Curriculum for

Diploma Programme in

COMPUTER ENGINEERING (BATCH 2018)

For the State of Haryana

Prepared by:

Curriculum Development Centre
National Institute of Technical Teachers Training and Research Sector 26, Chandigarh - 160 019

Haryana State Board of Technical Education Bays 7-12, Sector 4 Panchkula-134 112

July, 2018

FIRST YEAR (Computer Engg.)

Sr. No.	SUBJECTS	STUDY SCHEME HOURS / WEEK			CREDIT	MARKS IN EVALUATION SCHEME								Total Marks of Internal & External
						INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT					
		L	T	P		Th	Pr	Tot	Th	Hrs	Pr	Hrs	Tot	
1.1*	English	2	-	2	6	40	25	65	60	3	50	3	110	175
1.2*	Applied Mathematics	3	1	-	7	40	-	40	60	3	-	-	60	100
1.3*	Applied Physics	2	1	2	7	40	25	65	60	3	50	3	110	175
1.4**	Computer Fundamentals	3	-	-	6	40	-	40	60	3	-	3	60	100
1.5***	Fundamental of Electrical and Electronics Engg.	2	-	2	6	40	25	65	60	3	50	3	110	175
1.6*	Environmental Studies	2	-	1	5	40	25	65	60	3	50	3	110	175
1.7*	Engg. Graphics	-	-	3	3	40	25	65	60	3	25 (viva)	3	85	150
1.8*	Information Technology	-	-	2	2	-	50	50	-	-	50	3	50	100
1.9*	Internet of Things & Artificial Intelligence	-	-	2	2	-	50	50	-	-	100	3	100	150
1.10*	General Workshop Practice	-	-	3	3	-	50	50	-	-	50	3	50	100
#	Student Centered Activities(SCA)	-	-	2	2	-	25	25	-	-	-	-	-	25
	Total	14	02	19	49	280	300	580	420	-	425	-	845	1425

*Common with other diploma programmes
** Common with diploma in Electronics and Communication Engineering, Instrumentation and Control Engineering, Medical Electronics
*** Common with diploma in Electrical Engg, Electrical and Electronics Engg., Electronics and Communication Engg., Instrumentation and Control Engg, Medical Electronics
# SCA will comprise of co-curricular activities like extension lectures, games, hobby clubs, seminars, declamation contests, educational field visits, N.C.C., N.S.S., Cultural Activities and Disaster management etc.

THIRD SEMESTER (COMPUTER ENGINEERING)

Sr. No.	SUBJECTS	STUDY SCHEME Hours/Week		Credits	MARKS IN EVALUATION SCHEME								Total Marks of Internal & External
					INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT					
		Th	Pr		Th	Pr	Tot	Th	Hrs	Pr	Hrs	Tot	
3.1	Programming in C	3	6	6	25	25	50	100	3	50	3	150	200
3.2	Operating Systems	3	3	4	25	25	50	100	3	50	3	150	200
3.3.	*Digital Electronics	3	3	4	25	25	50	100	3	50	3	150	200
3.4	Multimedia Applications	3	6	6	25	25	50	100	3	50	3	150	200
3.5	Data Communication	3	-	3	50	-	50	100	3	-	-	100	150
	Soft Skills -I	-	2	-	-	25	25	-	-	-	-	-	25
	Total	**15**	**20**	**23**	**150**	**125**	**275**	**500**	**-**	**200**	**-**	**700**	**975**

*   Common with diploma programme in Electronics and Communication Engineering

FOURTH SEMESTER (COMPUTER ENGINEERING)

Sr. No.	SUBJECTS	STUDY SCHEME Hours/Week		Credits	MARKS IN EVALUATION SCHEME								Total Marks of Internal & External
					INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT					
		Th	Pr		*Th*	Pr	Tot	Th	Hrs	Pr	Hrs	Tot	
4.1	Data Structures Using C	3	6	6	25	25	50	100	3	50	3	150	200
4.2	Object Oriented Programming Using JAVA	3	6	6	25	25	50	100	3	50	3	150	200
4.3	Computer Organization	3	-	3	50	-	50	100	3	-	-	100	150
4.4	*Microprocessors & Peripheral Devices	3	3	4	25	25	50	100	3	50	3	150	200
4.5	Database Management System	3	3	4	25	25	50	100	3	50	3	150	200
	Soft Skills -II	-	2	-	-	25	25	-	-	-	-	-	25
	Total	**15**	**20**	**23**	**150**	**125**	**275**	**500**	**-**	**200**	**-**	**700**	**975**

*   Common with diploma programme in Electronics and Communication Engineering

Industrial Training
After examination of 4th Semester, the students shall go for training in a relevant industry/field organisation for a minimum period of 8 weeks and will prepare a diary. It shall be evaluated during 5th semester by his/her teacher incharge for 100 marks. The students shall also prepare a report at the end of training and shall present it in a seminar, which will be evaluated for another 100 marks. This evaluation will be done by lecturer in charge – training in the presence of one representative from Industry/Sector Skill Council/Training and Placement Officer/Subject Expert from other institution.

FIFTH SEMESTER (COMPUTER ENGINEERING)

Sr. No.	SUBJECTS	STUDY SCHEME Hours/Week		Credits	MARKS IN EVALUATION SCHEME								Total Marks of Internal & External
					INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT					
		Th	Pr		Th	Pr	Tot	Th	Hrs	Pr	Hrs	Tot	
	Industrial Training	-	-	5	-	100	100	-	-	100	-	100	200
5.1	Software Engineering	3	-	3	25	-	25	100	3	-	-	100	125
5.2	Computer Networks	3	3	4	25	25	50	100	3	50	3	150	200
5.3	Computer Programming Using Python	3	6	6	25	25	50	100	3	50	3	150	200
5.4	*Elective:	3	3	4	25	25	50	100	3	50	3	150	200
5.5	Web Development Using PHP	3	6	6	25	25	50	100	3	50	3	150	200
	Soft Skills -III	-	2	-	-	25	25	-	-	-	-	-	25
	Total	**15**	**20**	**28**	**125**	**225**	**350**	**500**	**-**	**300**	**-**	**800**	**1150**

* Elective: Choose any one out of the following:
5.4.1   Cloud Computing   5.4.2   Big Data

SIXTH SEMESTER (COMPUTER ENGINEERING)

Sr. No.	SUBJECTS	STUDY SCHEME Hours/Week		Credits	MARKS IN EVALUATION SCHEME								Total Marks of Internal & External
					INTERNAL ASSESSMENT			EXTERNAL ASSESSMENT					
		Th	Pr		Th	Pr	Tot	Th	Hrs	Pr	Hrs	Tot	
6.1	Network Security	3	3	4	25	25	50	100	3	50	3	150	200
6.2.	Mobile Application Development	3	6	6	25	25	50	100	3	50	3	150	200
6.3	Application Development Using Web Framework	-	6	3	-	50	50	-	-	100	3	100	150
6.4	*Entrepreneurship Development & Management	3	-	3	25	-	25	100	3	-	-	100	125
6.5	Project Work	-	9	4	-	50	50	-	-	100	3	100	150
	Soft Skills-IV	-	2	-	-	25	25	-	-	-	-	-	25
	Total	**9**	**26**	**20**	**75**	**175**	**250**	**300**	**-**	**300**	**-**	**600**	**850**

* Common with other diploma programmes

FIRST YEAR

(Annual System)

1.1 ENGLISH

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RATIONALE

Knowledge of English Language plays an important role in career development. This subject aims at introducing basic concepts of communication besides laying emphasis on developing listening, speaking, reading and writing skills as parts of Communication Skill.

LEARNING OUTCOMES

After undergoing the subject, the students will be able to:
.
- Understand the importance of good communication
- Describe process of communication.
- Explain, Compare and re-write the types of communication
- Identify and match the parts of speech
- Rewrite sentences correctly
- Modify sentences and relate them with real life situations.
- Reproduce and match words and sentences in a paragraph.
- Re-write the sentences according to given situation.
- Relate and use various words using proper vocabulary and grammar.
- Write the various types of paragraphs, notices and composition on picture with appropriate format.

DETAILED CONTENTS

1. Basics of Communication   **(06 Hrs)**
   1.1.   Definition and process of communication
   1.2.   Types of communication – Verbal (Listening, Speaking, Reading and Writing) and Non-verbal

2. Functional Grammar   **(22 Hrs)**
   2.1.   Noun and Pronoun
   2.2.   Punctuation
   2.3.   Preposition
   2.4.   Conjunction
   2.5.   Tenses (verb (Main verb and Auxiliary verb)

3. Reading Skills   **(12 Hrs)**

   3.1.   Unseen passage for comprehension. Based upon the passage, flowing aspects may be covered
- Questions from the passage
- One-word substitution

- Prefixes and Suffixes
- Antonyms and Synonyms etc.

4. Writing skills (30 Hrs)

4.1. Correspondence – Business and official
4.2. Notice, including Press Releases
4.3. Memos
4.4. Circular
4.5. Basics of Report Writing
4.6. Resume Writing
4.7. Writing E-mail
4.8. Paragraph writing
4.9. Picture composition

LIST OF PRACTICALS

1. Listening Exercises
2. Self and Peer Introduction
3. Debate
4. Situational Conversations: Offering - Responding to offers; Requesting – Responding to requests; Congratulating; Expressing sympathy and condolence; Apologizing and Forgiving; Complaining; Warning; Asking and giving information; Getting and giving permission; Asking for and giving opinions; Talking about likes and dislikes
5. Just a minute sessions – Extempore
6. Group Discussion
7. Newspaper reading
8. Mock Interviews: Telephonic and Personal

INSTRUCTIONAL STRATEGY

Student should be encouraged to participate in role play and other student centered activities in class room and actively participate in listening exercises

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual practical work, exercises and viva-voce
- Presentation and viva-voce

RECOMMENDED BOOKS

1. Communicating Effectively in English, Book-I by Revathi Srinivas; Abhishek Publications, Chandigarh.
2. Communication Techniques and Skills by R. K. Chadha; Dhanpat Rai Publications, New Delhi.
3. High School English Grammar and Composition by Wren & Martin; S.Chand & Company Ltd., Delhi.
4. e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Section	Percentage of syllabus to be covered	Units to be covered	Type of assessment	Weightage of Marks	Pass Percentage
A	20%	Unit 1.1, 2.1, 4.1	1st Internal	40%	40% (Combined in internal & final assessment) with minimum 25% marks in final assessment)
B	20%	Unit 2.2, 4.2, 4.3	2nd Internal		
C	60%	Unit 1.2, 2.3 to 2.5 , 3, 4.4 to 4.9	FINAL	60%	

1.2 APPLIED MATHEMATICS

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3   1   -

RATIONALE

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

LEARNING OUTCOMES

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

- Apply complex number in engineering problems.
- Apply permutation and combination to count without actual counting.
- Apply permutation and combination to understand binomial theorem.
- Calculate the approximate value of roots of certain expressions in engineering problems by application of binomial theorem.
- Resolve rational functions to partial fractions for the use in Integral Calculus.
- Use matrices to provide solution to engineering problems.
- Solve different problems using trigonometry.
- Understand the geometric shapes used in engineering problems by Co-ordinate Geometry.
- Explore the idea of location, graph, and linear relationships between two variables.
- Compute slope, the equation of tangent and normal to a curve at a point using differentiation.
- Find maximum and minimum values of a function by application of differential calculus..
- Calculate simple integration by using concepts of integration.
- Find the velocity from acceleration and displacement from velocity using integration.
- Evaluate area under curves by using definite integrals
- Calculate the area under a curve and axes.
- Calculate the approximate area under a curve by applying numerical integration using Trapezoidal and Simpson's rules.
- Solve engineering and industrial problems using differential equations.
- Apply differential Equations and numerical methods for higher learning of mathematics and engineering applications.

DETAILED CONTENTS

1. **Algebra** (30 Hrs)
   - Law of Indices, Formula of Factorisation and expansion i.e. $(a+b)^2$, (a^3+b^3) etc.
   - Partial fraction:- Definition of Polynomial fraction proper & improper fractions and definition of partial fractions. To resolve proper fraction into partial fraction with denominator containing non-repeated linear factors, only.
   - Complex numbers: definition of complex number, real and imaginary parts of a complex number, Polar and Cartesian Form and their inter conversion, Conjugate of a complex number, modulus and amplitude, addition subtraction, multiplication and division of complex number.
   - Logarithms and its basic properties
   - Determinants and Matrices – Evaluation of determinants (up to 3 order) by laplace method. Solution of equations (up to 3 unknowns) by Cramer's Rule. Definition of Matrices and types, addition subtraction and multiplication of Matrices (up to 2 order).
   - Permutation, combination formula, Values of ^nP_r and ^nC_r.
   - Binomial theorem for positive integral index , General term, simple problems

2. **Trigonometry** (14 Hrs)

   - Concept of angle: measurement of angle in degrees, grades, radians and their conversions.
   - T-Ratios of standard angle $(0^0,30^0,45^0$etc$)$ and fundamental Identities, Allied angles (without proof) Sum, Difference formulae and their applications (without proof). Product formulae (Transformation of product to sum, difference and vice versa)
   - Applications of Trigonometric terms in engineering problems such as to find an angle of elevation, height, distance etc.

3. **Co-ordinate Geometry** (12 Hrs)

   - Point: Distance Formula, Mid Point Formula, Centroid of triangle and area of triangle.
   - Straight line: Slope of a line, equation of straight line in various standards forms (without proof); (slope intercept form, intercept form, one-point form, two-point form, normal form, general form), angle between two straight lines.
   - Circle: General equation of a circle and identification of centre and radius of circle. To find the equation of a circle, given:
     - * Centre and radius
     - * Coordinates of end points of a diameter

4. **Differential Calculus** (40 Hrs)
   - Definition of function; Concept of limits (Introduction only) and problems related to four standard limits only.

   - Differentiation of standard function (Only formulas), Differentiation of Algebraic function, Trigonometric functions, Exponential function, Logarithmic function

- Differentiation of sum, product and quotient of functions.
- Successive differentiation (up to 2nd order)
- Application of differential calculus in:
    - (a) Rate measures
    - (b) Maxima and minima

5. Integral Calculus   (28 Hrs)

- Integration as inverse operation of differentiation with simple examples.
- Simple standard integrals, Integrations by parts and related Simple problems
- Evaluation of definite integrals with given limits.

    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) using pre-existing mathematical models.
- Applications of integration: for evaluation of area under a curve and axes (Simple problems where the limits are given).
- Numerical integration by Trapezoidal Rule and Simpson's $1/3^{rd}$ Rule using pre-existing mathematical models

6. Differential Equations   (04 Hrs)
Definition, order, degree and linearity, of an ordinary differential equation. Solution of I^{st} order and I^{st} degree differential equation by variable separable method (Simple problems)

7. Statistics   (12 Hrs)
- Measures of Central Tendency: Mean, Median, Mode
- Measures of Dispersion: Mean deviation from mean, Standard deviation
- Correlation coefficient and Coefficient of rank correlation (Simple problems)

INSTRUCTIONAL STATREGY

Activity based teaching and learning process using Mathematics lab consisting of physical models and computer based tools/software emphasising Practice => Theory => Practice.
Basic elements of algebra, trigonometry and co-ordinate geometry can be taught in the light of their applications in the field of engineering and technology. By laying more emphasis on applied part, teacher can also help in providing a good continuing education base to the students. Students need to be taught the skills needed to use software tools built by experts through multiple problem solving based on the topics related to Algebra, Trigonometry and Coordinate Geometry that the industry requires. Examples to be used should be related to engineering. Students should be able to relate to the actual use of these examples and the way mathematical calculations will help them in doing their job.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests, model/prototype making

RECOMMENDED BOOKS

1. Elementary Engineering Mathematics by BS Grewal, Khanna Publishers, New Delhi
2. Engineering Mathematics Vol. I & II by S Kohli, IPH, Jalandhar
3. Applied Mathematics, Vol. I & II by SS Sabharwal & Dr Sunita Jain, Eagle Parkashan, Jalandhar
4. Engineering Mathematics, Vol I, II & III by V Sundaram et al, Vikas Publishing   House (P) Ltd., New Delhi
5. Engineering Mathematics, Vol I & II by SS Sastry, Prentice Hall of India Pvt. Ltd.,
6. Applied Mathematics I, by Archana Sharma, Lords Publications, Jalandhar.
7. Engineering Mathematics by Srimanta Pal and Subodh C. Bhunia; Oxford University Press, New Delhi
8. e-books/e-tools/relevant   software   to   be   used   as   recommended   by   AICTE/HSBTE/NITTTR.

Websites for Reference:
   http://swayam.gov.in

Section	Percentage of syllabus to be covered	Units to be covered	Type of assessment	Weightage of Marks	Pass Percentage
A	20%	Unit 1	1st Internal	40%	40%(Combined in internal & final assessment)with minimum 25% marks in final assessment)
B	20%	Unit 2,3	2nd Internal		
C	60%	Unit 4,5,6,7	FINAL	60%	

1.3 APPLIED PHYSICS

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RATIONALE

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

Note: Teachers should give examples of engineering/technology applications of various concepts and principles in each topic so that students are able to appreciate learning of these concepts and principles. In all contents, SI units should be followed. Working in different sets of units can be taught through relevant software.

LEARNING OUTCOMES

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

- Identify physical quantities, parameters and select their units for use in engineering solutions.
- Find units and dimensions of different physical quantities.
- Represent physical quantities as scalar and vectors.
- Use basic laws of motions,
- Analyse and design banking of roads and apply conservation of momentum principle to explain recoil of gun etc.
- Define work, energy and power and their units. Solve problems about work and power
  - State the principle of conservation of energy.
  - Identify forms of energy, conversion from one form to another.
  - Compare and contrast the physical properties associated with linear motion and rotational motion and give examples of conservation of angular momentum.
  - Describe the surface tension phenomenon and its units, applications, effects of temperature on surface tension.
  - Describe the viscosity of liquids.
  - Define stress and strain, modulus of elasticity.
  - State Hooke's law.
  - Measure temperature in various processes on different scales.
  - Distinguish between conduction, convection and radiation.
  - Use equipments like Vernier calliper, screw gauge, Spherometer.
- Differentiate between Transverse and Longitudinal, Periodic and Simple Harmonic Motion.
- Explain the terms: frequency, amplitude, wavelength, wave velocity, frequency and relation between them.

- Explain various engineering and industrial applications of ultrasonics.
- Apply acoustics principles to various types of buildings to get best sound effect.
- Explain the laws of reflection and refraction of light.
- Explain total internal reflection as applied to optical fibers.
- Define capacitance and its unit and solve simple problems using C=Q/V
- Explain the role of free electrons in insulators, conductors and semiconductors.
- Application of semiconductors as diode, rectifiers, concept of transistors
- Explain electric current as flow of charge, the concept of resistance, heating effect of current.
- State and apply Ohm's law.
- Calculate the equivalent resistance of a variety of resistor combinations.
- Apply the concept of light amplification in designing of various LASER based instruments and optical sources.
- Apply the use of optical fibre in medical field and optical fibre communication.

DETAILED CONTENTS

1.   Units and Dimensions   (11Hrs)
1.1   Definition of Physics, Physical quantities (Fundamental and derived),
1.2   Units: fundamental and derived units,
1.3   Systems of units: CGS, FPS, MKS, SI
1.4   Definition of Dimensions;
1.5   Dimensional formulae and SI units of physical quantities (distance, displacement, area, volume, velocity, acceleration, momentum, force, impulse, work, power, energy, pressure, surface tension, stress, strain)
1.6   Principle of homogeneity of dimensions
1.7   Dimensional equations, Applications of dimensional equations; checking of correctness of equation, Conversion of system of unit (force, work)

2.   Force and Motion   (14 Hrs)
2.1   Scalar and vector quantities –(Definition and examples),
2.2   Addition of Vectors, Triangle & Parallelogram Law (Statement only),
2.3   Scalar and Vector Product (statement and formula only)
2.4   Definition of Distance, displacement, speed, velocity, acceleration
2.5   Force and its units, concept of Resolution of force
2.6   Newton's Law of motion (Statement and examples),
2.7   Linear Momentum, conservation of momentum (Statement only), Impulse
2.8   Circular motion: definition of angular displacement, angular velocity, angular acceleration, frequency, time period; Relation between linear and angular velocity.
2.9   Centripetal and centrifugal forces(definition and formula only)
2.10   Application of centripetal force in Banking of roads (derivation for angle of banking)

3.   Work, Power and Energy   (08 Hrs)
   3.1   Work (Definition, Symbol, Formula and SI units)
   3.2   Energy (Definition and its SI units), Examples of transformation of
          energy.
   3.3   Kinetic Energy (Formula, examples and its derivation)
   3.4   Potential Energy (Formula, examples and its derivation)
   3.5   Law of conservation of mechanical energy for freely falling bodies (With .
          Derivation)
   3.6   Power (definition, formula and units)
   3.7   Simple Numerical problems based on formula of Power

4.   Rotational Motion   (05 Hrs)
   4.1   Rotational motion with examples
   4.2   Definition of torque and angular momentum and their examples
   4.3   Conservation of angular momentum (quantitative) and its examples
   4.4   Moment of inertia and its physical significance, radius of gyration (definition,
          derivation and formula).

5.   Properties of Matter   (10 Hrs)
   5.1   Definition of Elasticity, Deforming force, Restoring force, example of
          Elastic and plastic body,
   5.2   Definition of Stress and strain with their types,
   5.3   Hooke's law, Modulus of Elasticity (Young's, Bulk modulus and shear)
   5.4   Pressure (definition, formula, unit), Pascals Law
   5.5   Surface tension: definition, its units, applications of surface tension,
          effect of temperature on Surface tension
   5.6   Viscosity: definition, units, effect of temperature on viscosity
   5.7   Fluid motion, stream line and turbulent flow.

6.   Heat and temperature   (05 Hrs)
   6.1   Definition of heat and temperature (on the basis of kinetic theory),
   6.2   Difference between heat and temperature
   6.3   Principles of measurement of temperature.
   6.4   Modes of transfer of heat (Conduction, convection and radiation with
          examples).
   6.5   Properties of heat radiation
   6.6   Different scales of temperature and their relationship

7. Wave motion and its applications (09 Hrs)

7.1 Wave motion, transverse and longitudinal wave motion with examples, Terms used in wave motion like displacement, amplitude, time period, frequency, wavelength, wave velocity; relationship among wave velocity, frequency and wave length .

7.2 Simple Harmonic Motion (SHM): definition, examples

7.3 Cantilever (definition, formula of time period (without derivation).

7.4 Free, forced and resonant vibrations with examples

7.5 Acoustics of buildings – reverberation, reverberation time, echo, noise, coefficient of absorption of sound, methods to control reverberation time.

7.6 Ultrasonics: Introduction and their engineering applications (cold welding, drilling, SONAR)

8. Optics (05 Hrs)

8.1. Reflection and refraction with laws, refractive index, lens formula (no derivation), power of lens (related numerical problems).

8.2. Total internal reflection and its applications, Critical angle and conditions for total internal reflection

8.3. Microscope, Telescope (definition)

8.4. Uses of microscope and telescope.

9. Electrostatics (09 Hrs)

9.1. Electric charge, unit of charge, conservation of charge.

9.2. Coulombs law of electrostatics,

9.3. Electric field, Electric lines of force (definition and properties), Electric field intensity due to a point charge.

9.4. Definition of Electric flux, Gauss law (Statement and derivation)

9.5. Capacitor and Capacitance (with formula and units), Series and parallel combination of capacitors (simple numerical problems)

10. Current Electricity (08 Hrs)

10.1 Electric Current and its Unit, Direct and alternating current,

10.2 Resistance, Specific Resistance and Conductance (definition and units)

10.3 Series and Parallel combination of Resistances.

10.4 Ohm's law (statement and formula),

10.5 Heating effect of current, Electric power and its units

10.6 Kirchhoff's laws (statement and formula)

11 Electromagnetism (05 Hrs)

11.1. Introduction to magnetism, Types of magnetic materials. Dia, para and ferromagnetic materials with examples.

11.2. Magnetic field, magnetic intensity, magnetic lines of force, magnetic flux and their units

11.3. Electromagnetic induction (definition)

12. Semiconductor physics   (08 Hrs)

    12.1. Definition of Energy level, Energy bands,

    12.2. Types of materials (insulator, semi conductor, conductor) with examples,

    12.3. Intrinsic and extrinsic semiconductors, p-n junction diode and its V-I characteristics

    12.4. Diode as rectifier – half wave and full wave rectifier (centre tap only)

    12.5. Semiconductor transistor; pnp and npn (Introduction only), symbol.

13. Modern Physics   (08 Hrs)

    13.1. Lasers: full form, principle, spontaneous emission, stimulated emission, population inversion, engineering and medical applications of lasers.

    13.2. Fibre optics: Introduction to optical fibers (definition, parts), applications of optical fibers in different fields.

    13.3. Introduction to nanotechnology (definition of nanomaterials with examples) and its applications.

LIST OF PRACTICALS (To perform minimum fourteen experiments)

1. To find diameter of solid cylinder using a vernier calliper
2. To find internal diameter and depth of a beaker using a vernier calliper and hence find its volume.
3. To find the diameter of wire using screw gauge
4. To find thickness of paper using screw gauge.
5. To determine the thickness of glass strip using a spherometer
6. To determine radius of curvature of a given spherical surface by a spherometer.
7. To verify parallelogram law of forces
8. To determine the atmospheric pressure at a place using Fortin's Barometer
9. To determine force constant of spring using Hooke's law
10. Measuring room temperature with the help of thermometer and its conversion in different scale.
11. To find the time period of a simple pendulum
12. To determine and verify the time period of Cantilever
13. To verify ohm's laws by plotting a graph between voltage and current.
14. To verify laws of resistances in series combination.
15. To verify laws of resistance in parallel combination.
16. To find resistance of galvanometer by half deflection method
17. To verify laws of reflection of light using mirror.
18. To verify laws of refraction using glass slab.
19. To find the focal length of a concave lens, using a convex lens
20. To study colour coding scheme of resistance.

INSTRUCTIONAL STATREGY

Teacher may use various teaching aids like models, charts, graphs and experimental kits etc. for imparting effective instructions in the subject. Students need to be exposed to use of different sets of units and conversion from one unit type to another. Software may be used to solve problems involving conversion of units. The teacher should explain about field applications before teaching the basics of mechanics, work, power and energy, rotational motion, properties of matter etc. to develop proper understanding of the physical phenomenon. Use of demonstration can make the subject interesting and develop scientific temper in the students.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests, model/prototype making
- Actual laboratory and practical work, exercises and viva-voce

RECOMMENDED BOOKS

1. Text Book of Physics for Class XI (Part-I, Part-II); N.C.E.R.T., Delhi
2. Applied Physics, Vol. I and Vol. II by Dr. HH Lal; TTTI Publications, Tata McGraw Hill, Delhi
3. Concepts in Physics by HC Verma, Vol. I & Vol.II, Bharti Bhawan Ltd. New Delhi
4. Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi
5. e-books/e-tools/relevant software to be used as recommended by AICTE/ HSBTE/ NITTTR.
6. Practical Physics, by C. L. Arora, S Chand Publication

Websites for Reference:

http://swayam.gov.in

Section	Percentage of syllabus to be covered	Units to be covered	Type of assessment	Weightage of Marks	Pass Percentage
A	20%	Unit 1,2	1st Internal	40%	40%(Combined in internal & final assessment)with minimum 25% marks in final assessment)
B	20%	Unit 3,4,5	2nd Internal		
C	60%	Unit 6,7,8,9, 10,11, 12, 13	FINAL	60%	

1.4   COMPUTER FUNDAMENTALS

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RATIONALE

The diploma holder needs to understand computer fundamentals and information technology. They should be able to operate basic software related to computer. Hence this subject is introduced in the curriculum.

LEARNING OUTCOMES

After undergoing the subject, students will be able to:
- Describe various component of computer system
- Draw the block diagram of computer system showing various units
- Outline various application of IT
- Differentiate between assembly and high level language
- List the features of the MS Word, MS-Excel & MS-PowerPoint
- Demonstrate the use of PowerPoint for seminar presentation
- Identify various web browser
- Use internet and create mail ID, send and receive Email
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DETAILED CONTENTS

1.   Fundamentals of Computer   (21 hrs)
   1.1   Draw the block diagram of a Computer.
   1.2.   Explain the interaction between the CPU, Memory Input/ Output devices.
   1.3.   Describe the function of CPU and major functional parts of CPU.
   1.4.   Describe the function of memory.
   1.5   Describe the function of input/output devices.
   1.6   State the relevance of speed and word length for CPU Performance.
   1.7   Recognize the current family of CPUs used in Computers
   1.8   State the use of storage devices used in a Computer.
   1.9   List types of memory used in a Computer.
   1.10   State the importance of cache memory.
   1.11   Generations of computers.
   1.12   Classification of computers –based on size, processor.
   1.13   Know importance of binary number system for use in Digital Computers.

2.   DOS & Windows Operating Systems   (40 hrs)
   2.1   Describe the need for an operating system
   2.2   List the various operating system used presently
   2.3   DOS Prompt, Types of Commands, Internal & External Commands
   2.4   Directories and files , wild cards, autoexec.bat, config.says,
   2.5   List the features of Window desktop
   2.6   List the components of Window
   2.7   State the function of each component of Window

2.8   Explain the method of starting a program using start button

2.9   Understand maximize, minimize, restore down and close button

2.10   State the meaning of a file

2.11   State the meaning of a folder

2.12   Explain the method of viewing the contents of hard disk drive using explore option

2.13   Explain the method of finding a file using search option

2.14   Explain formatting a floppy disk using explore option

2.15   Describe installing new software using control panel

2.16   Describe uninstalling software using control panel

2.17   Explain installing a new hardware using control panel

2.18   Explain uninstalling a hardware using control panel

2.19   Narrate finding out drive space using system tool option of accessories group

2.20   Explain the procedure of disk defragmentation using system tool

2.21   Narrate installing a Printer using control panel

2.22   Explain the procedure for changing resolution, colour, appearances, and screensaver option of the display

2.23   Narrate the process of charging the system date and time

3.   Fundamentals of Internet   (28 hrs)

     3.1   Explain meaning of a computer network

     3.2   Describe the concept of a local area network

     3.3   Explain the concept of wide area network

     3.4   Compare internet & intranet

     3.5   Describe the relevance of an internet service provider

     3.6   Explain the role of the modem in accessing the internet

     3.7   Explain the installation procedure of a modem using control panel

     3.8   Explain the purpose of web browser software

     3.9   Explain the structure of a Universal Resources Locator(URL)

     3.10   Describe the purpose of World Wide Web, FTP, telnet and E-mail

     3.11   Explain the process of sending and receiving e-mail

     3.12   Understand different connection methods

     3.13   Describe address format and IP address

     3.14   Describe DNS

     3.15   Describe the role of search engines with examples

     3.16   Differences between search engines and directory.

     3.17   Know about social network sites

     3.18   Understand internet security

4.   Understand Programming Methodology   (16 hrs)

     4.1.   State the different steps involved in problem solving

     4.2   State the steps involved in algorithm development

     4.3   Differentiate algorithm and flowchart

4.4   Develop algorithms for simple problems
4.5   Draw the symbols used in flowcharts
4.6   Draw flowcharts for simple problems

INSTRUCTIONAL STRATEGY

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

MEANS OF ASSESSMENT
- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work, exercises and viva-voce
- Software installation, operation and viva-voce

RECOMMENDED BOOKS

1.   Fundamentals of Computer by E Balagurusamy,Tata McGraw Hill EducationPvt. Ltd, New Delhi
2.   Fundamentals of Computer by V Rajaraman; Prentice Hall of India Pvt. Ltd., New Delhi
3.   Computer Fundamentals by RS Salaria; Khanna Book Publishing Co. (P) Ltd., New Delhi
4.   Computers Fundamentals Architecture and Organisation by B Ram, revised Edition, New Age International Publishers, New Delhi
5.   Computers Today by SK Basandara, Galgotia publication Pvt ltd. Daryaganj, New Delhi.
6.   A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
7.   Computer Fundamentals and Programming in C by ReemaThareja; Oxford University Press, New Delhi
8.   Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
9.   Computer Fundamentals and Information Technology by Preeti Shrivastav, Ishan publication
10.   Fundamentals of Information Technology by Vipin Arora, Eagle Parkashan, Jalandhar.
11.   e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:
        http://swayam.gov.in

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B	20%	Unit 2.1 to 2.11	2nd Internal		
C	60%	Unit 2.12 to 2.23, 3,4	FINAL	60%	

1.5 FUNDAMENTAL OF ELECTRICAL & ELECTRONICS ENGG

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RATIONALE

A diploma holder may be involved in various jobs ranging from preventive maintenance of electrical installation to fault location. In addition, he/she may be working in testing laboratories where he/she uses measuring instruments. To carry out these and similar jobs effectively, knowledge of basic concepts, principles and their applications is very essential. This course will enable the students to understand the basic concepts and principles of DC and AC fundamental, ac circuits, batteries, electromagnetic induction, voltage and current sources etc. This subject gives the knowledge of fundamental concepts and principles of basic electronics and aims at providing the students with basic understanding of various types of materials such as conductors, semiconductors and insulators, extrinsic and intrinsic semi-conductors, p-n junction, need of rectifiers, significance and use of filters in rectifiers, basic structure and working principle of LEDs, LCD; working of Transistors in various configurations; fundamental knowledge of FETs and MOSFETs etc. and their applications. The teacher should give emphasis on understanding of concepts by explaining the various terms used in the subject. Practical exercises have been included in order to reinforce various concepts

LEARNING OUTCOMES

After undergoing the subject, the students will be able to:
- Identify and able to take readings on various electrical equipments(voltmeter, ammeter, CRO, wattmeter, multi-meter)
- Determination of voltage-current relationship in a DC circuit under specific physical conditions
- Measure resistance of an ammeter and a voltmeter
- Verify DC circuits (Thevenin and Norton's Theorem), Superposition nodal analysis, Maximum Power Transfer Theorem
- Verify Kirchhoff's Current and Voltage Laws in a dc circuit
- Find the ratio of inductance of a coil having air-core and iron-core respectively and to observe the effect of introduction of a magnetic core on coil inductance
- Measure power and power factor in a single phase R-.L-.C. Circuit and calculation of active and reactive powers in the circuit. After undergoing the subject, the students will be able to take readings on various electronics equipments(multimeter, CRO, signal generator, LCR meter)
- Plot the VI characteristics of pn junction diode and Zener diode
- Measure voltage gain, input and output impedance in a single state CE amplifier circuit.
- Fabricate half wave, full wave and bridge rectifier and observe waveforms of each
- Plot the waveforms of the rectifier circuit with different filters
- Plot input and output characteristics of transistor in CB and CE mode
- Plot the characteristics of FET based amplifier

- Measure voltage gain, input and output impedance in a single state CE amplifier circuit. take readings on various electronics equipments(multi meter, CRO, signal generator, LCR meter)

DETAILED CONTENTS

1. Overview of DC Circuits   (05 hrs)

    1.1   Simple problems on series and parallel combination of resistors and capacitors with their wattage consideration,
    1.2   Application of Kirchhoff's current law and Kirchhoff's voltage law to simple circuits. Star – Delta connections and their conversion.

2. DC Circuit Theorems   (05 hrs)
    Thevenin's theorem, Norton's theorem, application of network theorems in solving D.C. circuit problems. Superposition nodal analysis, Mesh analysis, Maximum Power Transfer Theorem.

3. Voltage and Current Sources   (04 hrs)
    3.1   Concept of voltage source, symbol and graphical representation characteristics of ideal and practical sources.
    3.2   Concept of current sources, symbol, characteristics and graphical representation of ideal and practical current sources.

4. Semiconductor Physics   (06 hrs)
    4.1   Review of basic atomic structure and energy levels, concept of insulators, conductors and semi conductors, atomic structure of Germanium (Ge) and Silicon (Si), covalent bonds
    4.2   Concept of intrinsic and extrinsic semi conductor, process of doping.
    4.3   Energy level diagram of conductors, insulators and semi conductors; minority and majority charge carriers.
    4.4   P and N type semiconductors and their conductivity, effect of temperature on conductivity of intrinsic semi conductors.

5. Semiconductor Diode   (08 hrs)
    5.1   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.
    5.2   V-I characteristics, static and dynamic resistance and their value calculation from the characteristics.
    5.3   Application of diode as half-wave, full wave and bridge rectifiers. Peak Inverse Voltage, rectification efficiencies and ripple factor calculations, shunt capacitor filter, series inductor filter, LC and π filters.
    5.4   Types of diodes, characteristics and applications of Zener diodes. Zener and avalanche breakdown

6. Electro Magnetic Induction   (06 hrs)
    6.1   Concept of electro-magnetic field produced by flow of electric current, magnetic circuit, concept of magneto-motive force (MMF), flux, reluctance, permeability, analogy between electric and magnetic circuit.
    6.2   Faraday's laws of electro-magnetic induction, principles of self and mutual induction, self and mutually induced e.m.f, simple numerical problems.
    6.3   Concept of current growth, decay and time constant in an inductive (RL) circuit.
    6.4   Energy stored in an inductor, series and parallel combination of inductors.

7. Batteries   (05 hrs)
    7.1   Basic idea of primary and secondary cells
    7.2   Construction, working principle and applications of Lead-Acid, Nickel-Cadmium and Silver-Oxide batteries
    7.3   Charging methods used for lead-acid battery (accumulator)
    7.4   Care and maintenance of lead-acid battery
    7.5   Series and parallel connections of batteries
    7.6   General idea of solar cells, solar panels and their applications
    7.7   Introduction to maintenance free batteries

8. AC Fundamentals   (05 hrs)
    8.1   Concept of alternating quantities
    8.2   Difference between ac and dc
    8.3   Concepts of: cycle, frequency, time period, amplitude, instantaneous value, average value, r.m.s. value, maximum value, form factor and peak factor.
    8.4   Representation of sinusoidal quantities by phasor diagrams.
    8.5   Equation of sinusoidal wave form for an alternating quantity and its derivation
    8.6   Effect of alternating voltage applied to a pure resistance, pure inductance and pure capacitance.

9. AC Circuits   (06 hrs)
    9.1   Concept of inductive and capacitive reactance
    9.2   Alternating voltage applied to resistance and inductance in series.
    9.3   Alternating voltage applied to resistance and capacitance in series.
    9.4   Introduction to series and parallel resonance and its conditions
    9.5   Power in pure resistance, inductance and capacitance, power in combined RLC circuits. Power factor, active and reactive power and their significance, definition and significance of power factor.
    9.6   Definition of conductance, susceptance, admittance, impedance and their units

10. Introduction to Bipolar-Transistors   (06 hrs)
   10.1   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;
   10.2   CB, CE, CC configurations of a transistor; Input and output characteristics in CB and
           CE configurations; input and output dynamic resistance in CB and CE
           configurations; Current amplification factors. Comparison of CB, CE and CC
           Configurations;
   10.3   Transistor as an amplifier in CE Configuration; concept of DC load line and
           calculation of current gain and voltage gain using DC load line.

11. Transistor Biasing Circuits   (04 hrs)
   Concept of transistor biasing and selection of operating point. Need for stabilization of
   operating point. Different types of biasing circuits.

12. Field Effect Transistors   (05 hrs)
   Construction, operation and characteristics of FETs and their applications.
   12.1   Construction, operation and characteristics of a MOSFET in depletion and
           enhancement modes and its applications.
   12.2   CMOS - advantages and applications
   12.3   Comparison of JFET, MOSFET and BJT.

13. Introduction to Electrical Machines   (05 hrs)
   13.1   Transformers : Principal of operation, construction detail of single phase transformer,
           turns ratio , efficiency, loses in a transformer.
   13.2   DC machine : principal of operation, construction of DC motor and generator,
           Characteristics of different types of DC machines , Starter .
   13.3   AC machines : Principal and working of synchronous machines, single phase
           induction motor

LIST OF PRACTICALS

   1. Operation and use of measuring instruments viz voltmeter, ammeter, CRO, Wattmeter,
       multi-meter and other accessories
   2. Measurement of resistance of an ammeter and a voltmeter
   3. Verification of following Theorems:-
       a. Thevenin's theorem,
       b. Norton's theorem,
   4. Observation of change in resistance of a bulb in hot and cold conditions, using voltmeter
       and ammeter.
   5. Verification of Krichhoff's Current and Voltage Laws in a dc circuit
   6. To find the ratio of inductance of a coil having air-core and iron-core respectively and
       to observe the effect of introduction of a magnetic core on coil inductance

7. Charging and testing of a lead - acid storage battery.
8. Measurement of power and power factor in a single phase R-.L-.C. circuit and calculation of active and reactive powers in the circuit.
9. Plotting of V-I characteristics of a PN junction diode & Zener diode

10. Observe the output of waveform using
    a. Half-wave rectifier circuit using one diode
    b. Full-wave rectifier circuit using two diodes
    c. Bridge-rectifier circuit using four diodes
11. Plotting of the wave shape of full wave rectifier with
    a. Shunt capacitor filter
    b. Series inductor filter
12. Plotting of input and output characteristics and calculation of parameters of transistors in CE configuration.
13. Plotting of input and output characteristics and calculation of parameters of transistors in CB configuration.
14. Plotting of V-I characteristics of a FET.
15. To determine the efficiency of single phase Transformer

RECOMMENDED BOOKS

1. Electrical Technology by BL Theraja, S Chand and Co, New Delhi
2. Basic Electrical and Electronics Engineering by SK Sahdev; Dhanpat Rai and Sons, New Delhi
3. Experiments in Basic Electrical Engineering by SK Bhattacharya, KM Rastogi; New Age
   International (P) Ltd.; Publishers New Delhi
4. Principles of Electrical Engineering by BR Gupta, S Chand and Co, New Delhi
5. Basic Electrical Engineering by JB Gupta; SK Kataria and Sons, New Delhi
6. Basic Electrical Engineering by D.R Arora, Ishan Publications
7. Basic Electronics and Linear Circuit by NN Bhargava and Kulshreshta, Tata McGraw Hill Publishing Co, New Delhi.
8. Principles of Electrical and Electronics Engineering by VK Mehta; S Chand and Co., New Delhi
9. Electronic Components and Materials by SM Dhir, Tata McGraw Hill Publishing Co, New Delhi
10. Electronic Devices and Circuits by Bhupinder Jit Kaur; Modern Publishers, Jalandhar
11. Electronics – I by DR Arora, North Publications, Jalandhar

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B	20%	Unit 4 ,5	2nd Internal		
C	60%	Unit 6 to 13	FINAL	60%	

1.6   ENVIRONMENTAL STUDIES

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RATIONALE

A diploma holder must have knowledge of different types of pollution caused due to industries and constructional activities so that he may help in balancing the ecosystem and controlling pollution by various control measures. He should also be aware of environmental laws related to the control of pollution. He should know how to manage the waste. Energy conservation is the need of hour. He should know the concept of energy management and its conservation.

LEARNING OUTCOMES
After undergoing the subject, the student will be able to:
- Comprehend the importance of ecosystem and sustainable
- Demonstrate interdisciplinary nature of environmental issues
- Identify different types of environmental pollution and control measures.
- Take corrective measures for the abetment of pollution.
- Explain environmental legislation acts.
- Define energy management, energy conservation and energy efficiency
- Demonstrate positive attitude towards judicious use of energy and environmental protection
- Practice energy efficient techniques in day-to-day life and industrial processes.
- Adopt cleaner productive technologies
- Identify the role of non-conventional energy resources in environmental protection.
- Analyze the impact of human activities on the environment

DETAILED CONTENTS
1.   Introduction   (4 Hrs)
- Basics of ecology, eco system- concept, and sustainable development, Resources renewable and non renewable.

2.   Air Pollution   (12 Hrs)
- Source of air pollution. Effect of air pollution on human health, economy, plant, animals. Air pollution control methods.

3.   Water Pollution   (16 Hrs)
- Impurities in water, Cause of water pollution, Source of water pollution. Effect of water pollution on human health, Concept of dissolved O_2, BOD, COD. Prevention of water pollution- Water treatment processes, Sewage treatment. Water quality standard.

4.   Soil Pollution   (14 Hrs)
- Sources of soil pollution

- Types of Solid waste- House hold, Hospital, From Agriculture, Biomedical, Animal and human, excreta, sediments and E-waste
- Effect of Solid waste
- Disposal of Solid Waste- Solid Waste Management

5. Noise pollution   (8 Hrs)
- Source of noise pollution, Unit of noise, Effect of noise pollution, Acceptable noise level, Different method of minimize noise pollution.

6. Environmental Legislation   (10 Hrs)
- Introduction to Water (Prevention and Control of Pollution) Act 1974, Introduction to Air (Prevention and Control of Pollution) Act 1981 and Environmental Protection Act 1986, Role and Function of State Pollution Control Board and National Green Tribunal (NGT), Environmental Impact Assessment (EIA).

7. Impact of Energy Usage on Environment   (6 Hrs)
- Global Warming, Green House Effect, Depletion of Ozone Layer, Acid Rain. Eco-friendly Material, Recycling of Material, Concept of Green Buildings.

LIST OF PRACTICALS

1. Determination of pH of drinking water
2. Determination of TDS in drinking water
3. Determination of TSS in drinking water
4. Determination of hardness in drinking water
5. Determination of oil & grease in drinking water
6. Determination of alkalinity in drinking water
7. Determination of acidity in drinking water
8. Determination of organic/inorganic solid in drinking water
9. Determination of pH of soil
10. Determination of N&P (Nitrogen & Phosphorus) of soil
11. To measure the noise level in classroom and industry.
12. To segregate the various types of solid waste in a locality.
13. To study the waste management plan of different solid waste
14. To study the effect of melting of floating ice in water due to global warming

INSTRUCTIONAL STRATEGY
In addition to theoretical instructions, different activities pertaining to Environmental Studies like expert lectures, seminars, visits to green house, effluent treatment plant of any industry, rain water harvesting plant etc. may also be organized.

MEANS OF ASSESSMENT
- Assignments and quiz/class tests, mid-term and end-term written tests

RECOMMENDED BOOKS
1. Environmental and Pollution Awareness by Sharma BR; Satya Prakashan, New Delhi.
2. Environmental Protection Law and Policy in India by Thakur Kailash; Deep and Deep Publications, New Delhi.
3. Environmental Pollution by Dr. RK Khitoliya; S Chand Publishing, New Delhi
4. Environmental Science by Deswal and Deswal; Dhanpat Rai and Co. (P) Ltd. Delhi.
5. Engineering Chemistry by Jain and Jain; Dhanpat Rai and Co. (P) Ltd. Delhi.
6. Environmental Studies by Erach Bharucha; University Press (India) Private Ltd., Hyderabad.
7. Environmental Engineering and Management by Suresh K Dhamija; S K Kataria and Sons, New Delhi.

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B	20%	Unit 3	2nd Internal		
C	60%	Unit 4,5,6,7	FINAL	60%	

1.7   ENGINEERING GRAPHICS

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RATIONALE

Drawing is the language of engineers and technicians. Reading and interpreting engineering drawing is their day to day responsibility. The subject is aimed at developing basic graphic skills in the students so as to enable them to use these skills in preparation of engineering drawings, their reading and interpretation. The emphasis, while imparting instructions, should be to develop conceptual skills in the students following BIS SP 46 – 1988.

Note:

i)   First angle projection is to be followed
ii)   Minimum of 30 sheets to be prepared
iii)   Instructions relevant to various drawings may be given along with appropriate demonstrations, before assigning drawing practice to students
iv)   For better understanding, students should be encouraged to use engineering graph book, and computer based software like Auto CAD for free hand and orthographic projection practice.

LEARNING OUTCOMES

After undergoing the subject, the students will be able to:
* Identify and use of different grades of pencils and other drafting instruments which are used in engineering field
* Draw free hand sketches of various kinds of objects.
* Utilize various types of lines used in engineering drawing.
* Read and apply different dimensioning methods on drawing of objects.
* Use different types of scales and their utilization in reading and reproducing drawings of objects and maps.
* Draw 2 - dimensional view of different objects viewed from different angles (orthographic views)
* Draw and interpret complete inner hidden details of an object which are otherwise not visible in normal view
* Generate isometric (3D) drawing from different 2D (orthographic) views/sketches
* Identify conventions for different engineering materials, symbols, sections of regular objects and general fittings used in Civil and Electrical household appliances
* Use AutoCAD or other drafting software for making fast engineering drawings   and even animating the assembly drawings.

DETAILED CONTENTS

1. Introduction to Engineering Drawing   (4 sheets)

     1.1   Definition of Engineering Drawing, Introduction to drawing instruments, materials, layout and sizes of drawing sheets and drawing boards, engineering graph book, different grades of pencils to be used.

     1.2   Different types of lines in engineering drawing as per BIS specifications

     1.3   Practice of vertical, horizontal and inclined lines

     1.4   Principles of dimensioning: Types, elements, placing, different methods of dimensioning

     1.5   Practice of geometrical figures such as –triangles, rectangles, circles, ellipses and parabola, hexagonal, pentagon with the help of drawing instruments.

     1.6   Definition and classification of lettering, single stroke vertical and inclined lettering at 75^0 (alphabet and numerals)

     1.7   Freehand letter writing and sketches of various kind of objects in graph Sketch book/graph paper.

2. Scales   (2 sheets)

     2.1   Scales-their needs and importance(theoretical instructions), types of scales, definition of Representative Fraction(R.F.) and length of scale.

     2.2   Construction of Plain and diagonal scale.

3. Orthographic Projection   (5 sheets)

     3.1   Theory of orthographic projections (Elaborate theoretical instructions)

     3.2   Projections of points in different quadrants

     3.3   Projection of line (1st angle and 3rd angle)

         3.3.1   Line parallel to both planes

         3.3.2   Line perpendicular to any one of the principal plane

         3.3.3   Line inclined to any one of the principal plane and parallel to other

     3.4   Projection of Solid-Cube, Cuboid, Cone, Prism, pyramid

     3.5   Three views of orthographic projections of different objects (At least one sheet in 3rd angle)

4. Sectioning and Identification of surfaces   (2 sheets)

     4.1   Identifications of surfaces, Importance and salient features of sectioning of objects.

     4.2   Description of full section, half section.

5. Isometric Views   (2 sheets)

     5.1   Fundamental of isometric projections and isometric scale

     5.2   Isometric views of different objects

6 Graphics using CAD   (5 sheets)

  6.1   Meaning, requirement of computer graphics, CAD, screen structure and toolbars in AutoCAD, coordinate system, Drawing Limits, Units.

  6.2   Practice of LINE command, coordinates-Absolute, incremental, polar. POLYLINE, CIRCLE(3P,2P, TTR), ARC, ELLIPSE

  6.3   Using above geometrical commands for making figure e.g. triangle, rectangle, hexagon, pentagon, parabola.

  6.4   Editing commands-Scale, erase, copy, stretch, lengthen and explode.

  6.5   Use of SNAP, GRID and ORTHO mode for selection of points quickly. Use of these modes while picking points in LINE, CIRCLE, PLINE, ARC, ELLIPSE etc commands.

  6.6   Drawing projections of lines and solids.

  6.7   Drawing orthographic projections of different objects (at least 2 sheets)

  6.8   AutoCAD for the isometric views sheets. Making single computer sheet showing all the three views and an isometric (in single split screen view) of any object showing understanding of use of AutoCAD in making isometric views – at least 1 sheet

7 Common Symbols and conventions used in Engineering   (1 sheet)

  7.1   Civil Engineering sanitary fitting symbols

  7.2   Electrical fitting symbols for domestic interior installations

  7.3   Safety symbols used in engineering works

8 Development of surfaces (cylinder, cuboid, cone)   (1 sheet)

  8.1   Parallel line, radial line method

       (The teacher may explain both methods but will use one method in sheet in classroom and other method on sketchbook)

9 Detailed and assembly drawing   (3 sheets)

  9.1   Principle and utility of detailed and assembly drawings

  9.2   Wooden joints i.e. corner mortise and tenon joint, Tee Halving joint, Mitre faced corner joint, Tee bridle joint , crossed wooden joint, cogged joint, dovetail joint, through Mortise and tenon joint, furniture drawing – freehand and with the help of drawing instruments

  9.3   Making Wooden Joint sheets in AutoCAD, rendering & showing assembly animation at least 1 sheet

10 Screw threads and threaded fasteners   (5 sheets)

  10.1   Type of threads-external and internal threads, right and left hand threads (actual conventional representation), Single and multiple start thread.

10.2 Different forms of screw threads –V threads (B.S.W. threads, B.A thread, American National and Metric thread), Square threads (Square, Acme, buttress and Knuckle thread)

10.3 Different views of hexagonal and square nuts. Square and hexagonal headed bolt.

10. 4 Foundations bolts-Rag bolt, Lewis bolt, Curved bolt and eye bolt.

10. 5 Freehand sketches of various types of screws and studs.

11 Keys and Cotters (3 sheets)

11. 1 Various types of keys and cotters - their practical application, drawings of various keys and cotters showing keys and cotters in position.

11. 2 Various types of Joints
-Spigot and Socket Joints
-Gib and cotter joint
-Knuckle joint

12 Couplings (2 sheets)

12.1 Introduction to coupling, their use and types
12.2 Muff coupling
12.3 Flange coupling (protected)
12.4 Flexible Coupling

MEANS OF ASSESSMENT

- Drawing sheets
- Assignments and quiz/class tests

RECOMMENDED BOOKS

1. A Text Book of Engineering Drawing by Surjit Singh; Dhanpat Rai & Co., Delhi
2. Engineering Drawing by PS Gill; SK Kataria & Sons, New Delhi
3. Elementary Engineering Drawing in First Angle Projection by ND Bhatt; Charotar Publishing House Pvt. Ltd., Anand
4. Engineering Drawing I & II by JS Layall; Eagle Parkashan, Jalandhar
5. Engineering Drawing I by DK Goel, GBD Publication.
6. CAD/CAM by J.S.Narang, Dhanpat Rai & Sons Publishers, New Delhi.
7. e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.
8. Engineering Drawing with AutoCAD 2000 by T. Jeyapooran, Vikas Publishing House, Delhi
9. AutoCAD for Engineering Drawing Made Easy by P. Nageswara Rao; Tata McGraw Hill;, New Delhi.

Websites for Reference:
http://swayam.gov.in

Section	Percentage of syllabus to be covered	Units to be covered	Type of assessment	Weightage of Marks	Pass Percentage
A	20%	Unit 1 ,2	1st Internal	40%	40% (Combined in internal & final assessment) with minimum 25% marks in final assessment)
B	20%	Unit 3,4,5	2nd Internal		
C	60%	Unit 6, 7, 8, 9, 10, 11, 12	FINAL	60%	

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RATIONALE

Information technology has great influence on all aspects of 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 using MS Office/Open Office/Libre Office using internet etc.,. This exposure will enable the students to enter their professions with confidence, live in a harmonious way and contribute to the productivity.

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

LEARNING OUTCOMES

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

- Identify Computer hardware components, network components and peripherals.
- Explain the role of an operating System.
- Install system and application software.
- Explain the function of the system components including processor, motherboard and input-output devices.
- Use Word Processing software to prepare document.
- Use spreadsheet software to create workbooks and automate calculation.
- Use presentation software to create interactive presentation.
- Perform fundamental tasks common to most application software including print, save, edit, cut, copy, paste, format, spell and grammar check.
- Find and evaluate information on the Web.
- Install antivirus.
- Safeguard against online frauds, threats and crimes.

TOPICS TO BE EXPLAINED THROUGH DEMONSTRATION

1.   Basic Concepts of IT and Its Application

Information Technology concept and scope, applications of IT. in office, Air and Railway Ticket reservation, Banks financial transactions, E-Commerce and E- Governance applications etc., Ethics of IT, concept of online frauds, threats of IT crimes.

2.   Computer Hardware:

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

3.   Software Concepts:

System software, Application software, Virtualization software and Utility software, Introduction of Operating System, Installation of Window / linux, Features of OPEN OFFICE/MS_OFFICE(MS word, Excel, PowerPoint) .

4.   Internet Concepts:

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

LIST OF PRACTICAL EXERCISES

1.   Given a PC, name its various components and peripherals. List their functions .
2.   Installing various components of computer system and installing system software and application software
3   Installation of I/O devices, printers and installation of operating system viz. Windows/BOSS/ LINUX
4.   Features of Windows as an operating system
    - Start
    - Shut down and restore
    - Creating and operating on the icons
    - Opening, closing and sizing the windows and working with windows interfacing elements (option buttons, checkbox, scroll etc.)
    - Using elementary job commands like – creating, saving, modifying, renaming, finding and deleting a file and folders
    - Changing settings like, date, time, colour (back ground and fore ground etc.)
    - Using short cuts
    - Using on line help

5. Word Processing (MS Office/Open Office)
   a) File Management:
      - Opening, creating and saving a document, locating files, copying contents in some different file(s), protecting files, giving password protection for a file
   b) Page set up:
      - Setting margins, tab setting, ruler, indenting
   c) Editing a document:
      - Entering text, cut, copy, paste using tool-bars
   d) Formatting a document:
      - 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
      - Aligning of text in a document, justification of document, inserting bullets and numbering
      - Formatting paragraph, inserting page breaks and column breaks, line spacing
      - Use of headers, footers: Inserting footnote, end note, use of comments, autotext
      - Inserting date, time, special symbols, importing graphic images, drawing tools
   e) Tables and Borders:
      - Creating a table, formatting cells, use of different border styles, shading in tables, merging of cells, partition of cells, inserting and deleting a row in a table
      - Print preview, zoom, page set up, printing options
      - Using find, replace options
   f) Using Tools like:
      - Spell checker, help, use of macros, mail merge, thesaurus word content and statistics, printing envelops and lables
      - Using shapes and drawing toolbar,
      - Working with more than one window .

6. Spread Sheet Processing (MS Office/Open Office)

   a) Starting excel, open worksheet, enter, edit, data, formulae to calculate values, format data, save worksheet, switching between different spread sheets
   b) Menu commands:
      Create, format charts, organise, manage data, solving problem by analyzing data. Programming with Excel Work Sheet, getting information while working
   c) Work books:
      Managing workbooks (create, open, close, save), working in work books, selecting the cells, choosing commands, data entry techniques, formula creation and links, controlling calculations
      Editing a worksheet, copying, moving cells, pasting, inserting, deletion cells, rows, columns, find and replace text, numbers of cells, formatting worksheet, conditional formatting
   d) Creating a chart:

Working with chart types, changing data in chart, formatting a chart, use chart to analyze data

Using a list to organize data, sorting and filtering data in list

e) Retrieve data with query:

Create a pivot table, customizing a pivot table. Statistical analysis of data

f) Exchange data with other application:

Embedding objects, linking to other applications, import, export document.

7.   PowerPoint Presentation (MS Office/Open Office)

a)   Introduction to PowerPoint
-   How to start PowerPoint
-   Working environment: concept of toolbars, slide layout & templates.
-   Opening a new/existing presentation
-   Different views for viewing slides in a presentation: normal, slide sorter.
b)   Addition, deletion and saving of slides
c)   Insertion of multimedia elements
-   Adding text boxes
-   Adding/importing pictures
-   Adding movies and sound
-   Adding tables and charts etc.
-   Adding organizational chart
-   Editing objects
-   Working with Clip Art
d)   Formatting slides
-   Using slide master
-   Text formatting
-   Changing slide layout
-   Changing slide colour scheme
-   Changing background
-   Applying design template
e)   How to view the slide show?
-   Viewing the presentation using slide navigator
-   Slide transition
-   Animation effects, timing, order etc.
f)   Use of Pack and Go Options.

8.   Internet and its Applications

a)   Establishing an internet connection.
b)   Browsing and down loading of information from internet.
c)   Sending and receiving e-mail
-   Creating a message
-   Creating an address book
-   Attaching a file with e-mail message
-   Receiving a message

- Deleting a message
    d) Assigning IP Addresses to computers and use of domain names.

9. Functioning of Antivirus

    a) Installation and updation of an antivirus.
    b) How to scan and remove the virus.

INSTRUCTIONAL STRATEGY

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

RECOMMENDED BOOKS

1. Fundamentals of Computer by V Rajaraman; Prentice Hall of India Pvt. Ltd., New Delhi
2. Computers Fundamentals Architecture and Organisation by B Ram, revised Edition, New Age International Publishers, New Delhi
3. Computers Today by SK Basandara, Galgotia publication Pvt Ltd. Daryaganj, New Delhi.
4. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
5. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
6. Fundamentals of Information Technology by Leon and Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
7. Fundamentals of Information Technology by Vipin Arora, Eagle Parkashan, Jalandhar

1.9   INTERNET OF THINGS AND ARTIFICIAL INTELLIGENCE

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LEARNING OUTCOMES

At the end of this course, the students will be able to:
- Understand the concepts of Internet of Things
- Build small IoT applications
- Understand and analysing sensor generated data using analytic techniques in Excel

DETAILED CONTENTS

1. Introduction to Internet of Things (IoT)   (8 hrs)
   - Applications, architecture, protocols
   - Characteristics of IoT
   - Physical Design/Logical Design of IoT
   - Functional blocks of IoT, Communication Models.

2. Basics of C language using Arduino IDE   (14 hrs)
   - Understating basics of Arduino IDE
   - Variables, datatype, loops, control statement, function

3 Practical using Arduino-interfacing sensors   (28 hrs)
   i.   Interfacing Light Emitting Diode(LED)- Blinking LED
   ii. Interfacing Button and LED – LED blinking when button is pressed
   iii. Interfacing Light Dependent Resistor (LDR) and LED, displaying automatic night lamp
   iv. Interfacing Temperature Sensor(LM35) and/or humidity sensor (e.g. DHT11)
   v.   Interfacing Liquid Crystal Display(LCD) – display data generated by sensor on LCD
   vi. Interfacing Air Quality Sensor-pollution (e.g. MQ135) - display data on LCD , switch on LED when data sensed is higher than specified value.
   vii. Interfacing Bluetooth module (e.g. HC05)- receiving data from mobile phone on Arduino and display on LCD
   viii. Interfacing Relay module to demonstrate Bluetooth based home automation application. (using Bluetooth and relay).

4 Introduction to Artificial Intelligence (AI), Machine Learning (ML), Deep   (20 hrs)
   Learning (DL).
   - Role of AI in IoT and its applications
   - Managing and Analysing data generated by IoT devices – Big Data
   - Machine learning (ML) Techniques e.g. classification, linear regression, etc.
   - Numerical based on above techniques.
   - Understanding excel for analysing data

INSTRUCTIONAL STRATEGY

Since this subject is practical oriented, the teacher should demonstrate functioning of various sensors and demonstrate building of IoT applications. Solution to various regression and classification problems should also be built.

LIST OF REFERENCE BOOKS:

1. Vijay Madisetti, Arshdeep Bahga, "Internet of Things: A Hands On Approach, University Press
2. Yashavant Kanetkar, Shrirang Korde, "21 Internet Of Things (IOT) Experiments"
3. Neerparaj Rai , "Arduino Projects For Engineers"
4. Chandra S.S.V, "Artificial Intelligence and Machine Learning"

LIST OF COMPONENTS
1. One kit for 3-4 students : Arduino Uno, sensors(Bluetooth module(HC05), MQ135, DHT11, breadboard , LCD, 2-relay module etc)
2. Consumables : LED, button, connecting wires, LDR, LM35, battery, etc

1.10   GENERAL WORKSHOP PRACTICE

(Common for   Mechatronics Engineering, Medical Electronics, Electrical Engineering, Electronics and Communication Engineering,   Electrical & Electronics Engineering, , Instrumentation & Control Engineering, Computer Engineering, Food Technology, Chemical Engineering, Chemical Engineering (Pulp & Paper), Ceramic Engineering)

L T P
- - 3

SCHEDULING

The students will visit the different workshops in two major rounds in a year. In 1st round, they will learn basic skills of each workshop and in 2nd round, they will refine their skills further**.**

RATIONALE

In order to have a balanced overall development of diploma engineers, it is necessary to integrate theory with practice. General workshop practices are included in the curriculum in order to provide hands-on experience about use of different tools and basic manufacturing practices. This subject aims at developing general manual and machining skills in the students. In addition, the development of dignity of labour, safety at work place, team working and development of right attitude are the other objectives.

LEARNING OUTCOMES

After completing the course, the students will be able to:

- Identify tools and equipment used and their respective functions.
- Identify different types of materials and their basic properties.
- Use and take measurements with the help of basic measuring tools/equipment.
- Select materials, tools, and sequence of operations to make a job as per given specification/drawing.
- Prepare simple jobs independently and inspect the same.
- Inspect visually to identify various types of defects in different type of materials.
- Follow safety procedures and precautionary measures.
- Use safety equipment and Personal Protection Equipment(PPE).
- Maintain good housekeeping practices.

DETAILED CONTENTS (PRACTICAL EXERCISES)

1st ROUND

Workshop Safety Induction Session:

First turn of each shop shall be dedicated to safety practices and the contribution of safety to quality. The safety aspects should be categorised into 3 categories
- PSS (Process Safety System)
- SSS (Safety Shutdown System)
- ESD (Emergency Shutdown) or Emergency Depressurisation System.

The following practices should be included:
- Use of PPE (Personal Protection Equipment)
- Use of Safety Equipment like fire extinguishers etc.)
- Paramedic teaching suite, First –Aid
- Reports to be prepared for the damages
- At the end of this session, the student must sign "Student Safety Declaration form".

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.

The following shops are included in the syllabus:
1. Welding Shop – I
2. Fitting Shop – I
3. Sheet Metal Shop – I
4. Electric Shop – I
5. Electronic Shop – I

1. WELDING SHOP - I

1.1 Introduction and importance of welding process as compared to other material joining processes. Specifications and type of ARC welding machines, parts identification, classification, selection and coding of electrodes, welding parameters, welding joints and welding positions. Common weldable Materials, safety precautions, use of PPEs, welding screens, Hazards and remedies during welding, Elementary symbolic representations, demo of types of welding defects.

1.2 Jobs to be prepared

Job I   Practice of striking arc (Minimum 4 continuous beads on 100 mm long M.S. flat).

Job II   Practice of depositing beads on plate at different current levels. (Minimum 4 beads on M.S. plate at four setting of current level and differentiating their characteristics).

Types of joints and their edge preparations:

Job III Preparation of lap joint using arc welding process.

Job IV   Preparation of butt joint using arc welding process. (100 mm long).

Job V   Preparation of T Joint using arc or gas welding (100mm x 6 mm M.S. Flat).

2. FITTING SHOP – I

2.1 Introduction and Practical Importance of fitting jobs
2.2 Basic deburring processes.
2.3 Introduction to fitting shop tools, marking and measuring devices/equipment.
2.4 Identification of materials. (Iron, Copper, Stainless Steel, Aluminium etc.)
2.5 Identification of various steel sections (flat, angle, channel, bar etc.).

2.6 Introduction to various fitting shop operations/processes (Hacksawing, Drilling, Chipping and Filing). Demonstration of wrong fitting practices causing damage to filed surfaces (outsized, out angled etc.) and tool/blade breakages.

2.7 Jobs to be prepared:

Job I   Marking of job, use of marking tools and various types of files, use of tri square, surface plate, filing and use of measuring instruments. (zero error and least count of Vernier calliper, Micrometer and Vernier height gauge).

Job II   Filing a rectangular/square piece to maintain dimensions within an accuracy of ±0.5 mm.

Job III Making a cut-out from a square piece of MS flat using hand hacksaw and chipping.

3.   SHEET METAL SHOP – I

3.1.   Introduction and practical importance of sheet metal jobs, use of hand tools and accessories e.g. different types of hammers, hard and soft mallet, sheet and wire gauge, necessary allowance required during job fabrication, selection of material.

3.2   Introduction and demonstration of hand tools used in sheet metal shop.

3.3   Introduction and demonstration of various machines and equipment used in sheet metal shop e.g. Shearing Machine, Bar Folder, Burring Machine, Turning Machine, Wiring Machine, Setting Down Machine, Forming Machine, Brake etc.

3.4   Introduction and demonstration of various raw materials used in sheet metal shop e.g. black-plain sheet, galvanized-iron plain sheet, galvanised corrugated sheet, aluminium sheet etc.

3.5   Study of various types of nuts, bolts, rivets, screws etc.

Job I   Shearing practice on a sheet using hand shears.

Job II   Prepare a seam joint of G.I. Sheet

Job III Practice on making Single riveted lap joint/Double riveted lap Joint.

Job IV   Development of sheet for preparation of cubical container (300x150x25 mm)

4.   ELECTRIC SHOP – I

4.1   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.

4.2   Study of electrical safety measures and protective devices.

Job I   Identification of phase, Neutral and Earth wires for connection to domestic electrical appliances and their connections to three pin plugs. Difference between series and parallel wiring.

Job II   Carrying out house wiring circuits using fuse, switches, sockets, ceiling rose etc. in batten or P.V.C. casing-caping. Demo of conduit wiring through junctions

Job III To prepare a three level Godown wiring circuit with PVC conduit wiring system.

4.3   Introduction to the construction of lead acid battery, its working and its specification parameters(maH, sp gravity), precautions while handling battery, Introduction to battery charger and its functioning. Types of charging

   Job IV   Installation of battery and connecting two or three batteries in series and parallel and its effect. Charging a battery and testing with hydrometer and cell tester

4.4   Introduction to solar energised lighting or water heater system and their defects.

   Job V   Installation of Solar cells, costing according to capacity

5.   ELECTRONIC SHOP – I

Safety precautions to be observed in the Electronics Shop:
Identification and familiarization with the following tools used in electronic shop such as Tweezers, Screw drivers (different sizes), Insulated Pliers, Cutter, Sniper, Screw Driver (Star Screw Driver), L- Keys, Soldering Iron, soldering wire, flux . Their demonstration and uses.
Identification, familiarization and uses of commonly used components; active and passive components; colour code and types of resistor and potentiometers, Diode, Transistor, LED, LDR, SCR, TRIAC,DIAC, Thermistor etc.
Identification, familiarization, demonstration and use of the following electronic instruments:
a)   Analog multimeter
b)   Digital multimeter

Identification, familiarization, demonstration and use of the following electronic instruments:
a) Simple CRO, function of every knob on the front panel
b) Power supply, fixed voltage and variable voltage, single output as well as dual output.
 c) Function generator
Job I   Practice in the use of above mentioned tools and instruments. For this a small experimental set up may be done

2ND ROUND

LEARNING OUTCOMES

After undergoing the subject, the students will be able to:
- Follow safety procedures and measures.
- Maintain good housekeeping practices.
- Select materials, sequence of operations, select tools to make a given job based on interpretation of drawing as per given specification with close tolerances using at least the resources of three shops.
- Prepare a job using resources of shops and compare the job with the specifications given.
- Specify and read/understand specifications of different types of tools, equipment and machines used in various shops.
- Inspect visually to identify various types of defects in different type of materials.
- Analyze a given job and identify various operations required to make it.

DETAILED CONTENTS (PRACTICAL EXERCISES)

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.

The following shops are included in the syllabus.
1.   Electric Shop – II
2.   Electronic Shop – II
3.   Computer Shop

1.   ELECTRIC SHOP- II

1.1   Introduction to single phase and three phase supply and wiring system. Importance of three phase supply (RYB)& its sequence and wiring system.

Job I   Connecting Generator and 3 phase wiring through Change over Switch.

1.2   Estimating and costing of power consumption

Job II   Connecting single phase energy meter with supply and load. Reading and working out power consumption and cost of energy.

1.3   Study of internal wiring diagram of common electrical appliances such as auto electric iron, electric kettle, ceiling/table fan, desert cooler etc. Demonstration of dismantling, servicing and reassembling of table/ceiling fan, air-cooler, auto electric iron, heater etc.

Job III   Dismantling, servicing and reassembling of any of the above electrical appliances, finding faults with series testing lamp and multimeter.

1.4   Testing and reversing direction of rotation of single phase and three phase motors.

Job IV   Acceptance Testing of single phase/three phase motors by using voltmeter, ammeter and tachometer.

Job V   Reversing direction of rotation of single phase and three phase motors.

1.5   Identification and familiarisation with the following tools:

Tweezers, Screw Drivers (Different sizes), Insulated pliers, Cutters, Sniper, Philips Screw driver (star screw driver), L-Keys, Soldering Iron and their demonstration and uses.

Job VI   Practice on joining using soldering flux and removing components/wires by desoldering

2.   ELECTRONIC SHOP - II

Various types of protective devices such as : wire fuse, cartridge fuse etc. ,

Demonstrate the joining (or connecting) methods/mounting and dismantling method, as well as uses of the items mentioned below:

a) 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.

b) Various types of switches such as: normal/miniature toggle, slide, push button piano key, rotary, SPST, SPDT, DPST, DPDT, band selector, multi-way Master Mains Switch.

Job-I   Cut, bend, tin component, leads, inserts. Solder components e.g. resistor, capacitor, diodes, transistors on a PCB

Job-II   Wiring of a small circuit on a PCB/tag strip involving laying, sleeving and use of identifier tags

Job-III   De-soldering practice with de-soldering pump and with de-soldering wick.

Job-IV   Cut, strip, join and insulate two lengths of wires/cables (repeat with different types of cables/ wires)

3.   COMPUTER SHOP
EXERCISE– I

3.1   Keyboard
- Types of Keyboards
- Interfacing (PS2, USB port, DIN connector)
- Working
- Repairing

3.2   Mouse
- Types of Mouse
- Interfacing (serial, PS2, USB)
- Working

EXERCISE – II

3.3   Printers
- Types (Dot matrix, Inkjet, Laserjet)
- Interfacing (parallel port, USB port, Networking)
- Working
- Maintenance (cartridge change etc)
- Installation of printers
- Troubleshooting (Driver compatibility, Paper jam, printing problems due to uncleaned drum in laserjet printers, belt related problems in inkjet printer, jets choking problem in inkjet printer, color alignment problem).
- Tracing network printer and sharing it.

EXERCISE – III

3.4   Scanner
- Types
- Interfacing
- Scanning a document

3.5   Monitor

- Types and Interfacing
- Fault finding and repairing

EXERCISE – IV
3.6   CPU

- Motherboard connection (dimensions, processor, chipset, BIOS, EFI (Extended Firmware Interfacing), UFI (Unified Firmware Interfacing).
- SMPS-AT
  – Working
  – Voltage levels
  – Fault finding and repair

EXERCISE - V
3.7   Optical Devices
- CD-R, DVD, CD-W
- Working
- Copying
- CD/DVD drives
- Pen drive (copying data, formatting scanning)

3.8   Microphones and Speakers
- Types and Interfacing

EXERCISE – VI
3.9   Projectors
- Types
- Settings
- Interfacing
3.10   Hard disks
- Different makes of Hard disks
- Retrieval of Hard disk data

3.11   Graphic Card connection
3.12   Sound Card Connection
EXERCISE – VII
3.13   Different types of network interface cards, cables such as data cables, printer cables, network cables, power cables etc.
3.14   Networking tools such as cutter, connector (RJ45)
3.15   Network Cable
- Straight Cable
- Cross Cable
- Roll Cable

EXERCISE – VIII
3.16   Types of cables
- UTP Cables: CAT3, CAT5, CAT6, CAT7

- Fibre optic cable
- Structured cabling

MEANS OF ASSESSMENT

- Workshop jobs
- Report writing, presentation and viva voce

RECOMMENDED BOOKS
1. Workshop Technology I,II,III, by SK Hajra, Choudhary and AK Choudhary; Media Promoters and Publishers Pvt. Ltd. Mumbai.
2. Workshop Technology Vol. I, II, III by Manchanda; India Publishing House, Jalandhar.
3. Workshop Training Manual Vol. I, II by S.S. Ubhi; Katson Publishers, Ludhiana.
4. Manual on Workshop Practice by K Venkata Reddy; MacMillan India Ltd., New Delhi
5. Basic Workshop Practice Manual by T Jeyapoovan; Vikas Publishing House (P) Ltd., New Delhi
6. Workshop Technology by B.S. Raghuwanshi; Dhanpat Rai and Co., New Delhi
7. Workshop Technology by HS Bawa; Tata McGraw Hill Publishers, New Delhi
8. e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:
http://swayam.gov.in

THIRD SEMESTER

L T P
3 - 6

RATIONALE

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. In order to enable the students use the computers effectively in problem solving, this course offers the modern programming language C along with exposition to various applications of computers. The knowledge of C language will be reinforced by the practical exercises.

LEARNING OUTCOMES

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

- Identify the problem and formulate an algorithm for it.
- Identify various control structures and implement them.
- Identify various types of variables.
- Use pointer in an array and structure.
- Use structures and union for handling data.
- Explain the concepts of C programming language
- Explain and implement the language constructs concepts
- Install C software on the system and debug the programme
- Explain and execute member functions of C in the programme
- Describe and implement array concept in C programme
- Describe and execute pointers

DETAILED CONTENTS

1. **Algorithm and Programming Development**   (04 Periods)

    1.1   Steps in development of a program
    1.2   Flow charts, Algorithm development
    1.3   Programme Debugging

2. **Program Structure**   (08 Periods)

    2.1   I/O statements, assign statements
    2.2   Constants, variables and data types
    2.3   Operators and Expressions
    2.4   Unformatted and Formatted IOS
    2.5   Data Type Casting

3.   Control Structures   (08 Periods)

      3.1   Introduction
      3.2   Decision making with IF – statement
      3.3   IF – Else and Nested IF
      3.4   While and do-while, for loop
      3.5   Break. Continue, goto and switch statements

4   Pointers   (06 Periods)
      4.1.   Introduction to pointers
      4.2   Address operator and pointers
      4.3   Declaring and initializing pointers,
      4.4   Single pointer,

5.   Functions   (08 Periods)

      5.1   Introduction to functions
      5.2   Global and Local Variables
      5.3   Function Declaration
      5.4   Standard functions
      5.5   Parameters and Parameter Passing
      5.6   Call - by value/reference

6.   Arrays and Strings   (06 Periods)

      6.1.   Introduction to Arrays
      6.2.   Array Declaration, Length of array
      6.3   Single and Multidimensional Array.
      6.4   Arrays of characters
      6.5   Introduction of Strings
      6.6   String declaration and definition
      6.7   String Related function i.e. strlen, strcpy, strcmp
      6.8   Passing an array to function
      6.9   Pointers to an array and strings.

7.   Structures and Unions   (08 Periods)

      7.1   Declaration of structures
      7.2   Accessing structure members
      7.3   Structure Initialization
      7.4   Pointer to a structures,
      7.5   Unions

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 and their return type values.
6. Programming exercises using if statement.
7. Programming exercises using if – Else.
8. Programming exercises on switch statement.
9. Programming exercises on do – while, statement.
10. Programming exercises on for – statement.
11. Simple programs using pointers.
12. Programs on one-dimensional array.
13. Programs on two-dimensional array.
14. (i) Programs for putting two strings together.
    (ii) Programs for comparing two strings.
15. Simple programs using functions
16. Simple programs using structures.
17. Simple programs using union.

INSTRUCTIONAL STRATEGY

The subject is totally practical based. Students should be given clear idea about the basic concepts of programming. In practical session student should be asked to draw flow chart, write algorithm and then write program for the algorithm and run on computer. It is required that students should maintain records (files with printouts).

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work, exercises and viva-voce
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1. Let us C by Yashwant Kanetkar
2. Programming in ANSI C by E Balaguruswami, , Tata McGraw Hill Education Pvt Ltd , New Delhi
3. Problem Solving and Programming in C by RS Salaria, Khanna Book Publishing Co(P) Ltd. New Delhi
4. Programming in C by Reema Thareja; Oxford University Press, New Delhi
5. Programming in C by Gottfried, Schaum Series, , Tata McGraw Hill Education Pvt Ltd , New Delhi
6. Exploring C by Yashwant Kanetkar; BPB Publications, New Delhi
7. Programming in C by R Subburaj, Vikas Publishing House Pvt. Ltd., Jangpura, New Delhi
8. Elements of C by M.H. Lewin, Khanna Publishers, New Delhi
9. Programming in C by Stephen G Kochan

10. Programming in C by BP Mahapatra, Khanna Publishers, New Delhi
11. Programmming in C : A Practical Approach by Ajay Mittal, Pearson Publication
12. e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:

http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1	04	08
2	08	16
3	08	16
4	06	12
5	08	20
6	06	12
7	08	16
Total	**48**	**100**

L T P

3 - 3

RATIONALE

The course provides the students with an understanding of human computer interface existing in computer system and the basic concepts of operating system and its working. The students will also get hands-on experience and good working knowledge to work in windows and Linux environments. The aim is to gain proficiency in using various operating systems after undergoing this course. While imparting instructions, the teachers are expected to lay more emphasis on concepts and principles of operating systems, its features and practical utility.

LEARNING OUTCOMES

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

- Describe various types and services of operating system
- Identify the concept of process, various states in the process and their scheduling.
- Classify different types of schedulers and scheduling algorithms.
- Identify the significance of inter-process communication and synchronization.
- Describe deadlock and the various ways to recover from deadlock
- Identify memory management techniques
- Describe virtual memory and its underlying concepts.
- Describe the features and brief history of Linux
- Use General purpose commands and filters of Linux
- Use of shell scripts in Linux

DETAILED CONTENTS

1.   Overview of Operating Systems   (09 Periods)

Definition of Operating Systems, Types of Operating Systems, Operating System Services, User operating system interface, System Calls, Types of System Calls, System Programs, Operating System Structure, Virtual Machine, Benefits of Virtual Machine

2.   Process Management (Principles and Brief Concept)   (09 Periods)

Process concept, Process State, Process Control Block, Scheduling Queues, Scheduler, Job Scheduler, Process Scheduler, Context Switch, Operations on Processes, Interprocess Communication, Shared Memory Systems, Message-Passing Systems, CPU Scheduler, Scheduling Criteria, Scheduling Algorithms, Preemptive and Non Preemptive, First come first serve (FCFS), Shortest Job first (SJF), Round Robin (RR), Multiprocessor scheduling, Process Synchronization.

3.   Deadlocks (Principles and Brief Concept)   (04 periods)

Deadlock, Conditions for Dead lock, Methods for handling deadlocks, Dead   Prevention,   Deadlock Avoidance, Deadlock detection, Recovery from deadlock.

4.   Memory Management Function (Principles and Brief Concept)   (09 periods)

Definition – Logical and Physical address Space, Swapping, Memory allocation,   Contiguous Memory allocation, Fixed and variable partition, Internal and External   fragmentation   and   Compaction, Paging – Principle of operation, Page allocation,   Hardware   support   for   paging, Protection and   sharing, Disadvantages of paging,   Segmentation, Virtual Memory.

5.	I/O Management Functions (Principles and Brief Concept)	(04 periods)

Dedicated Devices, Shared Devices, I/O Devices, Storage Devices, Buffering,	Spooling.

6.	File Management (Principles and Brief Concept)	(04 periods)

Types of File System; Simple file system, Basic file system, Logical file system,	Physical	file system, Various Methods of Allocating Disk Space

7.	Linux Operating System	(09 Periods)

History of Linux and Unix, Linux Overview, Structure of Linux, Linux releases, Open Linux, Linux System Requirements, Linux Commands and Filters: mkdir, cd,rmdir,pwd, ls, who, whoami, date, cat,chmod, cp, mv, rm,pg,more, pr, tail, head, cut, paste, nl, grep, wc, sort, kill, write, talk,mseg,wall, merge,mail, news Shell: concepts of command options, input, output,redirection,pipes, redirecting and piping with standard errors, Shell scripts,vi editing commands

LIST OF PRACTICALS
1.	Demonstration of all the controls provided in windows control panel.
2.	Exercise on Basics of windows.
3.	Installation of Linux Operating System
4.	Usage of directory management commands of Linux: ls, cd, pwd, mkdir, rmdir
5.	Usage of File Management commands of Linux: cat, chmod,cp, mv, rm, pg, more, find
6.	Use the general purpose commands of Linux: wc, od, lp, cal , date, who, whoami
7.	Using the simple filters: pr, head, tail, cut, paste, nl, sort
8.	Communication Commands: news, write, talk, mseg, mail, wall
9.	Write a shell program that finds the factorial of a number.
10.	Write a shell program that finds whether a given number is prime or not.
11.	Write a shell program to find the average of three numbers.
12.	Write a shell program that will convert all the text of the file from lowercase to uppercase.

INSTRUCTIONAL STRATEGY
This subject is both theory and practical oriental. Therefore, stress must be given on particulars along with theory. Laboratory must have windows as well as Linux operating system. Concepts of O.S. must be taught practically.

MEANS OF ASSESSMENT
- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work exercises and viva-voce
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS
1.	Operating System Concepts by Silberschatz, Galvin; Wiley Publication
2.	Operating Systems by Stallings; Tata McGraw Hill.
3.	Operating Systems- A Concept Based Approach by DhamDhare; Tata McGraw Hill Education Pvt Ltd , New Delhi
4.	Operating Systems by Achyut S Godbole and AtulKahate; Tata McGraw Hill Education Pvt Ltd , New Delhi
5.	Unleashed Linux by Tech Media Publishers, New Delhi
6.	e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1.	09	15
2.	09	20
3.	04	10
4	09	20
5	04	10
6	04	10
7	09	15
Total	**48**	**100**

L T P
3 - 3

RATIONALE

This course has been designed to make the students know about the fundamental principles of digital electronics and gain familiarity with the available IC chips. This subject aims to give a background in the broad field of digital systems design and microprocessors.

LEARNING OUTCOMES

After undergoing the subject, student will be able to:

- Explain the importance of digitization.
- Verify and interpret truth tables for all logic gates.
- Realize all logic functions with NAND and NOR gates
- Design half adder and full adder circuit
- Demonstrate and design 4-bit adder, 2's complement subtractor
- Verify and interpret truth tables for all flip flops.
- Verify and interpret truth tables of multiplexer, demultiplexer, encoder and decoder ICs
- Design and realize different asynchronous and synchronous counters
- Design 4-bit SISO, PISO, SIPO, PIPO shift registers
- Explain the features and applications of different memories.
- Verify performance of different A/D and D/A converters.

DETAILED CONTENTS

1.   Introduction   (02 Periods)

    a)   Distinction between analog and digital signal.
    b)   Applications and advantages of digital signals.

2.   Number System   (03 Periods)

    a)   Binary, octal and hexadecimal number system: conversion from decimal and hexadecimal to binary and vice-versa.
    b) Binary addition and subtraction including binary points. 1's and 2's   complement   method   of addition/subtraction.

3.   Codes and Parity   (03 Periods)

    a)   Concept of code, weighted and non-weighted codes, examples of 8421, BCD, excess-3 and Gray code.

    b)   Concept of parity, single and double parity and error detection

4.   Logic Gates and Families   (05 Periods)

    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.
    (c)   Introduction to TTL and CMOS logic families

5.   Logic Simplification   (04 Periods)

    a)   Postulates of Boolean algebra, De Morgan's Theorems. Implementation of Boolean (logic) equation with gates

    b)   Karnaugh map (upto 4 variables) and simple application in developing combinational logic circuits

6.   Arithmetic circuits   (02 Periods)

   a)   Half adder and Full adder circuit, design and implementation.
   b)   4 bit adde circuit

7.   Decoders, Multiplexeres, De Multiplexeres and Encoder   (04 Periods)

   a)   Four bit decoder circuits for 7 segment display and decoder/driver ICs.
   b)   Basic functions and block diagram of MUX and DEMUX with different ICs
   c)   Basic functions and block diagram of Encoder

8.   Latches and flip flops   (04 Periods)

   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

9.   Counters   (06 Periods)

   a)   Introduction to Asynchronous and Synchronous counters
   b)   Binary counters
   c)   Divide by N ripple counters, Decade counter, Ring counter

10.   Shift Register   (06 Periods)

   Introduction and basic concepts including shift left and shift right.

   a)   Serial in parallel out, serial in serial out, parallel in serial out, parallel in parallel out.
   b)   Universal shift register

11.   A/D and D/A Converters   (06 Periods)

   -   Working principle of A/D and D/A converters
   -   Brief idea about different techniques of A/D conversion and study of :
         •   Stair step Ramp A/D converter
         •   Dual Slope A/D converter
         •   Successive Approximation A/D Converter
   -   Detail study of :
         •   Binary Weighted D/A converter
         •   R/2R ladder D/A converter
   -   Applications of A/D and D/A converter.

12.   Semiconductor Memories   (03 periods)
         Memory organization, classification of semiconductor memories (RAM, ROM, PROM, EPROM,
         EEPROM), static and dynamic RAM, introduction to 74181 ALU IC

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.   Realisation 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.   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).
5   Verification of truth table for encoder and decoder ICs, Mux and DeMux

6.   To design a 4 bit SISO, SIPO, PISO, PIPO shift registers using JK/D flip flops and   verification   of their operation.

7.   To design a 4 bit ring counter and verify its operation.

8.   Use of Asynchronous Counter ICs (7490 or 7493)

Note: Above experiments may preferably be done on Bread Boards.

INSTRUCTIONAL STRATEGY

The digital systems in microprocessors have significant importance in the area of electronics. Adequate competency needs to be developed by giving sufficient practical knowledge in microprocessors (programming as well as interfacing), A/D, D/A Converters and other topics. Help may be taken in the form of charts, simulation packages to develop clear concepts of the subject. Programming exercises other than the tested in circulation may be given to the students.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests, model/prototype making
- Actual laboratory and practical work, model/prototype making, assembly and disassembly exercises and viva-voce

RECOMMENDED BOOKS

1.   Digital Electronics and Applications by Malvino Leach, Tata McGraw Hill Education Pvt Ltd, New Delhi

2.   Digital Logic Designs by Morris Mano, Prentice Hall of India, New Delhi

3.   Digital Electronics by Soumitra Kumar Mandal, Tata McGraw Hill Education Pvt Ltd,

4.   Digital Electronics by V K Sangar , Raj Publishers, Jalandhar

5.   Digital Electronics by Tokheim, Tata McGraw Hill Education Pvt Ltd,

6.   Digital Fundamentals by Thomas Floyds, Universal Book Stall

7.   Digital Electronics by RP Jain, Tata McGraw Hill Education Pvt Ltd, New Delhi

8.   Digital Electronics by KS Jamwal, Dhanpat Rai and Co., New Delhi

9.   Digital Electronics by Yashpal and Sanjeev Kumar; North Publication, Ambala City

10.   Digital Electronics by BR Gupta, Dhanpat Rai & Co., New Delhi

11.   Digital Systems: Principles and Applications by RJ Tocci, Prentice Hall of India, New Delhi

12.   Digital Electronics by Rajaraman V., Prentice Hall of India, New Delhi

13.   Fundamentals of Digital Electronics by Naresh Gupta, Jain Brothers, New Delhi

14.   e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:
        http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allocation (%)
1.	02	04
2.	03	05
3.	03	05
4.	05	10
5.	04	10
6.	02	05
7.	04	10
8.	04	10
9	06	12
10.	06	12
11.	06	12
12	03	05
Total	**48**	**100**

RATIONALE

This subject aims to develop a clear understanding of What is multimedia?, and how it can be used for enhancing teaching instruction methodologies, business and personal communications. It will help the students in understanding technical aspects of multimedia content creation, the processes and tools used for designing multimedia systems. This will make the students proficient in designing and developing an multimedia application.

LEARNING OUTCOMES

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

- Define and describe multimedia functions.
- Identify and explain the devices, hardware and software system.
- Operate and design in graphics.
- Use photo-shop software for drawing and editing photos.
- Identify the tools to create animations,
- Reduce the size of various file formats i.e. audio, video and text.

DETAILED CONTENTS

1.   Introduction to Multimedia Systems   (12 Periods)

Concept of Multimedia, History of Multimedia, Multi media hardware and software-various classes, components, Quality criteria and specifications of different capturing devices, Communication devices, Storage devices, Display devices, Elements of Multimedia and different multimedia file formats, Applications of multimedia – benefits and problems.

2.   Content and Project Planning, Designing and development   (12 Periods)

Planning steps and process, Concept of data compression, Text encoding, Audio encoding techniques, Types of images, Capturing images using camera/scanner, coding techniques for Moving Images, Editing , Editing of images audio, text, video and graphics, navigation and user interface designing, Use of various codes like bar code, QR code in multimedia applications.

3.   Using Image Processing Tools   (12 Periods)

Photo-shop workshop, image editing tools, specifying and adjusting colors, using gradient tools, selection and move tools, transforming path drawing and editing tools, using channels, layers, filters and actions

4.   Multimedia Authoring Tools   (12 Periods)

Types of Authoring programmes – Icon based, Time based, Story boarding/scripting and object oriented working in macromedia flash, exploring interface using selection of PEN tools. Working with drawing and painting tools, applying colour viewing and manipulating time line, animating, processing, guiding layers, importing and editing sound and video clips in flash

LIST OF PRACTICALS

1. Installation of various multimedia software like Photoshop, Flash, Director or any open source software
2. Installing and use of various multimedia devices

   - Scanner

   - Digital camera, web camera

   - Mike and speakers

   - Touch screen

   - Plotter and printers

   - DVD

   - Audio CD and Video CD

3. Reading and writing of different format on CD/DVD

4. Transporting audio and video files

5. Using various features of Flash

6. Using various features of Photo-shop/GIMP

7. Making multimedia presentations combining, Flash, Photo-shop, such as department profile, lesson presentation, games and project presentations.

8. Generation and recognition of bar code & QR code using pre built application/mobile applications.

INSTRUCTIONAL STRATEGY

As the subject is practice oriented, more stress should be given to students to do the work practically. The features of software packages Photo-shop, Flash are to be demonstrated in class using LCD projector.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work, exercises and viva-voce
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1. Principles of Multimedia by Parikh, Tata McGraw Hill Education Pvt Ltd , New Delhi

2. Multimedia Technologies by Banerji,Tata McGraw Hill Education Pvt Ltd , New Delhi

3. Multimedia An Introduction by Villam Casanova and Molina; Prentice Hall of India, New Delhi

4. Multimedia Bible by Win Rosch

5. Multimedia Making it work by Vaughan, Tay

6. Photo-shop for Windows Bible by Deke Maclelland IDG Books India Pvt. Ltd., New Delhi

7. Multimedia Technology and Application by Hillman, Galgotia Publications, New Delhi

8. Flash 5 Bible by Rein Hardit, IDG Books India Pvt. Ltd.

9. Flash 5 in easy steps by Vandome IDG Books India Pvt. Ltd.

10. Fundamentals of Multimedia by Li and Drew, Pearson Publications.

11. e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

12. **Websites for Reference:**

 http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1	12	22
2	12	28
3	12	24
4	12	26
Total	**48**	**100**

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RATIONALE

Data Communication Course is intended to provide practical exposure and awareness of existing and upcoming Communication technologies

LEARNING OUTCOMES

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

- Identify various network
- Differentiate Analog and Digital system
- Identify various types of transmission media
- Identify slow/fast transmission media
- Identify incorrect data from various sources

DETAILED CONTENTS

1. Introduction   (07 periods)

    Data Communication- Components, Data representation, Data flow
    Networks- Distributed processing, Network criteria , Physical structures
    Network Category- LAN, WAN, MAN

2. Data and Signals   (10 periods)

    Analog and Digital data, Analog and digital signals, Periodic and Non Periodic signals, periodic analog signals

    Digital Signals- Bit rate, Bit length, Digital signal as a composite analog signal, transmission of digital signals
    Transmission Impairment- Attenuation, Distortion and noise
    Performance- bandwidth, throughput, latency, jitter

3. Digital and Analog Transmission   (10 periods)

    Analog transmission- Digital to Analog Conversion- ASK, PSK, FSK
    Analog to Analog Conversion- AM, PM,FM(No mathematical treatment)
    Digital transmission- Digital to digital conversion- coding and schemes
    Analog to digital conversion- PCM and Delta Modulation (DM)
    Transmission modes- Serial and parallel transmission

4. Multiplexing – FDM, WDM, TDM   (07 periods)

5. Transmission media   (07 periods)

Guided media-Twisted pair cable, Co-axial cable, fibre optics cable
Unguided Media- radio wave, Microwave, Infrared

6. Error Detection and Correction   (07 periods)

Types of Errors, redundancy, detection v/s correction, Forward error correction v/s retransmission.
Error detection through Parity bit, block parity to detect double errors and correct single errors.
General principles of error detection and correction using cyclic redundancy check

INSTRUCTIONAL STRATEGY

Explanation of basic concept of data communication and all entities involved need to be elaborated precisely by the teacher with the emerging technologies. The topics should be clarified diagrammatically as well as with help of multimedia presentations.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work, exercises and viva-voce

RECOMMENDED BOOKS
1.   Data Communication and Networking by Forouzan; Tata McGraw Hill
2.   Computer Networking by Tanenbaum; Prentice Hall of India, New Delhi
3.   Data and Computer Communication by William Stalling
4.   Data Communication by PS Gupta
5.   Computer Communication and Networking by John Freer
6.   e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:

        http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (in Periods)	Marks Allotted (%)
1.	07	15
2.	10	20
3.	10	20
4.	07	15
5.	07	15
6.	07	15
Total	**48**	**100**

SOFT SKILLS – I

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RATIONALE

The present day world requires professionals who are not only well qualified and competent but also possess good communication skills. The diploma students not only need to possess subject related knowledge but also soft skills to get good jobs or to rise steadily at their work place. The objective of this subject is to prepare students for employability in job market.

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

- Identify components of effective verbal communication
- Prepare a report
- Learn the techniques of enhancing memory
- Set goals for overall personality development
- Understand the concept of quality and its implementation in an organisation.

DETAILED CONTENTS

- Soft Skills - Concept and Importance
- Communication Skills- Improving verbal communication
- Report Writing
- Method to enhance memory and concentration
- Component of overall personality- Dressing sense/etiquettes/body language etc.

In addition, the students must participate in the following activities to be organized in the institute.

- Sports
- NCC/NSS
- Camp – Blood donation
- Cultural Event

Note : Extension Lectures by experts may be organized. There will be no examination for this subject.

FOURTH SEMESTER

4.1   DATA STRUCTURES USING C

L T P

3 - 6

RATIONALE

Data structures are the techniques of designing the basic algorithms for real-life projects. Understanding of data structures is essential and this facilitates the understanding of the language. The practice and assimilation of data structure techniques is essential for programming. The knowledge of 'C' language and data structures will be reinforced by practical exercises during the course of study. The course will help students to develop the capability of selecting a particular data structure.

LEARNING OUTCOMES

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

- Identify the problem and formulate an algorithm for it.
- Identify the best data structures to solve the problem
- Store data, process data using appropriate data structures
- Sort the data in ascending or descending order.
- Implement trees and various traversing techniques.
- Implement various searching and sorting algorithms and to compare them for checking efficiency.

DETAILED CONTENTS

1.   Fundamental Notations   (06 Periods)

    1.1   Problem solving concept top down and bottom up design, structured programming
    1.2   Concept of data types, variables and constants
    1.3   Concept of pointer variables and constants

2.   Arrays   (08 Periods)

    2.1   Concept of Arrays

    2.2   Storage representation of multi-dimensional arrays.

    2.3   Operations on arrays with Algorithms (searching, traversing, inserting, deleting)

3.   Linked Lists   (09 Periods)

    3.1   Introduction to linked list
    3.2   Representation of linked lists in Memory
    3.3   Operations on linked list (Insertion, deletion and traversals)
    3.4   Application of linked lists
    3.5   Doubly linked lists
    3.6   Operations on doubly linked lists (Insertion, deletion and traversals)

4.   Stacks, Queues and Recursion   (09 Periods)

4.1   Introduction to stacks
4.2   Representation of stacks
4.3   Implementation of stacks
4.4   Applications of stacks
4.5   Introduction to queues
4.6   Implementation of queues
4.7   Circular Queues
4.8   De-queues
4.9   Application of Queues
4.10   Recursion

5.   Trees   (07 Periods)

5.1   Concept of Trees
5.2   Representation of Binary tree in memory
5.3   Traversing Binary Trees (Pre order, Post order and In order)
5.4   Searching, inserting and deleting binary search trees
5.5   Introduction to Heap

6.   Sorting and Searching   (09 Periods)

6.1   Introduction to sorting and searching
6.2   Search algorithm (Linear and Binary)
6.3   Sorting algorithms (Bubble Sort, Insertion Sort, Quick Sort, Selection Sort, Merge Sort, Heap Sort

LIST OF PRACTICALS

Write programmes in C to implement
1.   Sorting an array
2.   The addition of two matrices using functions
3.   The multiplication of two matrices
4.   Push and pop operation in stack
5.   Inserting and deleting elements in queue
6.   Inserting and deleting elements in circular queue
7.   Insertion and deletion of elements in linked list
8.   Insertion and deletion of elements in doubly linked list
9.   The Factorial of a given number with recursion and without recursion
10.   Fibonacii series with recursion and without recursion
11.   Program for binary search tree operation
12.   The selection sort technique
13.   The bubble sort technique
14.   The quick sort technique
15.   The merge sort technique
16.   The binary search procedures to search an element in a given list
17.   The linear search procedures to search an element in a given list

INSTRUCTIONAL STRATEGY

This subject clears all fundamentals of programming techniques. Teachers should stress on explaining all the techniques and algorithms in detail in theory sessions. The students should be

asked to convert their ideas about a problem into an algorithm in theory class and implement it in practical class. This will help the students to have clear concepts of programming.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work, exercises and viva-voce
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1.   Data Structure using C by Robert Kruse; Prentice Hall of India
2.   Data Structure through C by Yashwant Kanekar; BPB Publications
3.   Data structures – Schaum's Outline Series by Lipschutz; McGraw Hill Education Pvt Ltd , New Delhi
4.   Data Structure using C by ISRD Group ; Tata McGraw Hills Education Pvt Ltd , New Delhi
5.   Expert Data Structures with C by R.B. Patel ; Khanna Publishers, New Delhi.
6.   Data Structures and Algorithm Using C by RS Salaria; Khanna Book Publishing Co. (P) Ltd. New Delhi
7.   Data Structure through C in depth by SK Srivastava, Deepali Srivastava; BPB Publications
8.   Data Structure through "C" Language by Sameeran Chattopadhyay, Matangini Chottopadhyay; BPB Publications
9.   Data Structure through "C" Language by DOEACC; BPB Publications
10. Data Structure using "C" Lab Workbook by Shukla; BPB Publications
11. e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:

http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1	06	10
2	08	15
3	09	20
4	09	20
5	07	15
6	09	20
Total	**48**	**100**

4.2   OBJECT ORIENTED PROGRAMMING USING JAVA

L T P
3 - 6

RATIONALE

Object orientation is a new approach to understand the complexities of the real world. In contrast to the earlier approaches like procedural etc, object orientation helps to formulate the problems in a better way giving high reliability, adaptability and extensibility to the applications. The students are already familiar with this concept of programming in C which is the basic for JAVA. This course offers the modern programming language JAVA that shall help the students to implement the various concept of object orientation practically. The students will be able to programme in the object oriented technology with the usage of JAVA.

LEARNING OUTCOMES

After undergoing the subject, students will be able to:

- Explain the concepts of OOPS
- Explain and execute the language construct concepts.
- Debug and compile the program written in Java.
- Explain and implement class program.
- Explain and execute member functions.
- Describe and implement inheritance concepts.
- Explain and implement Polymorphism using Java program.
- Install Java IDE, Compiler, Java virtual machines
- Explain and implement the abstract class and interface.
- Implement the exception handling in live projects

DETAILED CONTENTS

1.   Introduction and Features   (03 Periods)

    1.1   Fundamentals of object oriented programming – procedure oriented programming
          Vs. object oriented programming (OOP)
    1.2   Object oriented programming concepts – Classes, object, object reference,
          abstraction, encapsulation, inheritance, polymorphism
    1.3   Introduction of eclipse (IDE) for developing programs in Java

2.   Language Constructs   (10 Periods)

    Review of constructs of C used in JAVA : variables, types and type declarations, data types, increment and decrement operators, relational and logical operators; if then else clause; conditional expressions, input using scanner class and output statement, loops, switch case, arrays, methods.

3.   Classes and Objects   (08 Periods)

    3.1   Creation, accessing class members

3.2 Private Vs Public Vs Protected Vs Default
3.3 Constructors
3.4 Object & Object Reference

4. Inheritance (09 Periods)

Definition of inheritance, protected data, private data, public data, constructor chaining, order of invocation, types of inheritance, single inheritance, multilevel inheritance, hierarchical inheritance, hybrid inheritance

5. Polymorphism (06 Periods)

Method & constructor overloading, method overriding, up-casting and down-casting.

6. Abstract class & Interface (06 Periods)

Key points of Abstract class & interface, difference between an abstract class & interface, implementation of multiple inheritance through interface.

7. Exception Handling (06 Periods)

Definition of exception handling, implementation of keywords like try, catch, finally, throw & throws. importance of exception handling in practical implementation of live projects.

LIST OF PRACTICALS

1. Consider we have a Class of Cars under which Santro Xing, Alto and Wagon R represents individual Objects. In this context each Car Object will have its own, Model, Year of Manufacture, Colour, Top Speed, etc. which form Properties of the Car class and the associated actions i.e., object functions like Create(), Sold(), display() form the Methods of Car Class. Use this class to create another class Company that tracks the models it create.

2. In a software company Software Engineers, Sr. Software Engineers, Module Lead, Technical Lead, Project Lead, Project Manager, Program Manager, Directors all are the employees of the company but their work, perks, roles, responsibilities differs. Create the Employee base class would provide the common behaviors of all types of employee and also some behaviors properties that all employee must have for that company. Also include search method to search an employee by name.

3. Suppose the Airport personals want to maintain records for the arrival and departure of the planes. Create a class Airport that has data like name, id, and address. Create two more classes for Arrival and Departure implementing Airport that will have track of planes (their name, id, arrival time or departure time and a counter to count the number of arrivals) also include the necessary methods to access the information.

Also try to keep record of passengers by creating a new class Passenger. Also include a method search() in Airport class to search any passenger by name.

4. Create a whole menu driven hospital management system using concept of OOP like classes, inheritance. Include information about the following:
   a. Patient -name, registration id, age, disease, etc.
   b. Staff – id, name, designation, salary, etc.

5. Create a class called Musicians to contain three methods string ( ), wind ( ) and perc ( ). Each of these methods should initialize a string array to contain the following instruments:

   - veena, guitar, sitar, sarod and mandolin under string ( )
   - flute, clarinet saxophone, nadhaswaram and piccolo under wind ( )
   - tabla, mridangam, bangos, drums and tambour under perc ( )

   It should also display the contents of the arrays that are initialized. Create a derived class called TypeInsto contain a method called get ( ) and show ( ). The get ( ) method must display a means as follows.

   Type of instruments to be displayed:

   a. String instruments
   b. wind instruments
   c. Percussion instruments

   The show ( ) method should display the relevant detail according to our choice. The base class variables must be accessible only to its derived classes.

6. Write three derived classes inheriting functionality of base class person (should have a member function that ask to enter name and age) and with added unique features of student, and employee, and functionality to assign, change and delete records of student and employee.

7. Using the concept of multiple inheritance create classes: Shape, Circle, Square, Cube, Sphere, Cylinder. Your classes may only have the class variable specified in the table below and the methods Area and/or Volume to output their area and/or volume.

Class	Class Variable	Constructor	Base class
Shape	String name	Shape()	
Circle	double radius	Circle(double r, String n)	Shape
Square	double side	Square(double s, String n)	Shape
Cylinder	double height	Cylinder(double h, double r, String n)	Circle
Sphere	None	Sphere(double r, String n)	Circle
Cube	None	Cube(double s, String n)	Square

8. Write a program to create class Person.

a. Make two classes, Student and Instructor, inherit from Person. A person has a   name and year of birth.
b. A student has a major, student id.
c. An instructor has salary, subject.

Write the class definitions, the constructors, set methods, get methods and for all classes.

9.   Old MacDonald had a farm and several types of animals. Every animal shared certain characteristics: they had a type (such as cow, chick or pig) and each made a sound (moo, cluck or oink). An Interface defines those things required to be an animal on the farm. Define new classes for the Old MacDonald that implement the Animal and Farm class. Create array of object of animal to define the different types of animal in the farm. Also create appropriate methods to get and set the properties.

10.   Write a program with Student as abstract class and create derive classes Engineering, Medicine and Science from base class Student. Create the objects of the derived classes and process them and access them using array of pointer of type base class Student.

INSTRUCTIONAL STRATEGY

The subject is totally practical based. Students should be given clear idea about the basic concepts of programming. In practical session student should be asked to draw flow chart write algorithm and then write program for algorithm and run on computer. It is required that students should maintain records (files with printouts).

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work, exercises and viva-voce
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1.   Object Oriented Programming using JAVA by Sunil Bhutani & Amrendra Shara; Eagle Publishing House, Jalandhar
2.   Java Programming by Sachin Malhotra; Oxford University Press, New Delhi
3.   Head First Java, O-REILLY, Kathy Sierra & Bert Bates.
4.   Object-Oriented programming With Java, C.Thomas Wu.
5.   Advance Java Programming by Uttam K. Roy; Oxford University Press, New Delhi
6.   e-books/e-tools/relevant   software   to   be   used   as   recommended   by AICTE/HSBTE/NITTTR.

Websites for Reference:

        http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1.	03	06
2.	10	23
3.	08	15
4.	09	20
5.	06	12
6.	06	12
7.	06	12
Total	**48**	**100**

L T P
3 - -

RATIONALE

The subject provides the students with the knowledge of detailed organization of currently available personal computers in order to understand their functioning . The students will also get familiar with Architecture of multi processor systems.

LEARNING OUTCOMES

After undergoing the subject, students will be able to :

- Use CPU, register and stack.
- Compare micro programmed and hardwired control.
- Compare RISC and CISC architecture.
- Understand memory hierarchy and memory types.
- Explain the function of BIOS.
- Illustrate multi processor systems.

DETAILED CONTENTS

1. Hardware organisation of computer system   (16 periods)
   - CPU organisation : general register organisation, stack organisation, instruction formats(three address, two address, one address, zero address and RISC instruction).
     Addressing modes: Immediate, register, direct, in direct, relative, indexed.

   - CPU Design : Microprogrammed vs hard wired control.

   - Reduced instruction set computers: CISC characteristics, RISC characteristics, and their comparison.

2. Memory organisation   (14 periods)

   - Memory Hierarchy
   - RAM and ROM chips, Memory address map, Memory connections to CPU.
   - Auxillary memory : Magnetic disks and magnetic tapes.
   - Associative memory
   - Cache memory
   - Virtual memory
   - Memory management hardware
   - Read and Write operation

3. I/O organisation   (08 periods)

a. Basis Input output system(BIOS)
  o Function of BIOS
  o Testing and initialization
  o Configuring the system
b. Modes of Data Transfer
  o Programmed I/O : Synchronous, asynchronous and interrupt initiated.
  o DMA data transfer

4. Architecture of multi processor systems   (10 periods)

- Forms of parallel processing
- Parallel processing and pipelines, basic characteristics of multiprocessor
- General purpose multiprocessors'
- Interconnection networks : time shared common bus, multi port memory, cross bar switch, multi stage switching networks and hyper cube structures.

INSTRUCTIONAL STRATEGY

Since the subject is theoretical one, the practical aspects should be taught along with the theory instruction. The students be given quiz tests and asked to give seminars on small topics. There is sufficient time in the subject and the students can be taken to laboratory for demonstration.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Viva-voce

LIST OF RECOMENEDED BOOKS

1. Computer Architecture and Organisation by Moris Mano
2. Computer Architecture by J.P.Hayes
3. Structured Computer Organisation By Tanenbaum Andrew S, PHI
4. e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:

http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (in periods)	Marks Allotted (%)
1.	16	35
2.	14	30
3.	08	15
4.	10	20
Total	**48**	**100**

4.4   MICROPROCESSORS AND PERIPHERAL DEVICES

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3 - 3

RATIONALE

The study of microprocessors in terms of architecture, software and interfacing techniques leads to the understanding of working of CPU in a microcomputer.   The development in microprocessors of 32 bit architecture brings the students face-to-face with mainframe enabling them to get employment in R&D, assembly, repair and maintenance of hardware of microprocessors and computers. Microprocessors find application in process control industry. They also form a part of the electronic switching system between source and destination in long distance telecommunications. Thus the microprocessor is an area of specialization. Students of electronics and related engineering branches often use microprocessors to introduce programmable control in their projects, in industrial training.

LEARNING OUTCOMES

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

- Describe all the internal parts and pins of 8085
- Write and Edit assembly language program using mnemonics
- Write, execute and debug assembly language programs for simple applications
- Interface various peripheral devices with microprocessor.
- Use various data transfer techniques in micro computers
- Describe the internal parts and pins of 8086

DETAILED CONTENTS

1.   Evolution of Microprocessor   (03 Periods)

Typical organization of a microcomputer system and functions of its various blocks. Microprocessor, its evolution, function and impact on modern society

2.   Architecture of a Microprocessor (With reference to 8085 microprocessor)

(09 periods)

Concept of Bus, bus organization of 8085, Functional block diagram of 8085 and function of each block, Pin details of 8085 and related signals, Demultiplexing of address/data bus generation of read/write control signals, Steps to execute a stored programme

3.   Instruction Timing and Cycles   (06 periods)

Instruction cycle, machine cycle and T-states, Fetch and execute cycle.

4. Programming (with respect to 8085 microprocessor)   (12   periods)

Brief idea of machine and assembly languages, Machines and Mnemonic codes. Instruction format and Addressing mode. Identification of instructions as to which addressing mode they belong. Concept of Instruction set. Explanation of the instructions of the following groups of instruction set. Data transfer group, Arithmetic Group, Logic Group, Stack, I/O and Machine Control Group. Programming exercises in assembly language. (Examples can be taken from the list of experiments).

5. Memories and I/O interfacing   (08 periods)

Concept of memory mapping, partitioning of total memory space. Address decoding, concept of peripheral mapped I/O and memory mapped I/O. Interfacing of memory mapped I/O devices.

6. Interrupts   (03 periods)

Concept of interrupt, Maskable and non-maskable, Edge triggered and level triggered interrupts, Software interrupt, Restart interrupts and its use, Various hardware interrupts of 8085, Servicing interrupts, extending interrupt system

7. Data Transfer Techniques   (03 periods)

Concept of programmed I/O operations, sync data transfer, async data transfer (hand shaking), Interrupt driven data transfer, DMA, Serial output data, Serial input data

8. Peripheral devices   (02 periods)

8255 PPI, 8253 PIT and 8257 DMA controller

9   Architecture of 8086 Microprocessor   (02 periods)
   - Block diagram
   - Minimum and Maximum mode
   - Pin and Signals

LIST OF PRACTICALS

1. Familiarization of different keys of 8085 microprocessor kit and its memory map

2. Steps to enter, modify data/program and to execute a programme on 8085 kit

3. Writing and execution of ALP for addition and sub station of two 8 bit numbers

4. Writing and execution of ALP for multiplication and division of two 8 bit numbers

5. Writing and execution of ALP for arranging 10 numbers in ascending/descending order

6. Writing and execution of ALP for 0 to 9 BCD counters (up/down counter according to choice stored in memory)

7. Interfacing exercise on 8255 like LED display control

8. Interfacing exercise on 8253 programmable interval timer

9. Interfacing exercise on 8279 programmable KB/display interface like to display the hex code of key pressed on display

10. Use of 8085 emulator for hardware testing

INSTRUCTIONAL STRATEGY

The digital systems in microprocessors have significant importance in the area of electronics. Adequate competency needs to be developed by giving sufficient practical knowledge in microprocessors (programming as well as interfacing). Help may be taken in the form of charts, simulation packages to develop clear concepts of the subject. Programming exercises other than the given in the list may be given to the students.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work, exercises
- Viva-voce

RECOMMENDED BOOKS

1. Microprocessor Architecture, Programming and Applications with 8080/8085 by Ramesh S Gaonker, Willey Eastern Ltd. New Delhi

2. Introduction to Microprocessor by Mathur ,Tata McGraw Hill Education Pvt Ltd , New Delhi

3. Microprocessor and Microcontrollers by Dr BP Singh, Galgotia Publications, New Delhi

4. Microprocessor and Applications by Badri Ram: Tata McGraw Hill Education Pvt Ltd , New Delhi

5. Microprocessor and Microcomputers by Refiquzzaman, Prentice Hall of India Ltd., New Delhi.

6. Microprocessor programming & applications.by sudhir Goyal, North Publication.

7. Digital Logic and Computer Design by Mano, M Morris; Prentice Hall of India, New Delhi

8.   Digital Electronics by Rajaraman; Prentice Hall of India Ltd., New Delhi

9.   e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:

    http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1.	03	05
2.	09	20
3	06	15
4	12	25
5.	08	15
6.	03	05
7.	03	05
8.	02	05
9	02	05
Total	48	100

4.5   DATABASE MANAGEMENT SYSTEM

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3 - 3

RATIONALE

Database and database systems have become an essential component of everyday life in modern society. This course will acquaint the students with the knowledge of fundamental concepts of DBMS and its application in different areas, storage, manipulation and retrieval of data using query languages. Oracle/My SQL/SQL Server can be use as package to explain concepts.

LEARNING OUTCOMES

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

- Define and describe the database
- Contrast and compile the design of database architecture
- Convert and compare the designs and differentiate between the keys
- Convert database in the form of tables
- Normalize the data
- Provide the security to the database
- Respond various queries in the SQL

DETAILED CONTENTS

1.   Introduction   (06 Periods)

Database Systems; Database and its purpose, Characteristics of the database approach, Advantages and disadvantages of database systems. Classification of DBMS Users; Actors on the scene, Database Administrators, Database Designers, End Users, System Analysts and Application Programmers, Workers behind the scene (DBMS system designers and   implementers, tool developers, operator and maintenance   personnel)

2.   Database System Concepts and Architecture   (06 Periods)

Data models, schemas, instances, data base state. DBMS Architecture; The External level, The conceptual level, The internal level, Mappings. Data Independence; Logical data Independence, Physical data Independence. Database Languages and Interfaces; DBMS Language, DBMS Interfaces. Classification of Database Management Systems-Centralized, Distributed, parallel and object based.

3.   Data Modeling using E.R. Model (Entity Relationship Model)   (05 Periods)

Data Models Classification; File based or primitive models, traditional data models, semantic data models. Entities and Attributes, Entity types and Entity sets, Key attribute and domain of attributes, Relationship among entities, Database design with E/R model.

4.   Relational Model: (08 Periods)

Relational Model Concepts: Domain, Attributes, Tuples cardinlity, keys(Primary, Secondary, foreign, alternative keys) and Relations. Relational constraints and relational database schemes; Domain constraints, Key constraints and constraints on Null. Relational databases and relational database schemes, Entity integrity, referential integrity and foreign key. Comparison b/w E/R model and Relational model.

5.   Normalization   (08 Periods)
Trivial and non-trivial dependencies.

Non-loss decomposition and functional dependencies, First, Second and Third normal forms, Boyce/Codd normal form, denormalization

6.   Database Access and Security   (06 Periods)
Creating and using indexes, creating and using views.
Database security, process controls, database protection, grant and revoke

7.   MYSQL/SQL (Structured Query Language)   (09 Periods)

SQL* DDL (Data Definition Languages): Creating Tables, Creating a table with data from another table, Inserting values into a table, updating columns of a Table, Deleting Rows, Dropping a Table. DML (Data Manipulation Language): Database Security and Privileges, Grant and Revoke Command, Maintaining Database Objects, Commit and Rollback, various types of select commands, various types of joins, sub query, aggregate functions. Challenges of My SQL. Introduction to Big Data. Understanding Big Data with samples.

LIST OF PRACTICALS FOR DBMS
1.   Exercises on creation and modification of structure of tables.
2.   Exercises on inserting and deleting values from tables.

3.   Exercises on querying the table (using select command).

4.   Exercises on using various types of joins.

5.   Exercises on using functions provided by database package.

6.   Exercises on commands like Grant, Revoke, Commit and Rollback etc.

7.   Design of database for any application**.**

INSTRUCTIONAL STRATEGY

Explanation of concepts using real time examples, diagrams etc. For practical sessions books along with CDs or learning materials with specified activities are required. Various exercises and small applications should be given along with theoretical explanation of concepts.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work, exercises and viva-voce
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1) Fundamentals of Database Management Systems by Dr Renu Vig and Ekta Walia, - an ISTE, Publication, New Delhi
2) Database Management Systems by Arun K Majumdar and P Bhattacharya, Tata McGraw Hill Education Pvt Ltd, New Delhi
3) Introduction to DBMS by by ISRD Group, Tata McGraw Hill Education Pvt Ltd, New Delhi
4) Database Management Systems by Alexis Leon and Mathews Leon; Vikas Publishing House Pvt. Ltd., New Delhi
5) An introduction to database systems by Date C.J. Adison Wesley
6) Fundamentals of Database Systems by Elmasri/Navathe/Adison Wesley
7) SQL Unleashed by Hans Ladanyi Techmedia Publications, New Delhi
8) e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:

http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1	06	15
2	06	10
3	05	10
4	08	15
5	08	20
6	06	10
7	09	20
Total	**48**	**100**

SOFT SKILLS – II

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RATIONALE

The present day world requires professionals who are not only well qualified and competent but also possess good communication skills. The diploma students not only need to possess subject related knowledge but also soft skills to get good jobs or to rise steadily at their work place. The objective of this subject is to prepare students for employability in job market.

LEARNING OUTCOMES

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

- Develop Communication Skills
- Work in a team
- Learn to resolve conflict by appropriate method
- Identify leadership traits and learn self motivation
- Follow ethics

DETAILED CONTENTS

- Concept of team building, behavior in a team
- Developing Interpersonal Relations- empathy, sympathy
- Communication skills-improving non-verbal communication
- Conflict Management
- Motivation
- Leadership
- Professional Ethics and Values
- Health, Hygiene, Cleanliness and Safety

In addition, the students must participate in the following activities to be organized in the institute

- Sports
- NCC/NSS
- Camp – Environment awareness
- Cultural Event

Note : Extension Lectures by experts may be organized. There will be no examination for this subject.

INDUSTRIAL TRAINING

Industrial training provides an opportunity to students to experience the environment and culture of industrial production units and commercial activities undertaken in field organizations. It prepares student for their future role as diploma engineers in the world of work and enables them to integrate theory with practice.

For this purpose, students at the end of fourth semester need to be sent for industrial training of 08 weeks duration to be organized during the semester break starting after IV Semester examinations. The concerned HODs along with other teachers will guide and help students in arranging appropriate training places relevant to their specific branch. It is suggested that a training schedule may be drawn for each student before starting of the training in consultation with the training providers. Students should also be briefed in advance about the organizational setup, product range, manufacturing process, important machines and materials used in the training organization.

Equally important with the guidance is supervision of students training in the industry/organization by the teachers. A teacher may guide a group of 4-5 students. A minimum of one visit per week by the teacher is recommended. Students should be encouraged to write daily report in their diary to enable them to write final report and its presentation later on.

An internal assessment of 100 and external assessment of 100 marks have been provided in the study and evaluation scheme of V Semester. Evaluation of professional industrial training report through viva-voce/presentation aims at assessing students understanding of materials, industrial process, practices in industry/field organization and their ability to engage in activities related to problem solving in industrial setup as well as understanding of application of knowledge and skills learnt in real life situations. The formative and summative evaluation may comprise of weightage to performance in testing, general behavior, quality of report and presentation during viva-voce examination. It is recommended that such evaluations may be carried out by a team comprising of concerned HOD, teachers and representative from industry. The components of evaluation will include the following.

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

FIFTH SEMESTER

5.1 SOFTWARE ENGINEERING

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RATIONALE

The system analysis and design is the backbone of Application software development. After studying the subject the students will be able to develop and design the system according to given requirements. It involves various steps in analysis and design of the system. It includes the knowledge of preparing project systematically. It is important to know about various aspects of the system analysis and design so that the students will be able to understand the responsibilities while designing and implementing the project.

LEARNING OUTCOMES

- Understanding the problem and corresponding requirement for development of software.
- Describe the various phases of the system development life cycle.
- Identify the expected benefits and scope of the projects.
- Prepare and develop data flow diagrams and decision tables.
- Perform a feasibility study of the system.
- Write detailed design specifications for programmes and database.
- Select methods for evaluating the effectiveness and efficiency of a system.
- Apply different testing techniques on simple programme.

DETAILED CONTENTS

1. Introduction to Software Engineering   (8 periods)

Concept of systems: Types of systems : open, closed, static and dynamic systems.

Introduction, Programmes v/s Software Products
Emergence of Software Engineering- Early Computer Programming, High-level Language Programming, Control flow based Design, Data Structure Oriented Design,
Object Oriented Design

2. Software Life Cycle Models   (10 periods)

Requirement of Life Cycle Model, Classic Waterfall Model, Prototyping Model, Evolutionary Model, Spiral Model, introduction to angle methodology.
Comparison of different Life Cycle Models

3. Software Planning   (8 periods)

Responsibilities of Software Project Manager
- Metrics for Project Size Estimation- LOC(Lines of Code), Function Point Metric
- Project estimation Techniques- Using COCOMO Model.

4. Requirement Analysis and Specification   (6 periods)

Requirement gathering and Analysis, Software Requirement Specifications(SRS), Characteristics of good SRS

5. Software Design and Implementation   (8 periods)

Characteristics and features of good Software Design Cohesion and Cupling, Software design Approaches- Function Oriented Design(Data flow diagrams, Data dictionary, Decision Trees and tables), Object Oriented Design, Structured Coding Techniques, Coding Styles, documentation

6. Software Testing   (8 periods)

Concept of Testing, Verification v/s Validations, Unit Testing, Black Box Testing, White Box Testing, Integration testing, System testing, Configuration management.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1. Software Engineering by Rajib Mall, PHI Publishers, New Delhi
2. An Integrated Approach to Software Engineering by Pankaj Jalote, Narosa Publishing House Pvt Ltd, Darya Ganj, New Delhi 110002
3. Software Engineering, Sangeeta Sabharwal, New Age International, Delhi
4. Software Engineering by KK Aggarwal and Yogesh Singh
5. Software Engineering – A Practitioner's Approach by RS Pressman, Tata McGraw Hill Publishers, New Delhi
6 e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:

http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1	8	15
2	10	20
3	8	15
4	6	15
5	8	20
6	8	15
Total	**48**	**100**

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3 - 3

RATIONALE

The future of computer technology is in computer networks. Global connectivity can be achieved through computer networks. A diploma holder in computer engineering should therefore understand the function of networks. Knowledge about hardware and software requirements of networks is essential.

LEARNING OUTCOMES

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

- setup computer networks
- setup basic wireless network
- diagnose & solve network problems
- diagnose & solve network problems remotely
- provide security to networks
- manage & handle WAN
- prevent external Network Attacks
- identify network troubleshooting methods.

DETAILED CONTENTS

1.   Networks Basics   (12 Periods)

- Concept of network
- Models of network computing
- Networking models
- Peer-to –peer Network
- Client-Server Network
- LAN, MAN and WAN
- Network Services
- Topologies
- Switching Techniques

2.   Networking Models   (08 Periods)

- OSI model: Definition, Layered Architecture
  Functions of various layers
- TCP/IP Model: Definition, Functions of various layers
- Comparison between OSI and TCP/IP model

3.   TCP/IP Addressing   (08 Periods)

- Concept of physical and logical addressing
- IPV4 addresses – Address space, Notations
- Classful Addressing- Different IP address classes, Classes & Blocks, Net-id & Host-Id, Masks, Address depletion
- Classless Addressing – Address blocks, Masks
- Special IP Addresses
- Subnetting and Supernetting
- Loop back concept
- Network Address Translation
- IPV4 Header

- IPV6 Header
- Comparison between IPV4 and IPV6

4. Network Architecture   (03 Periods)

Ethernet specification and standardization: 10 Mbps (Traditional Ethernet), 10   Mbps(Fast Ethernet) and 1000 Mbps (Gigabit Ethernet)

5. Network Connectivity   (05 Periods)

- Network connectivity Devices
- NICs
- Hubs, Switches, Routers, Repeaters, Modem, Gateway
- Configuration of Routers & Switches

6 Network Administration   (07 Periods)

- Network Security Principles, Cryptography, using secure protocols
- Trouble Shooting Tools: PING,IPCONFIG, IFCONFIG, NETSTAT, TRACEROOT,Wireshark, Nmap, TCPDUMP, ROUTEPRINT
- DHCP Server
- Workgroup/Domain Networking

7 Introduction to Wireless Networks.   (05 Periods)

- Introduction to wireless LAN IEEE 802.11, WiMax ad Li-Fi
- Wireless Security
- Introduction to bluetooth - architecture, application
- Comparison between bluetooth and Wifi

LIST OF PRACTICALS

1.   Recognize the physical topology and cabling (coaxial, OFC, UTP, STP) of a network.

2.   Recognition and use of various types of connectors RJ-45, RJ-11,BNC and SCST

3.   Making of cross cable and straight cable

4.   Install and configure a network interface card in a workstation.

5.   Identify the IP address of a workstation and the class of the address and configure the IP Address on a workstation

6.   Managing user accounts in windows and LINUX

7.   Sharing of Hardware resources in the network.

8.   Use of Netstat and its options.

9.   Connectivity troubleshooting using PING, IPCONFIG, IFCONFIG

10.   Installation of Network Operating System(NOS)

11.   Visit to nearby industry for latest networking techniques

12.   Create a network of at least 6 computers.

Required Software
➢   Windows Server/Linux Server

Required Tools and Supplies
1) Crimping tool, Cable tester,
2) RJ 45 connectors, RJ-11, BNC, SCST
3) Coaxial Cable, UTP, STP, OFC cable
4) Screw Driver Kit
5) Switch/Hub
6) Manageable Switch

INSTRUCTIONAL STRATEGY

Since the facilities are not available in the polytechnic, students need exposure to various security systems and software available in some organisations, universities and engineering colleges. For this, visits may be organized for students. The teachers should also be exposed in this area. Some practicals can be conducted in the laboratory.

MEANS OF ASSESSMENT
- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work exercises and viva-voce
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1. Computer Networks by Tanenbaum, Prentice Hall of India, New Delhi
2. Data Communications and Networking by Forouzan, (Edition 2nd and 4th), Tata McGraw Hill Education Pvt Ltd , New Delhi
3. Data and Computer Communication by William Stallings, Pearson Education, New Delhi
4. Local Area Networks by Peter Hudson
5. Network+ Lab manual,- BPB Publications -by Tami Evanson
6. Networking Essentials – BPB Publications New Delhi
7. Computer Network and Communications By V.K. Jain and Narija Bajaj, Cyber Tech Publications, New Delhi.
8. Cloud Computing Bible by Berrie Sarinby
9. e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:

http://swayam.gov.in
NPTEL.ac.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1.	12	25
2.	08	15
3.	08	20
4.	03	05
5.	05	10
6.	07	15
7.	05	10
Total	**48**	**100**

5.3   COMPUTER PROGRAMMING USING PYTHON

L T P
3 - 6

RATIONALE

This course introduces to the students the Python language. Upon completion of this course, the student will be able to write non trivial Python programs dealing with a wide variety of subject matter domains.

Topics include language components, the IDLE/IDE environment, control flow constructs, strings, I/O, collections, classes, modules, and regular expressions

LEARNING   OUTCOMES

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

- Execute Python code in a variety of environments
- Use correct Python syntax in Python programs
- Use the correct Python control flow construct
- Write Python programs using various collection data types
- Write home grown Python functions
- Use many of the standard Python modules such as os, sys, math, and time
- Trap various errors via the Python Exception Handling model
- Use the IO model in Python to read and write disk files
- Create their own classes and use existing Python classes. Understand and use the Object Oriented paradigm in Python programs
- Use the Python Regular Expression capabilities for data verification

DETAILED CONTENTS

1.   Introduction   (03 Periods)

- Brief History of Python
- Python Versions
- Installing Python
- Environment Variables
- Executing Python from the Command Line
- IDLE
- Editing Python Files
- Python Documentation
- Getting Help
- Dynamic Types
- Python Reserved Words
- Naming Conventions

2.   Basic Python Syntax   (03 Periods)

- Basic Syntax
- Comments
- String Values
- String Methods
- The format Method
- String Operators
- Numeric Data Types
- Conversion Functions
- Simple Output
- Simple Input
- The % Method

- The print Function

3. Language Components   (04 Periods)

- Indenting Requirements
- The if Statement
- Relational and Logical Operators
- Bit Wise Operators
- The while Loop
- break and continue
- The for Loop

4. Collections   (09 Periods)

- Introduction
- Lists
- Tuples
- Sets
- Dictionaries
- Sorting Dictionaries
- Copying Collections
- Summary

5. Functions   (06 Periods)

- Introduction
- Defining Your Own Functions
- Parameters
- Function Documentation
- Keyword and Optional Parameters
- Passing Collections to a Function
- Variable Number of Arguments
- Scope
- Functions - "First Class Citizens"
- Passing Functions to a Function
- map
- filter
- Mapping Functions in a Dictionary
- Lambda
- Inner Functions
- Closures

6. Modules   (03 Periods)

- Modules
- Standard Modules - sys
- Standard Modules - math
- Standard Modules - time
- The dir Function

7. Exceptions   (05 Periods)

- Errors
- Runtime Errors
- The Exception Model

- Exception Hierarchy
- Handling Multiple Exceptions
- Raise
- assert

8.   Input and Output   (03 Periods)

- Introduction
- Data Streams
- Creating Your Own Data Streams
- Access Modes
- Writing Data to a File
- Reading Data From a File
- Additional File Methods
- Using Pipes as Data Streams
- Handling IO Exceptions

9.   Classes in Python   (07 Periods)

- Classes in Python
- Principles of Object Orientation
- Creating Classes
- Instance Methods
- File Organization
- Special Methods
- Class Variables
- Inheritance
- Polymorphism

10.   Regular Expressions   (05 Periods)

- Introduction
- Simple Character Matches
- Special Characters
- Character Classes
- Quantifiers
- The Dot Character
- Greedy Matches
- Grouping
- Matching at Beginning or End
- Match Objects
- Substituting
- Splitting a String
- Compiling Regular Expressions
- Flags

LIST OF PRACTICALS

1.   Getting started with Python and IDLE in interactive and batch modes

2.   What do the following string methods do?
- lower
- count
- replace

3. Write instructions to perform each of the steps below
   (a) Create a string containing at least five words and store it in a variable.
   (b) Print out the string.
   (c) Convert the string to a list of words using the string split method.
   (d) Sort the list into reverse alphabetical order using some of the list methods (you might need to use dir(list) or help(list) to find appropriate methods).
   (e) Print out the sorted, reversed list of words.

4. Write a program that determines whether the number is prime.
   What is your favorite number? 24
   24 is not prime
   What is your favorite number? 31
   31 is prime

5. Find all numbers which are multiple of 17, but not the multiple of 5, between 2000 and 2500?

6. Swap two integer numbers using a temporary variable. Repeat the exercise using the code format: a, b = b, a. Verify your results in both the cases.

7. Find the largest of n numbers, using a user defined function largest().

8. Write a function myReverse() which receives a string as an input and returns the reverse of the string.

10. Check if a given string is palindrome or not.

11. WAP to convert Celsius to Fahrenheit

12. Find the ASCII value of charades

13. WAP for simple calculator

INSTRUCTIONAL STRATEGY

Teachers should lay emphasis on practicals and experts from industries may be invited to deliver lectures and share experiences with the students.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work exercises and viva-voce
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1. Learning Python by Mark Lutz; Pratham Books, Bangalore
2. Foundations of Python Network Programming by John Goerzen and Brandeu Rhodes; Apress-eBook distributed by Springer Science and Business Media, New York
3. Dive Into Python by Mark Pilgrim; Pratham Books, Bangalore
4. Think Python by Allen B. Downey; O'Reily Media
5. Python Programming For Beginners: A Must Read Introduction to Python Programming by Robert Richards; Pratham Books, Bangalore
6. e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:

http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1.	03	05
2.	03	05
3.	04	10
4.	09	20
5.	06	15
6.	03	05
7.	05	10
8.	03	05
9.	07	15
10.	05	10
Total	**48**	**100**

ELECTIVE

5.4.1 CLOUD COMPUTING

L T P
3 - 3

RATIONALE

This course offers a good understanding of cloud computing concepts and challenges faced in implementation of cloud computing.

LEARNING OUTCOMES

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

- Explain core concepts of cloud computing paradigm.
- Explain various Service Models
- Explain various Deployment Models.
- Describe SLA management in Cloud Computing
- Explain and apply the concept of virtualization.
- Describe the scheduling of tasks in cloud.
- Illustrate the fundamental concepts of cloud storage.
- Describe various security issues in the cloud.
- Make use of cloud.

DETAILED CONTENTS

1.   Introduction   (6 Periods)

Evolution of Cloud Computing, Cloud Computing Overview, Characteristics, Applications, Benefits, Challenges.

2.   Service and Deployment Models   (6 Periods)

- Cloud Computing Service Models: Infrastructure as a Service, Platform as a Service, Software as a Service;

- Cloud Computing Deployment Models: Private Cloud; Public Cloud, Community Cloud, Hybrid Cloud, Major Cloud Service providers.

3.   Service Level Agreement (SLA) Management   (4 Periods)

Overview of SLA, Types of SLA, SLA Life Cycle, SLA Management Process.

4.   Virtualization Concepts   (8 Periods)

Overview of Virtualization, Types of Virtualization, Benefits of Virtualization, Hypervisors.

5.   Cloud Security   (6 Periods)

Infrastructure Security, Data Security & Privacy Issues, Legal Issues in Cloud Computing.

6.   Cloud Storage   (6 Periods)

Overview; Storage as a Service, Benefits and Challenges, Storage Area Networks (SANs).

7.   Scheduling in Cloud   (12 Periods)

Overview of Scheduling problem, Different types of scheduling, Scheduling for independent and dependent tasks, Static vs. Dynamic scheduling.

LIST OF PRACTICALS

1.   Introduction to Cloud Vendors: Amazon, Microsoft, IBM.
2.   Setting up Virtualization using Virtualbox/VMWare Hypervisor
3.   Introduction to OwnCloud
4.   Installation and configuration of OwnCloud software for SaaS
5.   Accessing Microsoft AZURE cloud-services
6.   Cloud Simulation Software Introduction: CloudSim

INSTRUCTIONAL STRATEGY

In addition to cassroom teaching, the teacher should demonstrate the practical usage of cloud using real cloud services.

MEANS OF ASSESSMENT

- Assignments and Quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work and Viva-Voce

RECOMMENDED BOOKS

1.   Rajkumar Buyya, James Broberg, Andrzej Goscinski (Editors): Cloud Computing: Principles and Paradigms, Wiley, 2011

2.   Kumar Saurabh, Cloud Computing, Wiley, 2012.

3.   Barrie Sosinsky: Cloud Computing Bible, Wiley, 2011.

4.   Judith Hurwitz, Robin Bloor, Marcia Kaufman,Fern Halper: Cloud Computing for Dummies, Wiley, 2010

5.   e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:

        http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1.	6	15
2.	6	15
3.	4	10
4.	8	15
5.	6	10
6.	6	10
7.	12	25
Total	**48**	**100**

5.4.2   BIG DATA

L T P
3 - 3

RATIONALE

The importance of Big Data in various domain disciplines has increased tremendously in recent years. The subject provides an overview of the historical and modern context and operation of Big Data for beginners. The objective of the curriculum is that the students can begin to study/practice Big Data tools and techniques.

Note: Teachers should demonstrate and expose the students to various practical applications of Big Data through tutorials and exercises.

LEARNING OUTCOMES

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

- Explain the challenges of Big Data
- Install and run Big Data tools
- Use tools to analyze big data and create statistical models.
- Solve problems using tools such as R and RStudio, and MapReduce/Hadoop
- Analyze data using different statistical techniques.
- Explain the utility of popular Big Data tools like: - Hadoop, Hive, Pig, Map Reduce, R Programming
- Deploy a structured life cycle approach to data science and big data analytics projects
- Use techniques and tools to analyze big data and create statistical models

DETAILED CONTENTS

1.   INTRODUCTION TO BIG DATA   (08 Periods)

Introduction – distributed file system, Big data: definition and taxonomy, Sources of Big Data, characteristics, Benefits of Big Data, Understanding Big Data with Examples. Big data applications, Top 10 industries using Big Data, Big data analytics, Challenges for processing big data.

2.   INTRODUCTION TO HADOOP   (12 Periods)

History of Hadoop, What is Hadoop & Hadoop vendors ,Big Data – Apache Hadoop & Hadoop EcoSystem. Hadoop Architecture, How Hadoop clusters work, Hadoop Storage: HDFS Introduction, 5 Dameons of Hadoop and their functionalities: NameNode, Secondary NameNode, DataNode, Job Tracker, and Task Tracker.

3   INTRODUCTION TO MAP REDUCE   (12 Periods)

MapReduce Introduction, How MapReduce Works, Understanding the Map Reduce architecture - Writing Hadoop MapReduce Word-Count problem - Loading data into HDFS - Executing the Map phase - Shuffling and sorting - Reducing phase execution.

4.   Hadoop Eco Systems   (08 Periods)

Pig: What is Pig. Introduction to Pig Data Flow Engine . Pig and MapReduce. When   Pig should be used, Hive: What is Hive, Architecture of Hive, how Hive Differs from Traditional RDBMS.

5.   Introduction to R   (08 Periods)

Reading and getting data into R – ordered and unordered factors – arrays and matrices – lists and data frames – reading data from files – probability distributions – statistical models in R.

LIST OF PRACTICALS

1.		Installation of Hadoop.
2.		Setting up a Hadoop cluster.
3.		Practice of various Hadoop commands
4.		MapReduce WordCount problem.
5.		MapReduce TeraSort problem
6.		Basics of R Programming/ Rstudio

INSTRUCTIONAL STRATEGY

The teachers should lay emphasis on demonstration and application of big data along with the theoretical inputs in the class. Experts may by invited to deliver lectures and share experiences.

MEANS OF ASSESSMENT
- Assignments and quiz/class tests, mid-term and end-term written tests
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, "Professional Hadoop Solutions", Wiley, ISBN: 9788126551071, 2015.
2. Chris Eaton, Dirk deroos et al. , "Understanding Big data ", McGraw Hill, 2012.
3. Tom White, "HADOOP: The definitive Guide" , O Reilly 2012.
4. Big Data and Analytics by Seema Acharya and Subhashini Chellappan; Wiley India

5. Vignesh Prajapati, "Big Data Analytics with R and Haoop", Packet Publishing 2013.
6. Nina Zumel, John Mount, "Practical Data Science with R", Manning Publications, 2014.
7. Jure Leskovec, Anand Rajaraman, Jeffrey D. Ullman, "Mining of Massive Datasets", Cambridge University Press, 2014.
8. Mark Gardener, "Beginning R - The Statistical Pr ogramming Language", John Wiley & Sons, Inc., 2012.
9. A Simple Introduction to DATA SCIENCE: BOOK ONE (New Street Data Science Basics 1) Kindle Edition ,by Lars Nielsen   Noreen Burlingame .
10. A Simple Introduction to Data Science: BOOK TWO (New Street Data Science Basics 2) Kindle Edition by Lars Nielsen
11. The Big Data Revolution : Kindle Edition, by Jason Kolb (Author), Jeremy Kolb
12. Big Data:Principles and best practices of scalable realtime data systems (Englisch),von Nathan Marz   James Warren
13. Data Mining Methods and Models: wileyindia ,by Daniel T Larose
14. Pro Apache Hadoop, 2ed by Sameer Wadkar, Madhu Siddalingaiah, Jason Venner; Wiley india,
15. e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:

 http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Periods)	Marks Allotted (%)
1	08	16
2	12	26
3	12	26
4	08	16
5	08	16
Total	**48**	**100**

L T P
3 - 6

RATIONALE:

This course will enable the students to understand and develop competency amongst the students to design professional database backed dynamic and feature based web sites. The course covers the use of programming with PHP and the concepts of database with MySQL.

LEARNING OUTCOMES

After going through the subject, the student will be able to

- Compare and contrast the use of various markup languages.
- Perform various logical operations in PHP
- Create simple programmes to validate forms in PHP
- Perform database connectivity using PHP

DETAILED CONTENTS

1.   DEVELOPING PORTALS USING HTML   (14 periods)

Introduction to HTML 5 and CSS 3. Basic structure of HTML, designing a web page, inserting liks images, horizontal rules, comments. Formatting text, title, headings, colors, fonts, sizes, simple tables and forms. HTML tags, hyperlinks. Adding graphics and images, image maps, image files. Using tables, forms, style sheets and frames. Floating of web site/pages.

2.   PHP   (24 periods)

Introduction to PHP: How PHP Works , The php.ini File, Basic PHP Syntax, PHP variables, statements, operators, decision making, loops, arrays, strings, forms, get and post methods, functions.
Introduction to cookies, storage of cookies at client side, Using information of cookies. Creating single or multiple server side sessions. Timeout in sessions, Event management in PHP. Introduction to content management systems based on PHP.

3.   PHP and MySQL   (10 periods)

Introduction to MySQL, connecting to MySQL, database, creation, insertion, deletion and retrieval of MySQL data using PHP.

LIST OF PRACTICALS

1.   Design PHP based web pages using correct PHP, CSS, and XHTML syntax, structure.
2.   Create Web forms and pages that properly use HTTP GET and POST protocol as
      appropriate.
3   Design SQL language within MySQL and PHP to access and manipulate databases.
4.   Install and configure both PHP and MySQL.
5   Create PHP code that utilizes the commonly used API library functions built in to PHP.
6.   Design and create a complete web site that demonstrates good PHP/MySQL client/serverdesign.
7.   To store a cookie using PHP on client side.
8.   To save the user session on server side.

9.   Design website using wordpress or Joomla.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work, exercises and viva-voce
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1   Sams Teach Yourself PHP, MySQL, and Apache All in One" by Julie C.
        Meloni, Publisher: SAMS ,ISBN 0-672-32976-X

2.   Web enabled development application by Ivan Byross: Commercial; TMH

3.   HTML, CSS, JavaScript, Perl, Python and PHP by Schafer Textbooks; Wiley India
4.   e-books/e-tools/relevant software to be used as recommended by
        AICTE/HSBTE/NITTTR.

Websites for Reference:

        http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic	Time Allotted (Periods)	Marks Allotted (%)
1	14	30
2	24	50
3	10	20
Total	**48**	**100**

SOFT SKILLS – III

L   T   P
-    -   2

RATIONALE

The present day world requires professionals who are not only well qualified and competent but also possess good communication skills. The diploma students not only need to possess subject related knowledge but also soft skills to get good jobs or to rise steadily at their work place. The objective of this subject is to prepare students for employability in job market.

LEARNING OUTCOMES

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

- Develop communication skills.
- Learn how to speak without fear and get rid of hesitation
- Use effective presentation techniques
- Understand entrepreneurial traits
- Exhibit attitudinal changes

DETAILED CONTENTS

- Communication Skills – Handling fear and phobia
- Resume Writing
- Applying for job through email/job portal
- Interview preparation : Mock Interview, Group Discussions and Extempore
- Presentation Techniques
- Developing attitude towards safety. Disaster management.

In addition, the students must participate in the following activities to be organized in the institute

- Sports
- NCC/NSS
- Camp – Entrepreneurial awareness
- Cultural Event

Note :   Extension Lectures by experts may be organized. There will be no examination for this subject.

SIXTH SEMESTER

L T P
3 - 3

RATIONALE

This course has been designed keeping in view basic computer users and information system managers. The students are acquainted with the concepts needed to secure a network, understanding risks and how to deal with them. It is hoped that the students will have a wider perspective on security in general and better understanding of how to reduce and manage the security risks.

LEARNING OUTCOMES

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

- Identify various types of network, security threats and security techniques
- Know about different attackers
- Explain the need of security
- Execute algorithms for encryption and decryption
- Install firewall and detection system
- Explain the method of recovering data and taking backup

DETAILED CONTENTS

1. Introduction   (08 Periods)

Need for securing a network; Principles of Security, Type of attacks, introduction to cyber crime, cyber law-Indian Perspective (IT Act 2000 and amended 2008), cyber ethics, ethical hacking. Hacking , Skimming, attacker, phreaker , hackivist, bluejacking, bluesnarfing, IOS Jailbreaking.

2. Securing Data over Internet   (10 Periods)

Introduction to basic encryption and decryption, concept of symmetric and asymmetric key cryptography, overview of DES, RSA and PGP. Introduction to Hashing: MD5, SSL, SSH, HTTPS, Digital Signatures, Digital certification, IPSec

3. Virus, Worms and Trojans   (08 Periods)

Definitions, preventive measures – access central, checksum verification, process configuration, virus scanners, heuristic scanners, application level virus scanners, deploying virus protection, Zombie, Ransomware

4. Firewalls   (04 Periods)

Definition and types of firewalls, firewall configuration, Limitations of firewall. Whitelisting Vs blacklisting.

5. Intrusion Detection System (IDS)/IPS   (02 Periods)

Introduction; IDS limitations – teardrop attacks, counter measures; Host based IDS set up

6   Handling Cyber Assets- Configuration policy as per standards, Disposable policy

(04 periods)

7.   Virtual Private Network (VPN)   (06 Periods)

Basics, setting of VPN, VPN diagram, configuration of required objects, exchanging keys, modifying security policy

8.   Disaster and Recovery   (06 Periods)

Disaster categories; network disasters – cabling, topology, single point of failure, save configuration files; server disasters – UPS, RAID, Clustering, Backups, server recovery

Note: A visit to an organization must be organized for the demonstration about network security and exposure to available software

INSTRUCTIONAL STRATEGY

Since the facilities are not available in the polytechnic, students need exposure to various security systems and software available in some organisations, universities and engineering colleges. For this, visits may be organized for students. The teachers should also be exposed in this area. Some practicals can be conducted in the laboratory.

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work exercises and viva-voce
- Software installation, operation, development and viva-voce

LIST OF PRACTICALS

1.   *Installation and comparison of various anti virus software*

2.   Installation and study of various parameters of firewall.

3.   Writing program in C to Encrypt/Decrypt using XOR key.

4.   Study of VPN.

5.   Study of various hacking tools.

6.   Practical applications of digital signature.

RECOMMENDED BOOKS

1.   Cryptography and Network Security by Forouzon; Tata McGraw Hill Education Pvt Ltd, New Delhi

2.   Cryptography and Network Security by Atul Kahate; Tata McGraw Hill Education Pvt Ltd, New Delhi

3.   Cryptography and Network Security by Padmanabham; Wiley India Pvt Ltd. Daryaganj, New Delhi

4.   Network Security by Eric Cole, Bible; Wiley India Pvt Ltd. Daryaganj, New Delhi

5.   Network Security by William Stalling

6. e-books/e-tools/relevant software to be used as recommended by   AICTE/HSBTE/NITTTR.

Websites for Reference:

        http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1.	08	15
2.	10	20
3.	08	15
4.	04	10
5.	02	05
6.	04	10
6.	06	15
7.	06	10
Total	**48**	**100**

<center>**6.2 MOBILE APPLICATION DEVELOPMENT**</center>

<div align="right">L   T   P
3   -   6</div>

RATIONALE

Knowing the details of Mobile and their working principle are need of the every common man. Mobile Application development is the very hot business domain. Majority of the corporate have a separate division for the development of mobile applications. It is essential that diploma students must know the way to apply advanced data communicating methods and networking protocols for wireless and mobile devices. Hence this subject.

LEARNING OUTCOMES

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

- Compare the characteristics, basic concepts and systems issues in different mobile computing technologies.
- Illustrate architecture and protocols in Mobile computing and to identify the trends and latest development of the technologies in the area
- Compare the network protocols governing the mobile communication
- Describe different kinds of mobile OS prevailing in the market
- Illustrate the usage of different components of Android OS in detail
- Develop a mobile application using different components of Android
- Write a program in Android to store data in databases

<center># DETAILED CONTENTS</center>

1. Introduction to Mobile Computing , WiFi , Bluetooth   (08 periods)

1.1   Introduction : Evolution of Mobile Computing, Important terminologies, Mobile computing functions, Mobile computing security issues, Mobile computing Devices, Networks: Wired , Wireless , Adhoc, Comparison of wired and wireless mechanism, Various types of wireless communication technologies used in Mobiles, Antennas , Basics of Base Station and Medium access control and Mobile station.

1.2   Architecture : Architecture of Mobile Computing, 3- Tier Architecture, Presentation (Tier-1), Application (Tier -2), Data (Tier – 3)

1.3   Mobile computing through Telephony: Evolution through telephony

1.4   Wireless LAN: Introduction - Applications of WLAN, Infrared versus Radio Transmission, Features of WI-FI and WI-MAX, Bluetooth : Introduction and application

2.   Introduction to ANDROID   (10 periods)

2.1   ANDROID : Android Versions, Features of Android, Architecture of Android, Android Market, Android Runtime (Dalvik Virtual Machine)

2.2   ANDROID SDK & ADT : Android SDK, Android Development Tool (ADT), Installing and configuring Android, Android Virtual Device (AVD)

2.3   ACTIVITIES & INTENTS : Understanding Activites, Linking activities and   indents, Calling built-in applications using intents, Fragments Displaying   Notifications

2.4   User Interface : Views and Viewgroups, Layouts, Display Orientation , Action Bar,   Listening for UI Notifications

3.   Views   (16 periods)

3.1   Basic Views : Textview, Button, Image Button, EditText, CheckBox,   ToggleButton, RadioButton and RadioGroup Views, ProgressBar View, Auto   Complete Text View

3.2   Advanced Views : Time Picker View and Date Picker View, List Views, Image
        View, Menus, Analog and Digital View, Dialog Boxes

3.3   Displaying Pictures & Menus with Views: Image View, Gallery View,   ImageSwitcher, GridView
- Creating the Helper Methods, Options Menu, Context   Menu

3.4   SMS, Phone: Sending SMS, Receiving SMS, Making phone call

4.   Location Based Service and SQLite   (14 periods)

4.1   Location Based Services : Obtaining the Maps API Key- Displaying the Map,   Zoom   Control   ,
Navigating to a specific location, Adding Marker , Geo Coding   and reverse   Geo coding
4.2   Location Based Service and SQLite

4.3   Location Based Services : Obtaining the Maps API Key, Displaying the   Map, Zoom Control,
        Navigating to a specific location, Adding   Marker, Geo   Coding and reverse Geo coding

4.4   Content Provider : Sharing data, view contacts, Add contacts, Modify contacts, Delete   Contacts

4.5   Storage : Store and Retire data's in Internal and External Storage, SQLite,   Creating   and   using databases

4.6   Android Service : Consuming Web service using HTTP , downloading binary   Data,   Downloading Text Content, Accessing Web Service

MEANS OF ASSESSMENT

- Assignments and quiz/class tests, mid-term and end-term written tests
- Actual laboratory and practical work, exercises and viva-voce
- Software installation, operation, development and viva-voce

RECOMMENDED BOOKS

1. Beginning Android 4 Application Development   by Wei-Meng Lee ; Wiley India
2. Android Apps for Absolute Beginners by Jackson; Apress
3 Mobile Computing by Asoke K Talukder, Hasan Ahmed, Roopa R Yavagal; Tata McGraw Hill
4 Mobile communications Jochen Schiller ; Pearson Education,
5. e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:

        http://swayam.gov.in

LIST OF EXPERIMENTS:

1. Write a program to demonstrate activity (Application Life Cycle)
2. Write a program to demonstrate different types of layouts
3. Write a program to implement simple calculator using text view, edit view, option button and button
4. Write a program to demonstrate list view
5. Write a program to demonstrate photo gallery
6. Write a program to demonstrate Date picker and time picker
7. Develop an simple application with context menu and option menu
8. Develop an application to send SMS
9. Write a program to view, edit contact
10 Write a program to send e-mail
11 Write a program to demonstrate a service
12 Write a program to demonstrate web view to display web site
13 Write a program to display map of given location/position using map view
14 Write a program to demonstrate the application of intent class
15. Write a program to create a text file in a external memory
16 Write a program to store and fetch data from SQL life database.

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1.	08	15
2.	10	20
3.	16	35
4.	14	30
Total	**48**	**100**

6.3   APPLICATION DEVELOPMENT USING WEB FRAMEWORK

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RATIONALE

This course will cover the practical aspects of Web App development using various frameworks. The course equips the students with resources for design, development and production of web applications. Students will be introduced to popular web application frameworks for building scalable web applications. The main objective for this course is to motivate student's interest in learning Web-app development by giving them an insight into its possibilities through practical applications. In addition, the course also provides a sufficiently broad but practical introduction to Server-side web technologies..

LEARNING OUTCOMES

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

- Identify basic aspects of web-frameworks.
- Apply the basic concepts, principles and practices of Web-site development using server-side technologies (PHP & MySql)
- Install Word Press
- Create and manage Blogs,Websites using WordPress.
- Use PHP & MySql with WordPress
- Install Moodle framework
- Create Web Application using Moodle
- Manage features of Moodle sites : Accounts, Enrollment, Roles & Permission
- Take backup of site content

DETAILED CONTENTS

(Theoretical Instructions)

1.   Practice on Various Web Technologies

        Practice on HTML, CSS, Java Script, Ajax. Practice on Servier side scripting i.e. PHP & MySql

2.   Introduction to Web Frameworks

        Introduction to WordPress, How WordPress Works, Introduction to Moodle,   Pedagogy, Moodle site - basic structure

3.   WordPress

        Installation of WordPress, Introduction to Blogging, Creating Blogs, Using Images, Wrapping Text Around Images, Comments, Post Formats, Linking to Posts, Pages, and Categories, Using Smilies, Links Manager, WordPress Feeds, Customizing Feeds, Use Gravatars in WordPress, Writing Code in Your Posts, Using Password Protection, Developing a Colour Scheme, Designing Headers, CSS Horizontal Menus, Dynamic Menu Highlighting, Navigation Links, Next and Previous Links, Styling for Print, Designing Your Post Meta Data Section, Separating Categories in your Post Meta Data Section, Customizing the Read More, Formatting Date and Time, Finding CSS Styles, Creating Individual Pages, Uploading Files, Using WordPress Themes, Templates, Template Tags, Template Hierarchy, Validating a Website, Know Your Sources, WordPress Site Maintenance

3.   Moodle

Installing Moodle, Installing plugins, Version Upgrading, Verify Database Schema, Managing a Moodle site, Managing authentication, Manual accounts, No login, Email-based self-registration, IMAP authentication, Browse list of users, Bulk user actions, Add a new user, Upload users, User profile, Managing enrolment plugins, Manual enrolment, Guest access, Category enrolments, External database enrolment, Managing Roles and permissions, Assign roles, Site administrator, Manager role, Course creator role, Teacher role, Non-editing teacher role, Student role, Guest role, Roles settings, Permissions, Password salting.

Site appearance, Front page, Front page settings, My Moodle, User profiles, Navigation, Course list, Themes, Theme settings, Standard themes, Installing a new theme, Header and footer, Language settings, Language customization, Server settings, System paths, Session handling, HTTP, Maintenance mode, Cleanup, Environment, Site registration, Config changes report, Using web services, Publishing a course, Blogs, Blog settings, Using Blogs, Comments, Tags, RSS feeds settings, Using RSS feeds, Using Calendar, Site backup, Course backup, Course restore, Automated course backup.

LIST OF PRACTICALS

1. Practice on HTML, CSS, Java Script, Ajax.PHP & MySql
2. Install WordPress & Create Blogs
3. Manage blogs features e.g. Images, Text Around Images, Comments, Post Formats, Linking, Pages, Categories, Smilies, Feeds, Gravatars, Password Protection
4. Practice various designing features: Colour Scheme, Headers, CSS Horizontal Menus, Dynamic Menu, Highlighting, Navigation Links, Print
5. Read More, Formatting Date and Time, Finding CSS Styles, Creating Individual Pages, Uploading Files, Using WordPress Themes, Templates, Template Tags, Template Hierarchy, Validating a Website, Know Your Sources, WordPress Site Maintenance
6. Integrate PHP & MySql with WordPress
7. Install Moodle & various plugins,
8. Create a Moodle site and Database Schema
9. Design Site appearance, Front page, Front page settings, My Moodle, User profiles, Navigation, Course list, Themes, Theme settings, Header and footer, Language settings, Using web services, Publishing a course, Blogs, RSS feeds
10. Manage Moodle site, Managing authentication, Manual accounts, No login, Email-based self-registration,Account
11. Create Roles and permissions, Assign roles,
12. Implement Password salting.
13. Perform Site backup, Course backup, Course restore, Automated course backup

INSTRUCTIONAL STRATEGY

Since the entire course content is web based, students can practice it online. The teachers should have practice on this framework. Entire course is hands-on based so practicals should be conducted in the laboratory.

RECOMMENDED RESOURCES

1.   http://www.wpbeginner.com/beginners-guide/how-to-learn-wordpress-for-free-in-a-week-or-less/

2.   https://docs.moodle.org/22/en/Table_of_Contents

3.   e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:
http://swayam.gov.in

6.4   ENTREPRENEURSHIP DEVELOPMENT AND MANAGEMENT

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RATIONALE

In the present day scenario, it has become imperative to impart entrepreneurship and management concepts to students so that a significant percentage of them can be directed towards setting up and managing their own small enterprises. It may be further added that an entrepreneurial mindset with managerial skills helps the student in the job market. This subject focuses on imparting the necessary competencies and skills of enterprise set up and its management.

LEARNING OUTCOMES

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

- Know about various schemes of assistance by entrepreneurial support agencies
- Conduct market survey
- Prepare project report
- Explain the principles of management including its functions in an organisation.
- Have insight into different types of organizations and their structures.
- Inculcate leadership qualities to motivate self and others.
- Manage human resources at the shop-floor
- Maintain and be a part of healthy work culture in an organisation.
- Use marketing skills for the benefit of the organization .
- Maintain books of accounts and take financial decisions.
- Undertake store management.
- Use modern concepts like TQM, JIT and CRM.

DETAILED CONTENTS

SECTION – A   ENTREPRENEURSHIP

1.   Introduction   (10 Periods)

- Concept /Meaning and its need
- Qualities and functions of entrepreneur and barriers in entrepreneurship
- Sole proprietorship and partnership forms and other forms of business organisations
- Schemes of assistance by entrepreneurial support agencies at National, State, District – level,   organisation: NSIC, NRDC, DC, MSME, SIDBI, NABARD, NIESBUD, HARDICON Ltd., Commercial Banks, SFC's TCO, KVIB, DIC, Technology Business Incubators (TBI) and Science and Technology Entrepreneur Parks

2.   Market Survey and Opportunity Identification/Ideation   (08 Periods)

- Scanning of the business environment
- Salient features of National and Haryana State industrial policies and resultant business opportunities
- Types and conduct of market survey
- Assessment of demand and supply in potential areas of growth
- Identifying business opportunity
- Considerations in product selection
- Converting an idea into a business opportunity

3. Project report Preparation   (06 Periods)

- Preliminary project report
- Detailed project report including technical, economic and market feasibility
- Common errors in project report preparations
- Exercises on preparation of project report
- Sample project report

SECTION –B   MANAGEMENT

4. Introduction to Management   (04 Periods)

- Definitions and importance of management
- Functions of management: Importance and process of planning, organising, staffing, directing and controlling
- Principles of management (Henri Fayol, F.W. Taylor)
- Concept and structure of an organisation
- Types of industrial organisations and their advantages

- Line organisation, staff organisation
- Line and staff organisation
- Functional Organisation

5.   Leadership and Motivation   (03 Periods)

a) Leadership

- Definition and Need
- Qualities and functions of a leader
- Manager Vs leader
- Types of leadership
- Case studies of great leaders

 b) Motivation

- Definition and characteristics
- Importance of self motivation

- Factors affecting motivation
- Theories of motivation (Maslow, Herzberg, Douglas, McGregor)

6.   Management Scope in Different Areas   (06 Periods)

   a) Human Resource Management

- Introduction and objective
- Introduction to Man power planning, recruitment and selection
- Introduction to performance appraisal methods

   b) Material and Store Management

- Introduction functions, and objectives
- ABC Analysis and EOQ

   c) Marketing and sales

- Introduction, importance, and its functions
- Physical distribution
- Introduction to promotion mix
- Sales promotion

   d) Financial Management

- Introductions, importance and its functions
- knowledge of income tax, sales tax, excise duty, custom duty, VAT, GST

7.   Work Culture   (04 Periods)
   7.1.   Introduction and importance of Healthy Work Culture in organization
   7.2.   Components of Culture
   7.3.   Importance of attitude, values and behaviour
           Behavioural Science – Individual and group behavior.
   7.4.   Professional ethics – Concept and need of Professional Ethics and human values.

8.   Basic of Accounting and Finance   (04 Periods)

   a)   Basic of Accounting:

           -       Meaning and definition of accounting
           -       Double entry system of book keeping
           -       Trading account, PLA account and balance sheet of a company
   b)   Objectives of Financial Management

           - Profit Maximization v/s Wealth Maximization

9.   Miscellaneous Topics   (03 Periods)
   a) Total Quality Management (TQM)

- Statistical process control

- Total employees Involvement
- Just in time (JIT)

b) Intellectual Property Right (IPR)

- Introduction, definition and its importance
- Infringement related to patents, copy right, trade mark

INSTRUCTIONAL STRATEGY

Some of the topics may be taught using question/answer, assignment, seminar or case study method. The teacher will discuss stories and case studies with students, which in turn will develop appropriate managerial and entrepreneurial qualities in the students. In addition, expert lecturers may also be arranged from outside experts and students may be taken to nearby industrial organisations on visit. Approach extracted reading and handouts may be provided.

MEANS OF ASSESSMENT

Assignments and quiz/class tests, mid-term and end-term written tests, model/prototype making

RECOMMENDED BOOKS

1. A Handbook of Entrepreneurship, Edited by BS Rathore and Dr JS Saini; Aapga Publications, Panchkula (Haryana)
2. Entrepreneurship Development and Management by J.S.Narang; Dhanpat Rai & Sons, Delhi.
3. Entrepreneurship Development by CB Gupta and P Srinivasan, Sultan Chand and Sons, New Delhi
4. Handbook of Small Scale Industry by PM Bhandari
5. Entrepreneurship Development and Management by MK Garg
6. e-books/e-tools/relevant   software   to   be   used   as   recommended   by AICTE/HSBTE/NITTTR.

Websites for Reference:

   http://swayam.gov.in

SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Periods)	Marks Allotted (%)
1	10	20
2	08	16
3	06	14
4	04	10
5	03	06
6	06	14
7	04	08
8	04	08
9	03	06
Total	48	100

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RATIONALE

Industry Based Project Work aims at developing innovative skills in the students whereby they apply the knowledge and skills gained through the course by undertaking a project. The individual students have different aptitudes and strengths. Project work, therefore, should match the individual strengths of students. The prime emphasis of the project work is to understand and apply the basic knowledge of the principles of software engineering practices in real life situations, so as to participate and manage a large software engineering projects in future.

LEARNING OUTCOMES

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

- Implement the theoretical and practical knowledge and skills gained through various subjects/courses into an application suitable for a real practical working environment, preferably in an industrial environment.
- Develop software packages or applications and implement these for the actual needs of the community/industry.
- Explain the working of industrial environment and its work ethics.
- Explain what entrepreneurship is and how to become an entrepreneur.
- Identify and contrast gap between the technological knowledge acquired through curriculum and the actual industrial need and to compensate it by acquiring additional knowledge as required.
- Carry out cooperative learning through synchronous guided discussions within the class in key areas, asynchronous document sharing and discussions, as well as prepare collaborative edition of the final project report.
- Field computing and to achieve real life experience in software design.
- Apply the knowledge about disaster management in practical situations.

General Guidelines

- The individual students have different aptitudes and strengths. Project work, therefore, should match the strengths of students. For this purpose, students should be asked to identify the type of project work, they would like to execute. The activity of problem identification should begin well in advance (say at the end of second year). Students should be allotted a problem of interest to him/her as a major project work.   It is also essential that the faculty of the respective department may have a brainstorming session to identify suitable project assignments for their students. The project assignment can be individual assignment or a group assignment. There should not be more than 3 students if the project work is given to a group. The project work identified in collaboration with industry should be preferred.
- This   project work **should not be considered** as merely conventional industrial training in which students are sent at work places with either minimal or no supervision. This experience is required to be planned in advance and supervised on regular basis by the polytechnic faculty. For the fulfillment of above objectives, polytechnics may establish close linkage with 8-10 relevant organization for providing such an experience to

students. It is necessary that each organization is visited well in advance and activities to be performed by students are well defined. The chosen activities should be such that it matches with the curricular interest to students and of professional value to industrial/ field organizations. Each teacher is expected to supervise and guide 5-6 students.

The project assignments may consist of:
- ✓ Installation of computer systems, peripherals and software
- ✓ Programming customer based applications
- ✓ Web page designing including database connectivity
- ✓ Database applications
- ✓ Networking
- ✓ Software Development
- ✓ Fabrication of components/equipment (computer related components)
- ✓ Fault-diagnosis and rectification of computer systems and peripherals
- ✓ Bringing improvements in the existing systems/equipment
- ✓ Projects related to Multimedia
- ✓ Projects related to Computer Graphics
- ✓ Web Hosting
- ✓ Configuration of Network Operating System(Windows, Linux)
- ✓ Configuration of servers (Proxy, DNS etc)
- ✓ Data analysis
- ✓ Data acquisition through multiple interfaces.

Following are the broad suggestive areas of project work

- ✓ Database Management Systems.
- ✓ Software Engineering and Software Development.
- ✓ Web page Designing.
- ✓ Computer Graphics and Animation.
- ✓ Multimedia Systems.
- ✓ Computer Networks.
- ✓ Internet and e-commerce.
- ✓ Computer Security and Cryptography.
- ✓ Computer hardware and embedded systems.
- ✓ Improving existing systems / equipments.
- ✓ Any other related area found worth.

A suggestive criterion for assessing student performance by the external (person from industry) and internal (teacher) examiner is given in table below:

Sr. No.	Performance Criteria	Max. Marks	Rating Scale				
			Excellent	Very Good	Good	Fair	Poor
1.	Selection of project assignment	10%	10	8	6	4	2
2.	Planning and execution of considerations	10%	10	8	6	4	2
3.	Quality of performance	20%	20	16	12	8	4
4.	Providing solution of the problems or production of final product	20%	20	16	12	8	4

5.	Sense of responsibility	10%	10	8	6	4	2
6.	Self expression/ communication skills	5%	5	4	3	2	1
7.	Interpersonal skills/human relations	5%	5	4	3	2	1
8.	Report writing skills	10%	10	8	6	4	2
9	Viva voce	10%	10	8	6	4	2
	Total marks	**100**	**100**	**80**	**60**	**40**	**20**

The overall grading of the practical training shall be made as per following table.

In order to qualify for the diploma, students must get "Overall Good grade" failing which the students may be given one more chance to improve and re-evaluate before being disqualified and declared "not eligible to receive diploma ". It is also important to note that the students must get more than six "goods" or above "good" grade in different performance criteria items in order to get "Overall Good" grade.

	Range of maximum marks	**Overall grade**
i)	More than 80	Excellent
ii)	79 < > 65	Very good
iii)	64 < > 50	Good
iv)	49 < > 40	Fair
v)	Less than 40	Poor

Important Notes

1. This criteria must be followed by the internal and external examiner and they should see the daily, weekly and monthly reports while awarding marks as per the above criteria.

2. The criteria for evaluation of the students have been worked out for 200 maximum marks. The internal and external examiners will evaluate students separately and give marks as per the study and evaluation scheme of examination.

3. The external examiner, preferably, a person from industry/organization, who has been associated with the project-oriented professional training of the students, should evaluate the students performance as per the above criteria.

4. It is also proposed that two students or two projects which are rated best be given merit certificate at the time of annual day of the institute. It would be better if specific nearby industries are approached for instituting such awards.

The teachers are free to evolve other criteria of assessment, depending upon the type of project work.

It is proposed that the institute may organize an annual exhibition of the project work done by the students and invite leading Industrial organisations in such an exhibition.

SOFT SKILLS – IV

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RATIONALE

The present day world requires professionals who are not only well qualified and competent but also possess good communication skills. The diploma students not only need to possess subject related knowledge but also soft skills to get good jobs or to rise steadily at their work place. The objective of this subject is to prepare students for employability in job market.

LEARNING OUTCOMES

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

- Communicate effectively.
- Apply techniques of effective time management
- Develop habits to overcome stress
- Face problems with confidence
- Exhibit attributes required to appear for an interview
- Learn about current and future career opportunities
- Exhibit entrepreneurial skills
- Use QC/QT tools

DETAILED CONTENTS

- Communication Skills - Presentation
- Time management
- Stress Management
- Problem solving
- Career opportunities-Current and future
- Entrepreneurial Skills
- Quality and Quality tools used in industry

In addition, the students must participate in the following activities to be organized in the institute

- Sports
- NCC/NSS
- Cultural Event

Note : Extension Lectures by experts may be organized. There will be no examination for this subject.