COURSE OBJECTIVES:

Wood Technology diploma holders have to supervise construction of various types of wood works and use of various materials like timber and wood based products, paints and varnishes, metals and other miscellaneous materials. The students should have requisite knowledge regarding characteristics, uses and availability of various materials and skills in conducting tests to determine suitability of materials for various construction purposes. In addition, specifications of various materials should also be known (PWD/BIS) for effective quality control.

COURSE CONTENT

1. Paints and Varnishes:

1.1 Introduction, purpose and use of paints
1.2 Types, ingredients, properties and uses of oil paints, water paints and Cement paints
1.3 Covering capacity of various paints
1.4 Types, properties and uses of varnishes
1.5 Trade name of different products.

2. Timber and Wood Based Products

2.1 Identification and uses of different types of timber: Teak, Deodar, Shisham, Sal, Mango, Kail, Chir, Fir, Hollock, Champ
2.2 Market forms of converted timber as per BIS Code
2.3 Seasoning of timber: Purpose, methods of seasoning as per BIS Code
2.4 Properties of timber and specifications of structural timber
2.5 Defects in timber, decay in timber
2.6 Preservation of timber and methods of treatment as per BIS
2.7 Other wood-based products, their brief description of manufacture and Uses: laminated board, block board, fibre board, hard board, sunmica, Plywood, veneers, nu-wood and study of the brand name and cost of the Wood based products available in the market, Cement Panel Board, Moulded Door.
2.8 Materials used in interior decoration works like POP, methods of doing POP.

3. Polishing of Furniture

3.1 Description & method of French polish.
3.2 Method of wax polish and its uses.
3.3 Methods of old furniture repolish.
3.4 Estimation process of wooden furniture.

4. Making Lengthening Joints

4.1 Lengthening joint description.
4.2 Types of lengthening joint.
4.3 Application of different lengthening joint.
4.4 Setting of two tapper wedges.
4.5 Advantages of table & scarf joint.
4.6 Veneer, Plywood
4.7 Types of plywood
4.8 Advantage of plywood
4.9 Application of plywood, block board, laminated board, hard board, insulation board, mica etc.

4. Make small wall bracket

5.1 Parts & terms of portable disc sander.
5.2 Application of portable disc sander.
5.3 Care & maintenance of disc sander.
5.4 Method of making a wooden partition.
5.5 Door frames.
5.6 Door & window panels.

6. Miscellaneous Materials

6.1 Plastics – Introduction and uses of various plastic products in buildings
6.2 Types and uses of insulating materials for sound and thermal insulation
6.3 Construction chemicals like water proofing compound, epoxies, polymers
6.4 Materials used in interior decoration works like POP, methods of doing POP

NOTE: Field visit may be planned to wood based industry/ Plant to explain and show the relevant things

RECOMMENDED BOOKS

1) Sharma, SK; and Mathur, GC; "Engineering Materials;" Delhi-Jalandhar, S. Chand and Co.
2) Surendra Singh; "Engineering Materials;" New Delhi, Vikas Publishing House Pvt. Ltd.
3) Chowdhuri, N; "Engineering Materials;" Calcutta, Technical Publishers of India.
4) Bahl, SK; "Engineering Materials;" Delhi, Rainbow Book Co.
5) Kulkarni, GJ; "Engineering Materials;" Ahmedabad, Ahmedabad Book Depot.

UNIT WISE TIME AND MARKS DISTRIBUTION

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	09	15
2	12	20
3	14	15
4	12	20
5	12	20
6	05	10
Total	**64**	**100**

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN WOOD TECHNOLOGY

Course Code: **WTPC203**	Course Title: **Construction Materials & Wood Based Products. Lab**
Semester: **2nd**	Credits: 1
Periods Per Week: **(L: 0, T: 0, P: 2)**	

COURSE OBJECTIVE:

The subject Constructions Materials Lab deals the determination of strength parameters of various construction materials Especially Wood based Products.

LIST OF PRACTICALS

1. Measurements of seasoning defects.
2. Moisture content determination of wood (by all methods)
3. Measurement of drying strains.
4. Stacking and preparation of Kiln samples.
5. To determine the crushing strength of bricks
6. To determine fineness, consistency, setting time and physical test of cement
7. To determine compressive strength of cement – Any three types

PROGRAM: THREE YEARS DIPLOMA PROGRAMME IN WOOD TECHNOLOGY	
Course Code: **WTPC204**	Course Title: **Wood Workshop Practices**
Semester: **2nd**	Credits: 3
Periods Per Week: 5**(L: 0, T: 1, P: 4)**	

COURSE OBJECTIVE:

As we know that, the psychomotor skills are mastered through practice, an opportunity therefore, has been extended to students through this course to refine their skills in different trades. The basic skills developed during first semester will be refined during this course by doing higher order skills jobs. In addition to developing general manual and machining skills in the students, the objective of development of sense of dignity of labour, precision, safety at work places, team working and right attitude among the students will also be met.

COURSE CONTENTS

1. Carpentry and Painting Shop-II

1.1 Introduction to joints, their relative advantages and uses.

Job I Preparation of Dovetail joint and glued joint.

Job II Preparation of Mitre Joint

Job III Preparation of a lengthening Joint

Job IV Preparation of at least one utility job with and without lamination.

1.2 Demonstration of job showing use of Rip Saw, Bow saw and Tenon saw, method of sharpening various saws.

1.3 Demonstration of job on Band Saw and Circular Saw, Chain and Chisel, Universal wood working machine, saw re-sharpening machine, Saw Brazing unit.

1.4 Importance and need of polishing wooden items, Introduction to polishing materials.

Job V Polishing on wooden items.

2. Plumbing Shop

2.1 Introduction to various types of threads (internal, external)-single start, multi-start, left hand and right hand threads.

2.2 Description and demonstration of various types of drills, taps and dies Selection of dyes for threading, selection of drills, taps and reamers for tapping operations. Job I Making

internal and external threads on a job by tapping and dieing operations (manually)

2.3 Precautions while drilling soft metals, e.g. Copper, Brass, Aluminium etc.

Job II Drilling practice on soft metals (Aluminum, Brass and Copper)

Job III Preparation of a job by filing on non- ferrous metal up to an accuracy of ± 0.2mm

Job IV Preparation of job involving thread on GI pipe/ PVC pipe and fixing of different types of elbow, tee, union, socket, stopcock, taps, etc

3. Sheet Metal Shop-II

3.1 Introduction to various metal forming processes e.g. Spinning, Punching, Blanking, cup drawing

3.2 Introduction to soldering and brazing.

3.3 Introduction to metal spinning process.

Job I Preparation of job involving shearing, circular shearing, rolling, folding, beading and soldering process e.g. Funnel or any other job involving above operations.

Job II Exercise on job involving brazing process

Job III Spinning a bowl/cup/saucer

Job IV Visit to a sheet metal industry e.g. coach builders etc.

4. Wood Work

4.1. Identify timber/wood, apply measuring, marking and testing instrument and other holding and supporting hand Tools following safety precautions.
4.2. Identify and apply various saws and portable power saw machines for Ripping, cross cutting, oblique sawing and curve cutting etc.
4.3. Analyze the surface finish with exact sizing by planning, operation, identifying and applying various shaving tools or portable power planning machine.
4.4. Identify and apply various paring tools, analyze and choose the positioning and employ holding device for chiselling with better finish.
4.5. Identify and classify various types of joints, analyze and prepare correct joint at correct position, related with strength and appearance.
4.6. Make small wooden job as per drawing with schedule sizes of timber or alternatives
4.7. Prepare various type of wooden floor, partition wall etc.
4.8. Check, identify, analyze and repair the wooden job.

Note:

The students are supposed to come in proper workshop dress prescribed by the institute. Wearing shoes in the workshop(s) is compulsory. Importance of safety and cleanliness, safety measures and upkeep of tools, equipment and environment in each of the following shops should be explained and practiced. The students should prepare sketches of various tools/jobs

in their practical Notebook.

RECOMMENDED BOOKS

1. Workshop Technology I, II, III, by S K Hajra, Choudhary and A K Choudhary. Media Promoters and Publishers Pvt. Ltd., Bombay
2. Workshop Technology by Manchanda Vol. I,II,III India Publishing House, Jalandhar.
3. Manual on Workshop Practice by K Venkata Reddy; MacMillan India Ltd. New Delhi
4. Basic Workshop Practice Manual by T Jeyapoovan; Vikas Publishing House (P) Ltd., New Delhi
5. Workshop Technoogy by B.S. Raghuwanshi, Dhanpat Rai and Co., New Delhi
6. Workshop Technology by HS Bawa, Tata McGraw Hill Publishers, New Delhi

********** **********End of 2nd Semester Curriculum**********