MAHARAJA AGRASEN
HIMALAYAN GARHWAL UNIVERSITY
UTTARAKHAND

POLYTECHNIC
(DIPLOMA IN COMPUTER SCIENCE)

REVISED SYLLABUS PREPARED BY

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Maharaja Agrasen Himalayan Garhwal University

RECOMMENDED BY BOARD OF STUDIES DEPARTMENT OF ENGINEERING AND TECHNOLOGY

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APPROVED BY

ACADEMIC COUNCIL, MAHARAJA AGRASEN HIMALAYAN GARHWAL UNIVERSITY

W.E.F. - ACADEMIC SESSION 2022-23

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Diploma 1st Sem.

Subject Code	Subject	L	T	P	TOT	EVALUATION SCHEME						Total Marks	Credit Point
		Period/Weeks				Internal		External					
						Theory	Practical	Theory		Practical			
						Max Marks	Max Marks	Max Marks	Hrs. : Min	Max Marks	Hrs. : Min		
DA101	English & Communication Skills -1st	3	0	2	5	20	30	50	2:15	50	3:00	150	4
DA102	Applied Mathematics 1st	3	0	0	3	50	0	100	2:15	0	0	150	3
DA103	Applied Physics 1st	3	0	2	5	20	30	50	2:15	50	3:00	150	4
DA104	Applied Chemistry 1st	3	0	2	5	20	30	50	2:15	50	3:00	150	4
DA105	Basics of Information Technology	3	0	2	5	10	10	50	2:15	30	3:00	100	4
DA106	Engineering Drawing-1st	0	0	6	6	0	50	100	0:00	0	9:00	150	3
DAP107	General Workshop Practice 1st	0	0	6	6	0	50	0	0	50	9:00	100	3
Disc/Game/Sca/Ncc/NSS		0	0	4	4	0	0	0	0	25	6:00	25	2
Industrial Exposure(Assesment at Inst. Level)		0	0	0	0	0	0	0	0	25	0	25	0
Total		**15**		**24**	**39**	**120**	**200**	**400**	**11:15**	**280**	**36:00:00**	**1000**	**27**

General Proficiency will comprise of various co-curricular activities like games, hobby clubs, seminars, declamation contests, extension lectures, NCC, NSS, cultural activities and discipline etc.

+ Industrial visit compulsory at minimum 2 industry or department

Note: 1- Each period will be 45 minutes. 2- Each session will be of 16weeks. 3- Effective teaching will be at least 15 week + Industrial Visit

Theory 1 Credit = 10 Hrs

Practical 1 Credit = 10 Hrs

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Diploma 2nd Sem.

Subject Code	Subject	L	T	P	TOT	EVALUATION SCHEME						Total Marks	Credit Point
						Internal		External					
		Period/Weeks				Theory	Practical	Theory		Practical			
						Max Marks	Max Marks	Max Marks	Hrs. : Min	Max Marks	Hrs. : Min		
DA201	English & Communication Skills - 2nd	3	0	2	5	20	30	50	2:15	50	3:00	150	4
DA202	Applied Mathematics 2nd	3	0	0	3	50	0	100	2:15	0	0:00	150	3
DA203	Applied Physics 2nd	3	0	2	5	20	30	50	2:15	50	3:00	150	4
DA204	Applied Chemistry 2nd	3	0	2	5	20	30	50	2:15	50	3:00	150	4
DA205	Environmental Science	3	0	0	3	30	0	70	2:15	0	0:00	100	3
DA206	Engineering Drawing-2nd	0	0	6	6	0	50	100	0:00	0	9:00	150	3
DAP207	General Workshop Practice 2nd	0	0	6	6	0	50	0	0	50	9:00	100	3
Disc/Game/Sca/Ncc/NSS		0	0	6	6	0	0	0	0	25	9:00	25	3
Industrial Exposure(Assesment at Inst. Level)		0	0	0	0	0	0	0	0	25	0	25	0
Total		**15**	**0**	**24**	**39**	**140**	**190**	**420**	**11:15**	**250**	**36:00:00**	**1000**	**27**

General Proficiency will comprise of various co-curricular activities like games, hobby clubs, seminars, declamation contests, extension lectures, NCC, NSS, cultural activities and discipline etc.

+ Industrial visit compulsory at minimum 2 industry or department

Note: 1- Each period will be 45 minutes. 2- Each session will be of 16weeks. 3- Effective teaching will be at least 15 week + Industrial Visit

Theory 1 Credit = 10 Hrs

Practical 1 Credit = 10 Hrs

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STUDY AND EVALUATION SCHEME FOR DIPLOMA PROGRAMME INCOMPUTER SCIENCE AND ENGINEERING

Subject code.	Subject	L	T	P	T 0 T	EVALUATION SCHEME						Total Marks	Credit
						Internal Assessment		External Assessment (Examination)					
		Periods/Week				Theory	Practical	Theory		Practical			
						Max. Marks	Max. Marks	Max. Marks	Hrs:min	Max. Marks	Hrs:min		
DCS 301	Programming in C	4	-	2	6	20	20	80	3:00	50	3.00	170	5
DCS 302	Basics of Electrical and Electronics Engineering	3	-	2	5	20	20	80	2.15	50	3.00	170	4
DCS 303	Object Oriented Concepts	3	-	2	5	20	20	80	2.15	50	3.00	170	4
DCS 304	Computer System Peripherals	3	-	2	5	20	20	80	2.15	50	3.00	170	4
DCS 305	Digital Data Communication	4	-	-	4	20	-	80	3:00			100	4
DCS 306	Operating Systems	4	-	2	6	20	20	80	3:00	50	3.00	170	5
General Proficiency #		-		4	4		25	-	-	-	6:00	25	2
Industrial Exposure (Assessment at Inst. Level) +		-	-	-	-	-	25	-	-	-	-	25	
Total		21	-	14	35	120	150	480	15:45	250	21:00	1000	28

General Proficiency will comprise of various co-curricular activities like games, hobby clubs, seminars, declamation contests, extension lectures, NCC, NSS, cultural activities and discipline etc.

\+ Industrial visit compulsory at minimum 2 industry or department

Note: 1- Each period will be 45 minutes. 2- Each session will be of 16weeks. 3- Effective teaching will be at least 15 week + Industrial Visit

Theory 1 Credit = 10 Hrs

Practical 1 Credit = 20 Hrs

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FOURTH SEMESTER (COMPUTER SCIENCE AND ENGINEERING)

Subject code	Subject	L	T	P	T 0 T	EVALUATION SCHEME						Total Marks	Credit
		Periods/Week				Internal Assessment		External Assessment (Examination)					
						Theory	Practical	Theory		Practical			
						Max. Marks	Max. Marks	Max. Marks	Hrs:min	Max. Marks	Hrs		
DCS 401	Data Structure Using C	3		2	5	25	25	100	2.15	50	3.00	200	4
DCS 402	Web Technologies	3		2	5	25	25	100	2.15	50	3.00	200	4
DCS 403	Computer Organization and Architecture	3		-	3	25	-	100	2.15	-	-	125	3
DCS 404	Database Management System	4		-	4	25	-	100	3:00	-	-	125	4
DCS 405	System and Software Engineering	4		-	4	25	-	100	3:00	-	-	125	4
DCS 406	Computer Networks	3		4	7	25	25	100	2.15	25	6:00	175	5
	Industrial Training	Industrial Training of 30 days done after 4th Semester would be evaluated in 5th semester through Report and Viva-voice											
General Proficiency #		-	-	4	4	-	25	-	-	-	6:00	25	2
Industrial Exposure (Assessment at Inst. Level) +		-	-	-	0	-	25	-	-	-	-	25	
Total		20	-	12	32	150	125	600	15:00	125	18:00	1000	26

General Proficiency will comprise of various co-curricular activities like games, hobby clubs, seminars, declamation contests, extension lectures, NCC, NSS, cultural activities and discipline etc.

+ Industrial visit compulsory at minimum 2 industry or department

Note: 1- Each period will be 45 minutes. 2- Each session will be of 16weeks. 3- Effective teaching will be at least 15 week + Industrial Visit

Theory 1 Credit = 10 Hrs

Practical 1 Credit = 20 Hrs

STUDY AND EVALUATION SCHEME FOR DIPLOMA PROGRAME IN

FIFTH SEMESTER (COMPUTER SCIENCE AND ENGINEERING)

Subject code	Subject	Periods/Week				EVALUATION SCHEME						Total Marks	Credit
						Internal Assessment		External Assessment (Examination)					
		L	T	P	TOT	Theory	Practical	Theory		Practical			
						Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs		
DCS 501	Database Programming	3	-	2	5	20	20	75	2.15	25	3	140	4
DCS 502	Visual Programming with C#	3	-	2	5	20	20	75	2.15	25	3	140	4
DCS 503	Computer and Network Troubleshooting	3	-	2	5	20	20	75	2.15	25	3	140	4
DCS 504	Cryptography and Network Security	3	-	-	3	25	-	75	2.15	-	-	100	3
DCS 505	Software Quality and Testing	3	-	2	5	20	20	75	2.15	25	3	140	4
DCS 506	Microprocessor	3	-	2	5	20	20	75	2.15	25	3	140	4
DCSP 507	Industrial Training	4 Weeks				-	25	-	-	25	3	50	
DCSP R508	Minor Project Work	-	-	4	4	-	50	-	-	50	6	100	2
General Proficiency #		-	-	4	4	-	25	-	-	-	6	25	2
Industrial Exposure (Assessment at Inst. Level) +		-	-	-	-	-	25	-	-	-	-	25	
Total		18	-	18	36	125	225	450	13:30	200	30:00	1000	27

General Proficiency will comprise of various co-curricular activities like games, hobby clubs, seminars, declamation contests, extension lectures, NCC, NSS, cultural activities and discipline etc.

+ Industrial visit compulsory at minimum 2 industry or department

Note: 1- Each period will be 45 minutes. 2- Each session will be of 16weeks. 3- Effective teaching will be at least 15 week + Industrial Visit

Theory 1 Credit = 10 Hrs

Practical 1 Credit = 20 Hrs

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STUDY AND EVALUATION SCHEME FOR DIPLOMA PROGRAME IN

SIXTH SEMESTER (COMPUTER SCIENCE AND ENGINEERING)

Subject code	Subject	L	T	P	T O T	EVALUATION SCHEME						Total Marks	Credit
		Periods/Week				Internal Assessment		External Assessment (Examination)					
						Theory	Practical	Theory		Practical			
						Max. Marks	Max. Marks	Max. Marks	Hrs	Max. Marks	Hrs		
DCS 601	Object Oriented Programming UsingJava	3	-	2	5	25	25	75	2.15	50	3	175	4
DCS 602	Computer Graphics	3	-	2	5	25	25	75	2.15	50	3	175	4
DCS 603	Data Warehouse and Mining	3	-	-	3	25	-	75	2.15	-	-	100	3
DCS 604	Open Source Technology	3	-	2	5	25	25	75	2.15	50	3	175	4
DCS 605	Mobile Computing	3	-	-	3	25	-	75	2.15	-	-	100	3
DCS 606	Entrepreneurship Development and Management	4	-	-	4	25	-	75	2.15	-	-	100	4
DCS 607	Employable Skills	-	-	4	4	-	25	-	-	-	6	25	2
DCSPR608	Major Project Work	-	-	4	6	-	25	-	-	75	6	100	2
General Proficiency #		-	-	4	4	-	25	-	-	-	6	25	2
Industrial Exposure (Assessment at Inst. Level) +		-	-	-	-	-	25	-	-	-	-	25	
Total		19	-	18	37	150	175	450	13:30	225	27:00	1000	28

General Proficiency will comprise of various co-curricular activities like games, hobby clubs, seminars, declamation contests, extension lectures, NCC, NSS, cultural activities and discipline etc.

+ Industrial visit compulsory at minimum 2 industry or department

Note: 1- Each period will be 45 minutes. 2- Each session will be of 16weeks. 3- Effective teaching will be at least 15 week + Industrial Visit

Theory 1 Credit = 10 Hrs

Practical 1 Credit = 20 Hrs

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FIRST SEMESTER

DA101 ENGLISH AND COMMUNICATION SKILLS – I

	L	T	P
Periods/Week	3	-	2

RATIONALE

Interpersonal communication is a natural and necessary part of organizational life. Yet, communicating effectively can be challenging because of our inherent nature to assume, overreact to and misperceive what actually is happening. Poor communication or lack of communication is often cited as the cause of conflict and poor teamwork. In today's team-oriented workplace, managing communication and developing strategies for creating shared meaning are crucial to achieve results and create successful organizations. The goal of the Communicating Skills course is to produce civic-minded, competent communicators. To that end, students must demonstrate oral as well as written communication proficiency. These include organizational and interpersonal communication, public address and performance. The objectives of this subject are understanding how communication works, gaining active listening and responding skills, understanding the importance of body language, acquiring different strategies of reading texts and increasing confidence by providing opportunities for oral and written expressions

DETAILED CONTENTS

1. COMMUNICATION SKILLS (12 Periods)

1.1 Introduction and Process of Communication
1.2 Objectives of Communication
1.3 Verbal and Non-verbal Communication
1.4 Process of Communication
1.5 Barriers to Communication; Overcoming Strategies
1.6 Listening and Speaking Skills and Sub-Skills
(All topics should be in detail)

2. GRAMMAR AND USAGE (08 Periods)

2.1 Syntax (Parts of speech)

3. WRITING SKILLS (10 Periods)

3.1 Writing Paragraphs
3.2 Picture Composition
3.3 Developing writing skills based on some audio-visual stimulus

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4. READING COM PREHENSION SKILLS (10 Periods)

Unseen comprehension passages (at least 3 passages of literary, scientific, data interpretation).

5. FACETS OF LITERATURE (24 Periods)

5.1 Fiction

5.1.1 Homecoming – R.N. Tagore
5.1.2 The Selfish Giant - Oscar Wilde
5.1.3 The Missing Mail – R K Laxman

5.2 Prose

5.2.1 Of Studies – Francis Bacon
5.2.2 Art of Conversation – Richard Steel
5.2.3 Democracy – Dr. Radhakrishnan

5.3 Poems

5.3.1 Ozymandias – P.B. Shelley
5.3.2 Daffodils – William Wordsworth
5.3.3 Stopping by Woods on a Snowy Evening – Robert Frost

LIST OF PRACTICALS

(Note: The following contents are only for practice. They should not be included in the final theory examination)

DEVELOPING ORAL COMMUNICATION SKILLS

- Greeting, Starting a Conversation
- Introducing Oneself
- Introducing Others
- Leave Taking
- Thanking, Wishing Well
- Talking about Oneself
- Talking about Likes and Dislikes
- Mock Interview

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LIST OF REFERENCE BOOKS

1. Communicating Effectively in English, Book-I by Revathi Srinivas; Abhishek Publications, Chandigarh.
2. High School English Grammar and Composition by Wren and Martin; S. Chand & Company Ltd., Delhi.
3. Communication Techniques and Skills by R. K. Chadha; Dhan pat Rai Publications, New Delhi.

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DA102 APPLIED MATHEMATICS - I

	L	T	P
Periods/Week	3	-	-

RATIONALE

Applied Mathematics forms the backbone of engineering students. The curriculum of mathematics has undergone changes from time to time in accordance with growth of subject. Diploma in Engineering is a launching stage where the students learn the basics of engineering. The revised syllabus has been designed keeping in view the emerging needs of all categories of students. Great emphasis has been laid on application of various contents like algebra, complex numbers, trigonometry and coordinate geometry. This course will develop analytical abilities to make exact calculations and provide continuing educational base to the students.

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.

DETAILED CONTENTS

1. Algebra (30 Periods)

   1.1 Series: A.P. and G.P., nth term of AP and GP, sum to nth term, Value of ${}^{n}p_{r}$ and ${}^{n}c_{r}$.

   1.2 Binomial theorem (without proof) for positive integral index (expansion and general form); binomial theorem for any index (expansion without proof)

   1.3 Partial fractions (linear factors, repeated linear factors, non-reducible quadratic factors only)

   1.4 Determinants and Matrices – expansion of determinants (up to third order), properties of determinants, solution of equations (up to 3 unknowns) by Cramer's rule. Definition of matrix, addition, subtraction, multiplication of matrices (up to third order), minors and co-factors, inverse of a matrix by adjoint method (up to second order)

   1.5 Scalar and vector product of two /three vectors

2. Trigonometry (20 Periods)

   Review of ratios of some standard angles (0,30,45,60,90 degrees), T-Ratios of Allied angles (without proof), Sum, difference formulae and their applications (without proof). Product formulae (Transformation of product to sum, difference and vice versa). T-Ratios of multiple angles, sub-multiple angles (2A, 3A, A/2).

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3. Complex numbers (10 Periods)

Definition of complex numbers, real and imaginary parts of a complex number, polar and Cartesian form and their inter-conversion, conjugate of a complex number, modulus and argument of a complex number, addition, subtraction, multiplication and division of a complex number. De-Moiver's Theorem (simple problems)

4. Co-ordinate Geometry (20 Periods)

4.1 Equation of straight line in various standard forms (without proof), inter section of two straight lines, angle between two lines, perpendicular distance formula (without proof)

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

* Centre and radius
* Three points lying on it
* Coordinates of end points of a diameter

4.3 Equations of conics (ellipse, parabola and hyperbola), simple problems related to engineering (standards forms only)

RECOMMENDED BOOKS

1. Applied Mathematics by Dr. RD Sharma, Dhan pat Rai Publications, Delhi
2. Elementary Engineering Mathematics by BS Grewal, Khanna Publishers, New Delhi
3. Applied Mathematics-I (Hindi) by Dr. Kailash Sinha, Nav Bharat Publication, Meerut.
4. Engineering Mathematics by Vol. I & II by S Kohli, IPH, Jalandhar
5. Applied Mathematics, Vol. I & II by SS Sabharwal and Sunita Jain, Eagle Parkashan, Jalandhar

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DA103 APPLIED PHYSICS – I

	L	T	P
Periods/Week	3	-	2

RATIONALE

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

Note: - Teachers should give examples of engineering/technology applications of various concepts and principles in each topic so that students are able to appreciate learning of these concepts and principles.

DETAILED CONTENTS

1. Units and Dimensions (8 Periods)

   1.1 Physical quantities
   1.2 Units - fundamental and derived units, systems of units (FPS, CGS, MKS and SI units)
   1.3 Dimensions and dimensional formulae of physical quantities
   1.4 Dimensional equations and principle of homogeneity, applications to conversion from one system of units to another, checking the correctness of physical relations and derivation of simple physical relations, limitations of dimensional analysis

   1.5 Error in measurement, random and systematic errors, types of errors, propagation of errors, significant figures

2. Force and Motion (12 Periods)

   2.1 Concept of Scalar and Vector quantities – examples, types of vectors.
   2.2 Resolution and Composition of vectors, Vector multiplication (scalar product and vector product of vectors), addition of vectors (Parallelogram law)
   2.3 Force: Newton's laws of motion, linear momentum and conservation of linear momentum, impulse and its application, simple numerical problem in brake system of vehicles and trains etc.
   2.4 Friction: Types of friction and its application.

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2.5 Circular motion: Angular displacement, angular velocity and angular acceleration
2.6 Relation between linear and angular variables (velocity and acceleration)
2.7 Centripetal force (derivation) and centrifugal force with application such as banking of roads and bending of cyclists
2.8 Application of various forces in lifts

3 Rotational Motion (6 Periods)

3.1 Concept of translatory and rotating motion with examples
3.2 Definitions of torque, angular momentum and their relationship
3.3 Conservation of angular momentum (qualitative) and its examples
3.4 Moment of inertia and its physical significance, radius of gyration, Theorems of parallel and perpendicular axes (statements), Moment of inertia of rod, disc, ring and sphere (Formulae only).
3.5 Application of rotational motions in transport vehicles, trains and aero plane turbine/engine.

4 Work, Power and Energy (8 Periods)

4.1 Work: definition and its SI units
4.2 Work done in moving an object on horizontal and inclined plane (incorporating frictional forces) with its application
4.3 Power: definition and its SI units, calculation of power with numerical problems
4.4 Energy: Definition and its SI units: Kinetic energy and Potential energy with examples and their derivation
4.5 Principle of conservation of mechanical energy (for freely falling bodies), transformation of energy from one form to another with its application

5 Properties of Matter (10 Periods)

5.1 Elasticity: definition of stress and strain, different types of modulus of elasticity, stress – strain diagram, Hooke's law with its applications
5.2 Pressure: definition, its units, atmospheric pressure, gauge pressure, absolute pressure, Fortin's Barometer and its applications
5.3 Surface tension: concept, its units, angle of contact, measurement of surface tension by capillary tube method, applications of surface tension, effect of temperature and impurity on surface tension
5.4 Viscosity and coefficient of viscosity: Stoke's Law and derivation of terminal velocity, effect of temperature on viscosity.

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6 Thermometry (10 Periods)

6.1 Difference between heat and temperature
6.2 Principles of measurement of temperature and different scales of temperature and their relationship
6.3 Types of thermometers (Concept only)
6.4 Expansion of solids, liquids and gases, coefficient of linear, surface and cubical expansions and relation amongst them
6.5 Modes of transfer of heat (Conduction, convection and radiation with examples)
6.6 Co-efficient of thermal conductivity
6.7 Engineering Application of conduction, convection and radiations

7. Waves and Vibrations (10 Periods)

7.1 Simple Harmonic Motion(SHM): definition, expression for displacement, velocity, acceleration, time period, frequency in S.H.M. Equation of simple harmonic progressive wave
7.2 Wave motion: transverse and longitudinal wave motion with examples, sound and light waves, velocity, frequency and wave length of a wave (relationship $v = n\lambda$) and their applications
7.3 Free, forced and resonant vibrations with examples
7.4 Acoustics of buildings – reverberation, reverberation time, echo, noise, coefficient of absorption of sound, methods to control reverberation time and their applications
7.5 Ultrasonics – production (magnetostriction and piezoelectric methods) and their engineering and medical applications

LIST OF PRACTICALS (to perform minimum ten experiments)

1. To find the diameter of wire using a screw gauge
2. To find volume of solid cylinder and hollow cylinder using a vernier calipers
3. To determine the thickness of glass strip and radius of curvature using a spherometer
4. To verify parallelogram law of forces
5. To find the time period of a simple pendulum and determine the length of second's pendulum.
6. To find the velocity of sound by using resonance apparatus at room temperature.
7. To determine the viscosity of glycerin by Stoke's method
8. To determine the coefficient of friction on horizontal plane.

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9. To determine the Young's Modulus by Searles apparatus
10. To determine force Constant of spring using Hooke's Law

INSTRUCTIONAL STATREGY

Teacher may use various teaching aids like models, charts, graphs and experimental kits etc. for imparting effective instructions in the subject. The teacher should explain about field applications before teaching the basics 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.

RECOMMENDED BOOKS

1. Text Book of Physics for Class XI (Part-I, Part-II) N.C.E.R.T
2. Text Book of Physics for Class XII (Part-I, Part-II) N.C.E.R.T
3. Applied Physics Vol. I and Vol. II, TTTI Publications, Tata McGraw Hill, New Delhi
4. Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi
5. Berkeley Physics Course, Vol. I, II &III, Tata McGraw Hill, Delhi
6. Comprehensive Practical Physics, Vol. I & II, JN Jaiswal, Laxmi Publishers
7. Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi
8. Applied Physics I & II by RA Banwait & R Dogra, Eagle Parkashan, Jalandhar
9. Applied Physics by Jasmer Kaur and Bhupinder Singh, Lords Publications, Jalandhar
10. Engineering Physics by Vanchna Singh and Sheeetal Kumar, Cengage Learning India Pvt. Ltd. Patparganj, Delhi

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DA104 APPLIED CHEMISTRY - I

	L	T	P
Periods/Week	3	-	2

RATIONALE

The role of Chemistry and chemical products in every branch of engineering is expanding greatly. Now a days various products of chemical industries are playing important role in the field of engineering with increasing number of such products each successive year. The strength of materials, the chemical composition of substances, their behavior when subjected to different treatment and environment, and the laws of heat and dynamic energy have entered in almost every activity of modern life. Chemistry is considered as one of the core subjects for diploma students in engineering and technology for developing in them scientific temper and appreciation of chemical properties of materials, which they have to handle in their professional career. Effort should be made to teach this subject through demonstration and with the active involvement of students.

DETAILED CONTENTS

1. Basics Concepts (08 Periods)

1.1 Definition of chemistry and its importance
1.2 Definition of matter, element, compound and mixtures, atom, molecule, ion, symbol, formula, valency and chemical equation.
1.3 Writing of the chemical formula of a simple chemical compound. Calculation of percentage composition of a chemical compound and form the empirical and molecular formula of the compound
1.4 Essentials of a chemical equation, balancing of a chemical equation by hit and trial method

2. Atomic Structure and Chemical Bonding (08 Periods)

2.1 Fundamental particles i.e. electron, proton and neutron, their characteristics (discovery is not included)
2.2 Electronic concept of valency
2.3 Elementary account of electrovalent, covalent and coordinate bond formation on the basis of the electronic concept of valency giving suitable examples to each
2.4 Hydrogen bonding and its effect on physical properties of the compounds
2.5 Electronic configuration of elements (up to Z = 30) with special reference to Aufbau principle

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3. Water (16 Periods)

3.1 Hard and soft water, types of hardness and its causes, disadvantages of hardness of water (i) in industrial use (ii) in boilers for steam generation with special reference to sludge and scale formation; foaming and priming in boilers

3.2 Methods to remove hardness of water (i) Clark's Process (ii) Permutit Process (iii) Soda Lime process (iv) Ion-Exchange resin process. Simple numerical problems related to soda lime process.

3.3 Definition of degree of hardness of water and the systems to express the degree of hardness of water. Simple numerical problems related to finding the degree of hardness on different scales. Estimation of hardness of water sample by O'Hehner's Method and E.D.T.A. Method

3.4 Qualities of water used for drinking purposes, treatment of river water to make it fit for town supply

3.5 Disinfection of water by chlorination process

4. Solutions (12 Periods)

4.1 Concept of homogenous solution, brief introduction of the terms (i) Ionization (ii) Acidity (iii) Basicity (iv) equivalent weight and gram equivalent weight with suitable examples

4.2 Strength of a solution (i) Normality (ii) Molarity (iii) Molality as applied in relation to a solution with simple numerical problems related to these terms

4.3 Definition of pH, and different industrial applications of pH, determination of pH of a solution with the help of pH meter including simple numerical problems.

5 Electrolysis (12 Periods)

5.1 Definition of the terms: Electrolytes, Non-electrolytes conductors and non-conductors with suitable examples

5.2 Faraday's Laws of Electrolysis with simple numerical problems

5.3 Different industrial applications of 'Electrolysis' with special reference to electroplating and electrorefining of metals

5.4 Basic concept of Buffer solutions, indicators and solubility product.

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6 Environmental Chemistry (08 Periods)

6.1 General concept of pollution and pollutants
6.2 Types and control of pollution like air, water, noise and soil pollution
6.3 General idea of ozone depletion, global warming

LIST OF PRACTICALS

1. Volumetric analysis and study of apparatus used therein. Simple problems on volumetric analysis equation
2. Preparation of standard solution of oxalic acid or potassium dichromate
3. To analyse the inorganic mixture for two acidic and two basic radicals from the following radicals
   a) Acidic Radicals CO_3^{--}, SO_4^{--}, NO_3^{-}, CH_3COO^{-}, Cl^{-}, Br^{-}, I^{-}
   b) Basic Radicals NH_4^{++}, Pb^{+}, Cu^{++}, Cd^{++}, As^{+++}, Sb^{+++}, Sn^{++}, Al^{+++}, Fe^{+++}, Cr^{+++}, Mn^{++}, Ni^{++}, Co^{++}, Zn^{++}, Ba^{++}, Sn^{++}, Ca^{++} and Mg^{++},
4. Determine the degree of temporary hardness of water by O'Heher's method
5. Estimation of total alkalinity of water volumetrically
6. Determine pH of a given sample by using pH meter
7. Determination of solubility of a solid at room temperature
8. Demonstration – Application of $FeCl_3$ in etching process for designing circuits on PCB (Printed Circuit Board)

RECOMMENDED BOOKS

1. Chemistry in Engineering by J.C. Kuriacose and J. Rajaram; Tata McGraw-Hill Publishing Company Limited, New Delhi
2. Engineering Chemistry by Dr. S. Rabindra and Prof. B.K. Mishra ; Kumar and Kumar Publishers (P) Ltd. Bangalore-40
3. A Text Book of Applied Chemistry-I by SS Kumar; Tata McGraw Hill, Delhi
4. A Text Book of Applied Chemistry-I by Sharma and Others; Technical Bureau of India, Jalandhar
5. Engineering Chemistry by Jain PC and Jain M,
6. Chemistry of Engineering by Aggarwal CV,
7. Chemistry for Environmental Engineers by Swayer and McCarty, McGraw Hill, Delhi
8. Progressive Applied Chemistry –I and II by Dr. G.H. Hugar; Eagle Prakashan, Jalandhar

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DA105 BASICS OF INFORMATION TECHNOLOGY

	L	T	P
Periods/Weeks	3	-	2

RATIONALE

Information technology has great influence on all aspects of life. Almost all work places and living environment are being computerized. In order to prepare diploma holders to work in these environments, it is essential that they are exposed to various aspects of information technology such as understanding the concept of information technology and its scope; operating a computer; use of various tools of MS office; using internet etc. form the broad competency profile of diploma holders. This exposure will enable the students to enter their professions with confidence, live in a harmonious way and contribute to the productivity.

DETAILED CONTENTS

1. Information Technology – its concept and scope (2 Periods)
2. Elements of a computer system, its usefulness and applications, block diagram of a computer, CPU, memory, data – numeric data, alpha numeric data; contents of a program, processing of data (4 Periods)
3. Computer organization, computer hardware and software; primary and secondary memory: RAM, ROM, PROM etc. (4 Periods)
4. Input devices; keyboard, scanner, mouse etc.; output devices; VDU and Printer, Plotter (4 Periods)
5. Primary and Secondary Storage (Auxiliary Storage), Secondary storage; magnetic disks – tracks and sectors, optical disk (CD, CD-RW and DVD Memory) (4 Periods)
6. Introduction to Operating Systems such as MS-DOS and Windows (4 Periods)
7. Introduction to internet, browsing using search engine (like google etc.) (5 Periods)
8. Basics of Networking – LAN, WAN, Topologies (5 Periods)

LIST OF PRACTICALS

1. Given a PC, name its various components and list their functions
2. Identification of various parts of a computer and peripherals
3. Practice in installing a computer system by giving connection

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4. DOS Commands (internal / external) e.g. TYPE, REN, DEL, CD, MD, COPY, TREE, BACKUP

5. Exercises on entering text and data (Typing Practice using any tutor)

6. Features of Windows as an operating system
   - Start
   - Shutdown and restore
   - Creating and operating on the icons
   - Opening closing and sizing the windows
   - Using elementary job commands like – creating, saving, modifying, renaming, finding and deleting a file
   - Creating and operating on a folder
   - Changing setting like, date, time color (back ground and fore ground)
   - Using short cuts
   - Using on line help

7. MS-Word
   - 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
   - Page Set up:
     Setting margins, tab setting, ruler, indenting
   - Editing a document:
     Entering text, Cut, copy, paste using tool- bars
   - 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
   - Inserting date, time, special symbols, importing graphic images, drawing tools
   - 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
   - Using Tools like:
     Spell checker, help, use of macros, mail merge, thesaurus word content and

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statistics, printing envelops and labels
- Using shapes and drawing toolbar,
- Working with more than one window in MS Word,
- How to change the version of the document from one window OS to another
- Conversion between different text editors, software and MS word

8. MS-Excel
   - Starting excel, open worksheet, enter, edit, data, formulae to calculate values, format data, create chart, printing chart, save worksheet, switching between different spread sheets
   - Menu commands:
     Create, format charts, organize, manage data, solving problem by analyzing data, exchange with other applications. Programming with MS-Excel, getting information while working
   - 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, working with arrays
   - Editing a worksheet, copying, moving cells, pasting, inserting, deletion cells, rows, columns, find and replace text, numbers of cells, formatting worksheet
   - 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

9. MS PowerPoint
   a) Introduction to PowerPoint
      - How to start PowerPoint
      - Working environment: concept of toolbars, slide layout, templates etc.
      - Opening a new/existing presentation
      - Different views for viewing slides in a presentation: normal, slide sorter etc.
   b) Addition, deletion and saving of slides
   c) How to view the slide show?
      - Viewing the presentation using slide navigator
      - Slide transition
      - Animation effects etc.

10. Internet and its Applications
    a) Log-in to internet
    b) Navigation for information seeking on internet
    c) Browsing and down loading of information from internet

d) 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

INSTRUCTIONAL STRATEGY

Since this is an introductory computer related subject, the teacher should demonstrate and explain computer and its peripherals in the laboratory. The theory may be dovetailed with practical exercises for better understanding. The students may be encouraged to work independently on computer to gain confidence.

RECOMMENDED BOOKS

1. Fundamentals of Computer by V. Rajaraman; Prentice Hall of India Pvt. Ltd., New Delhi
2. Computers Today by SK Basandara, Galgotia Publication Pvt ltd. Darya Ganj, New Delhi.
3. MS-Office 2000 for Everyone by Sanjay Saxena; Vikas Publishing House Pvt. Ltd., New Delhi
4. Internet for Every One by Alexis Leon and Mathews Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
5. A First Course in Computer by Sanjay Saxena; Vikas Publishing House Pvt. Ltd., Jungpura,New Delhi
6. Mastering Windows 95, BPB Publication, New Delhi
7. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
8. Fundamentals of Information Technology by Leon and Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
9. On Your Marks - Net...Set...Go... Surviving in an e-world by Anushka Wirasinha, Prentice Hall of India Pvt. Ltd., New Delhi
10. Learning MS Office XP by Ramesh Bangia, Khanna Book Publishing Co. (P) Ltd., New Delhi.
11. Fundamentals of Information Technology by Vipin Arora, Eagle Parkashan, Jalandhar

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L T P

DA106 ENGINEERING DRAWING – I

Periods/Weeks - - 6

RATIONALE

Drawing is said to be the language of engineers and technicians. Reading and interpreting engineering drawing is their day-to-day responsibility. The course is aimed at developing basic graphic skills 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.

Note:
1. First angle projection is to be followed
2. Instruction relevant to various drawings may be given along with appropriate demonstration, before assigning drawing practice to the students
3. S.P. 46.1988 should be followed
4. Minimum of 15 sheets to be prepared by each student

DETAILED CONTENTS

1. Drawing Office Practice, Lines & Lettering (2 Sheets)

   1.1 Drawing instruments
   1.2 Sizes and layout of standard drawing sheets and drawing boards
   1.3 Different types of lines in engineering drawing as per BIS specifications
   1.4 Free hand lettering (alphabet and numerals) lower case and upper case, single stroke vertical and inclined at 75 degree in different standard series of 2.5, 3, 5, 7, 10, and 15 mm heights in the ratio of 7:4

2. Dimensioning (2 Sheets)

   2.1 Necessity of dimensioning, Types of dimensioning (chain, parallel and progressive dimensioning, size and location dimensioning)
   Methods of placing dimensioning (Aligned and unidirectional system), use of leader lines. General principles of dimensioning.
   2.2 Dimensioning of overall sizes, circles, thread holes, chamfered surfaces, angles, tapered surface holes equally spaced on PCD, counter sunk hole counter bored holes, cylindrical parts, narrow space and gaps, radii, curves and arches.

3. Simple Geometrical Constructions used in Engineering Practice (2 Sheets)

   3.1 Construction of regular polygons (triangle, square, pentagon, hexagon) and circles
   3.2 Ellipses (concentric circle method and Intersecting Arcs method)
   3.3 Parabola (rectangle and tangent method), cycloid

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4. Scale (2 sheets)

4.1 Scale – their need and importance, Definition of representative fraction (R.F), find RF of given scale

4.2 Construction of plain and diagonal scales

5. Principle of Projections (7 sheets)

5.1 Principle of orthographic projection and introduction to first angle projection and third angle projection

5.2 Projection of points situated in different quadrants (1 Sheet)

5.3 Projection of lines, Lines inclined to one plane and parallel to the other and vice versa (1st &3rd quadrants); Line inclined to both reference planes (HP and VP)) (1 Sheet)

5.4 Projection of Planes: Planes perpendicular and parallel to either of the planes; planes perpendicular to one plane and inclined to the other or vice versa (1st & 3rd quadrants) (1 Sheet)

5.5 Projection of solids, such as Prism, Cube, Cylinder and Cones with axis perpendicular to horizontal plane or parallel to horizontal plane/vertical plane or both

5.6 Drawing 3 orthographic views of given objects (3 sheets, at least one sheet in 3rd Angle Projection)

5.7 Identification of surfaces on drawn orthographic views from isometric object drawn (1Sheet)

6. Sectional Views (1 sheet)

6.1 Need for sectional views –Drawing of different conventions for materials in sections, conventional breaks for shafts, pipes, rectangular, square, angle, channel and rolled sections

7. Isometric Views (2 sheets)

7.1 Fundamentals of isometric projections (theoretical instructions) and isometric scales

7.2 Isometric views of combination of regular solids like cylinder, cone, cube, prism and pyramid

8. Symbols and Conventions (2 sheets)

8.1 Civil engineering sanitary fitting symbols

8.2 Electrical fitting symbols for domestic interior installations and electronics symbols

8.3 Building plan drawing with electrical and civil engineering symbols

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RECOMMENDED BOOKS

1 Engineering Drawing by C M Verma, Takniki Parkashak, Roorkee.

2. Elementary Engineering Drawing (in First Angle Projection) by ND Bhatt, Charotar Publishing House

3. A Text Book of Engineering Drawing by Surjit Singh ; Dhanpat Rai and Co., Delhi

4. Engineering Drawing by PS Gill ; SK Kataria and sons, Delhi

5. Engineering Drawing by RB Gupta ; Satya Prakashan, New Delhi

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DAP107 GENERAL WORKSHOP PRACTICE – I

	L	T	P
Periods/Week	-	-	6

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 hand on experience about use of different tools and basic manufacturing practices. This course aims at developing general manual and machining skills in the students. Besides above, the development of dignity of labour, precision, safety at work place, team working and development of right attitude are the other objectives.

DETAILED CONTENTS (PRACTICALS)

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. Carpentry and Painting Shop-1
2. Fitting Shop
3. Welding Shop-I
4. Electric Shop –I
5. Smithy Shop or Electronic Shop-I
6. Sheet Metal Shop

Note:

1. The branches e.g. Civil Engineering, Electrical Engineering and Automobile Engineering, will do **Smithy Shop** instead of Electronic Shop- I
2. The branches e.g. Electronics and Communication Engineering, Computer Engineering and Information Technology will do **Electronic Shop-I** instead of Smithy Shop.

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1. Carpentry and Painting Shop -I

1.1 Introduction to various types of wood such as Deodar, Kail, Partal, Teak, Mango, Sheesham, etc. (Demonstration and their identification).

1.2 Demonstration, function and use of commonly used hand tools. Care, maintenance of tools and safety measures to be observed.

Job I Marking, sawing, planning and chiseling & their practice (size should be mentioned)

1.3 Introduction to various types of wooden joints, their relative advantages and uses.

Job II Preparation of half lap joint

Job III Preparation of Mortise and Tenon Joint

1.4 Demonstration of various methods of painting wooden items.

Job IV Preparation of wooden surface before painting including primer coating

Job V Painting Practice by brush/spray

Job VI Preparation of surface, before Painting such as cleaning, sanding, putty. Procedure and application of primer code and painting steel items.

1.5 Safety precautions in carpentry shop

2. Fitting Shop

2.1 Introduction to fitting shop tools, common materials used in fitting shop, Identification of materials. Such as Steel, Brass, Copper, Aluminum etc. Identification of various sections of steel such as Flat, Angle, Tee, Channel, Bar Girder, Square, Z-Section, etc.

2.2 Description and demonstration of various types of work benches, holding devices and files. Precautions while filing.

2.3 Description and demonstration of simple operation of hack-sawing, demonstration and description of various types of blades and their specifications, uses and method of fitting the blade.

Job I Marking of job, use of marking tools and measuring instruments.

Job II Filing a dimensioned rectangular or square piece of an accuracy of ± 0.5mm

Job III Filing practice (production of flat surfaces). Checking by straight edge.

Job IV Making a cutout from a square piece of MS Flat using hand hacksaw.

2.4 Care and maintenance of measuring tools like calipers, steel rule, try square, vernier calipers, micrometer, height gauge, combination set. Handling of measuring instruments, checking of zero error, finding of least count (all gauges including dial gauge).

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3. Welding Shop – I

3.1 (a) Introduction to welding and its importance in engineering practice; types of welding; common materials that can be welded, introduction to welding equipment e.g. a.c. welding set, d.c. rectifier, electrode holder, electrodes and their specifications, welding screens and other welding related equipment, accessories and gloves.

(b) Safety precautions during welding

(c) Hazards of welding and its remedies

3.2 Electric arc welding, (a.c. and d.c.) precautions while using electric arc welding, Practice in setting current and voltage for striking proper arc. Earthing of welding machine.

Job I Practice of striking arc bending and tacking while using electric arc welding set.

Job II Welding practice on electric arc welding for making uniform and straight weld beads

3.3 Various types of joints and end preparation.

Job III Preparation of butt joint by electric arc welding.

Job IV Preparation of lap joint by electric arc welding.

Job V Preparation of corner joint by using electric arc welding.

Job VI Preparation of Tee joint by electric arc welding.

4. Electric Shop – I

4.1 Study, demonstration and identification of common electrical materials such as wires, cables, switches, fuses, ceiling roses, PVC Conduits, PVC Channels and allied items, tools along with electrical instruments such as voltmeter, ammeter and multimeter.

4.2 Study of electrical safety measures and demonstration about use of protective devices such as fuses, MCBs, ELCBs and relays including earthing.

Job I Identification of phase, neutral and earth of domestic appliances and their connection to two pin/three pin plugs.

Job II Preparation of a house wiring circuit on wooden board using fuse, switches, socket, holder, ceiling rose etc. in PVC conduit and PVC casing and capping wiring system.

4.3 Study of common electrical appliances such as electric iron, electric kettle, ceiling fan, table fan, electric mixer, electric Geyser, gas geyser, desert cooler, refrigerator, water purifier

4.4 Introduction to lead-acid battery, identification of parts and its working.

Job III Installation of inverter with battery and to connect two or more batteries in series and in parallel (knowledge of a.c. and d.c.)

Job IV Charging of a battery and testing it with the help of hydrometer and cell tester

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5. Smithy Shop

5.1 Demonstration and detailed explanation of tools and equipment used. Forging operations in smithy shop. Safety measures to be observed in the smithy shop.

5.2 Demonstration and description of bending operation, upsetting operation, description and specification of anvils, swage blocks, hammers etc.

5.3 Demonstration and description of tongs, fullers, swages etc.

Job I To forge a L-hook.

Job II To prepare a job involving upsetting process

Job III To forge a chisel

Job IV To prepare a cube from a M.S. round by forging method.

OR

5. Electronic Shop – I

5.1 Identification and familiarization with the following tools used in electronic shop: Such as Tweezers, Screw drivers (different sizes), Insulated Pliers, Cutter, Sniper, Philips Screw Driver (Star Screw Driver), L- Keys, Soldering Iron, soldering wire, flux. Their demonstration and uses.

5.2 Identification and familiarization with Multimeter (analog and digital)

Job I Practice in the use of above mentioned tools and instruments. For this a small experimental set up may be done

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

5.4 Identification and familiarization with ear phone speaker connector, telephone jacks and similar male and female connectors (audio, video)

5.5 Safety precautions to be observed in the electronic shop

5.6 Identification and familiarization with soldering and desoldering practice

5.7 Introduction to thimbles and crimping tools

NOTE: Demonstration boards for the electronics components such as resistor, capacitor, diodes, transistors, FETs, IFT Coils, ICs should be made.

Job II Cut, strip, join an insulated wire with the help of soldering iron (repeat with different types of wires)

Job III Cut, strip, connect/solder/crimp different kinds of wires/ cables (including co-axial and shielded cable) to different types of power/general purpose/audio video/telephone plugs, sockets, jacks, terminals, binding posts, terminal strips, connectors. The tasks should include making complete recording/ playback/ antenna/ speaker leads for common electronic products such as Radio, TV, CD players, VCD/DVD players, cassette recorder and players, Hi-Fi equipment, hand- set, microphone

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6. Sheet Metal Shop

Introduction to sheet metal shop, 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 and specifications.

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

6.2 Introduction and demonstration of various machines and equipment used in sheet metal shop e.g. shearing machine, bar folder, burring machine, power press, sheet bending machine.

6.3 Introduction and demonstration of various raw materials used in sheet metal shop e.g., M.S. sheet, galvanized-iron plain sheet, galvanized corrugated sheet, aluminum sheets etc.

6.4 Study of various types of rivets, steel screw etc.

Job I Shearing practice on a sheet using hand shears.

a) Practice on making single riveted lap joint/double riveted lap Joint.
b) Practice on making single cover plate chain type, seam joint and riveted butt joint

RECOMMENDED BOOKS

1. Workshop Technology I,II,III, by S K Hajra, Choudhary and A K Chaoudhary. Media Promoters and Publishers Pvt. Ltd., Bombay
2. Workshop Technology by Manchanda Vol. I,II,III India Publishing House, Jalandhar.
3. Manual on Workshop Practice by K Venkata Reddy, KL Narayana et al; MacMillan India Ltd. New Delhi
4. Basic Workshop Practice Manual by T Jeyapoovan; Vikas Publishing House (P) Ltd., New Delhi
5. Workshop Technology by B.S. Raghuwanshi, Dhanpat Rai and Co., New Delhi
6. Workshop Technology by HS Bawa, Tata McGraw Hill Publishers, New Delhi.

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SECOND SEMESTER

DA201: ENGLISH AND COMMUNICATION SKILLS – II

	L	T	P
Periods/Week	3	-	2

RATIONALE

Interpersonal communication is a natural and necessary part of organizational life. Yet, communicating effectively can be challenging because of our inherent nature to assume, overreact to and misperceive what actually is happening. Poor communication or lack of communication is often cited as the cause of conflict and poor teamwork. In today's team-oriented workplace, managing communication and developing strategies for creating shared meaning are crucial to achieve results and create successful organizations. The goal of the Communicating Skills course is to produce civic-minded, competent communicators. To that end, students must demonstrate oral as well as written communication proficiency. These include organizational and interpersonal communication, public address and performance. The objectives of this subject are understanding how communication works, gaining active listening and responding skills, understanding the importance of body language, acquiring different strategies of reading texts and increasing confidence by providing opportunities for oral and written expressions

DETAILED CONTENTS

Section A

1.FACETS OF LITERATURE (22 Periods)

- 1.1 Fiction
  - 1.1.1 The Portrait of a Lady - Khushwant Singh
  - 1.1.2 The Doll's House – Katherine Mansfield
  - 1.1.3 The Refugees – Pearl S. Buck
- 1.2 Prose
  - 1.2.1 Of Truth – Francis Bacon
  - 1.2.2 Praises of Solitude – Samuel Johnson
  - 1.2.3 A Gentleman – John Henry Newman
- 1.3 Poems
  - 1.3.1 All The World's A Stage – W. Shakespeare
  - 1.3.2 A Solitary Reaper – William Wordsworth

2. READING SKILLS (08 Periods)

Unseen comprehension passages (at least 3 passages).

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Section B

3. WRITING SKILLS (16 Periods)

Writing Notice Page 31 of 21
Writing Circular
Writing a Memo
Agenda for a Meeting
Minutes of the Meeting
Press release
Telephonic Messages
Paragraph writing:
Simple and Current Topics should be covered.

4. Correspondence (06 Periods)
Business Letters
Personal Letters

5. Communication (12 Periods)
Media and Modes of Communication
Channels of Communication
Barriers to Communication
Listening Skills
Body language
Humour in Communication

LIST OF PRACTICALS

(Note: The following contents are only for practice. They should not be included in the final theory examination)

1. LISTENING COMPREHENSION
   a. Locating Main Ideas in a Listening Excerpt, Note-taking

2. DEVELOPING ORAL COMMUNICATION SKILLS
   a. Offering-Responding to Offers, Requesting-Responding to Requests, Congratulating, Expressing Sympathy and Condolences, Expressing Disappointments, Asking Questions-Polite Responses, Apologizing, Forgiving

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Complaining, Persuading, Warning, asking for and Giving Information, Giving Instructions, Getting and Giving Permission, asking for and Giving Opinions, Group Discussion

TEXTBOOK:

1. Communication Techniques and Skills by R. K. Chadha; Dhanpat Rai Publications, New Delhi

LIST OF REFERENCE BOOKS

1. Communicating Effectively in English, Book-I by Revathi Srinivas; Abhishek Publications, Chandigarh.
2. High School English Grammar and Composition by Wren & Martin; S. Chand & Company Ltd., Delhi.
3. Communication Techniques and Skills by R. K. Chadha; Dhanpat Rai Publications, New Delhi.

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DA202: APPLIED MATHEMATICS - II

	L	T	P
Periods/Week	3	-	-

RATIONALE

Applied Mathematics forms the backbone of engineering students. The curriculum of mathematics has undergone changes from time to time in accordance with growth of subject. Diploma in Engineering is a launching stage where the students learn the basics of engineering. The revised syllabus has been designed keeping in view the emerging needs of all categories of students. Great emphasis has been laid on application of various contents like differential calculus, integral calculus, differential equations and statistics. This course will develop analytical abilities to make exact calculations and provide continuing educational base to the students.

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.

DETAILED CONTENTS

1. Differential Calculus (30 Periods)

Definition of function; Concept of limits.

Four standard limits $\lim_{x \to a} \frac{x^n - a^n}{x - a}$,

$\lim_{x \to 0} \frac{\sin x}{x}$, $\lim_{x \to 0} \frac{a^x - 1}{x}$, $\lim_{x \to 0} (1+x)^{1/x}$

Differentiation by definition of x^n, sin x, cos x, tan x, e^x, $\log_a x$ only

Differentiation of sum, product and quotient of functions. Differentiation of function of a function.

Differentiation of inverse trigonometrical functions, Logarithmic differentiation, Exponential differentiation, Successive differentiation (up to third order only).

Applications:

(a) Maxima and minima

(b) Equation of tangent and normal to a curve (for explicit functions only) – Simple problems only

2. Integral Calculus (25 Periods)

Integration as inverse operation of differentiation

Simple standard integrals and related problems

Simple integration by substitution, by parts and by partial fractions (for

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linear factors only)
Properties of definite integrals
Evaluation of definite integrals (simple problems)-

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

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

Numerical integration by Simpson's Rule and Trapezoidal Rule (simple problems only)

3 Ordinary Differential Equations (10 Periods)

3.1 Definition, order, degree, linear and non-linear differential equations
3.2 Formation of differential equations (up to second order)
3.3. Solution of first order differential equations (a) Variable Separable (b) Homogeneous (c) Linear and (d) Exact.

4. Statistics (15Periods)

Measures of Central Tendency: Mean, Median, Mode
Measures of Dispersion: Mean deviation, Standard deviation
Co-efficient of rank correlation

TEXTBOOK:

1. Applied Mathematics by Dr. RD Sharma, Dhanpat Rai Publications, Delhi

RECOMMENDED BOOKS

1. Applied Mathematics by Dr. RD Sharma, Dhanpat Rai Publications, Delhi
2. Elementary Engineering Mathematics by BS Grewal, Khanna Publishers, New Delhi
3. Applied Mathematics-I (Hindi) by Dr. Kailash Sinha, Nav Bharat Publication, Meerut.
4. Engineering Mathematics by Vol. I & II by S Kohli, IPH, Jalandhar
5. Applied Mathematics, Vol. I & II by SS Sabharwal & Sunita Jain, Eagle Parkashan, Jalandhar

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DA203: APPLIED PHYSICS – II

	L	T	P
Periods/Week	3	-	2

RATIONALE

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

DETAILED CONTENTS

1. Optics (10 Periods)

Review of basic optics laws: reflection and refraction

Refraction and refractive index, image formation in lenses, image magnification, lens formulae (thin lens only), power of lens, total internal reflection and their applications

Simple and compound microscope, astronomical telescope, magnifying power and its calculation (in each case), Terrestrial and Galileo's telescope (Concept only) and their applications

2. Electrostatics (12 Periods)

Coulombs law, unit of charge, electric potential and electric potential difference

Electric field, electric field intensity, electric lines of force, electric flux Gauss's Law

Applications of Gauss law in finding electric field of point charge, straight charged conductor, plane charged sheet and between two plane parallel charged sheets

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

Application of electrostatics in electrostatic precipitator

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3. DC Circuits (12 Periods)

Concept of electricity, current and its units, direct and alternating current, voltage, resistance and resistivity, potential difference and e.m.f., Concept and applications of potentiometer.

Ohm's law and its applications, concept of resistance, conductance, specific resistance, effect of temperature on resistance, co-efficient of resistance, series and parallel combination of resistors, introduction to super conductivity.

Kirchhoff's laws, Wheatstone bridge principle and its applications (Slide Wire Bridge)

Heating effect of current and concept of electric power, energy and their units, related numerical problems

Application of electricity in various equipment, advantages of electrical energy over other forms of energy

4. Electromagnetism (13 Periods)

Magnetic field and its units, magnetic intensity, magnetic lines of force, magnetic flux and their units, Right hand thumb rule, magnetic lines of force due to straight conductor, circular coil and solenoid

Force on a charge, moving in a uniform magnetic field (Lorentz force). Force on a current carrying straight conductor. Torque on a current carrying rectangular coil.

Moving coil galvanometer conductor, its principle, construction and working, conversion of a galvanometer into ammeter and voltmeter.

Electromagnetic induction, Faradays Laws, Lenz's Law.

Applications of Electromagnetism

5. Semiconductor physics (07 Periods)

Energy bands, intrinsic and extrinsic semiconductors, p-n junction diode and its characteristics

Diode as rectifier – half wave and full wave rectifier, semiconductor transistor pnp and npn (concept only)

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6. Modern Physics (10 Periods)

Electrom agnetic spectrum, photo electric effect and work function, X rays -properties, production and their applications in medicine and industries.

Lasers: concept of energy levels, ionizations and excitation potentials; spontaneous and stimulated emission; lasers and its characteristics, population inversion, types of lasers, Helium- Neon and ruby lasers, their engineering and medical applications

Fiber optics: introduction to optical fiber materials, types, light propagation and applications in communication.

LIST OF PRACTICALS (To perform minimum eight experiments)

1. Conversion of Galvanometer into an Ammeter of given range.
2. Conversion of Galvanometer into Voltmeter of given range.
3. To verify ohm's laws by drawing a graph between voltage and current.
4. To verify laws of resistances in series and in parallel connection.
5. To draw characteristics of a pn junction diode and determine knee and break down voltages
6. Verification of Kirchhoff's Laws
7. Determination of resistivity by Wheatstone bridge
8. To determine the resistance of electronic components by multimeter
9. Determination of internal resistance of primary cell by using ammeter and voltmeter
10. To determine emf of primary cell using potentiometer and standard voltage source.

INSTRUCTIONAL STATREGY

Teacher may use various instructional media like models, charts and graphs while imparting instructions. The field application should be made clear before teaching the basics of waves, sound, light, electrostatics, dc circuits, electromagnetism, and semiconductor physics etc to develop proper understanding of the physical phenomenon. Use of demonstration can make the subject interesting and develop scientific temper in the students.

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TEXTBOOK:

1. Applied Physics Vol II by Jasmer Kaur and Bhupinder Singh, Lords Publications, Jalandhar

RECOMMENDED BOOKS

1. Text Book of Physics for Class XI (Part-I, Part-II) N.C.E.R.T
2. Applied Physics, Vol. I and Vol. II, TTTI Publications, Tata McGraw Hill, Delhi
3. Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi
4. Fundamentals of Physics by Resnick, Halliday and Walker, Asian Book Pvt. Ltd., New Delhi
5. Fundamentals of Optics by Francis A. Jenkins & Harvey E White, McGraw Hill International Editions, Physics Series
6. A Text Book of Optics, Subramanian and Brij Lal, S Chand & Co., New Delhi
7. Comprehensive Practical Physics, Vol, I & II, JN Jaiswal, Laxmi Publishers
8. Engineering Physics by PV Naik, Pearson Education Pvt. Ltd, New Delhi
9. Applied Physics I & II by RA Banwait & R Dogra, Eagle Parkashan, Jalandhar
10. Applied Physics Vol II by Jasmer Kaur and Bhupinder Singh, Lords Publications, Jalandhar
11. Basic Electronics and Linear Circuits by NN Bhargava et al Tata Mc Graw Hill Publishers, New Delhi
12. Principles of Electronics by SK Sahdev, Dhanpat Rai and Co, New Delhi
13. Engineering Physics by Vanchna Singh and Sheeetal Kumar, Cengage Learning India Pvt. Ltd. Patparganj, Delhi

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DA204: APPLIED CHEMISTRY-II

	L	T	P
Periods/Week	3	-	2

RATIONALE

The role of Chemistry and chemical products in every branch of engineering is expanding greatly. Now a days various products of chemical industries are playing important role in the field of engineering with increasing number of such products each successive year. The strength of materials, the chemical composition of substances, their behavior when subjected to different treatment and environment, and the laws of heat and dynamic energy have entered in almost every activity of modern life. Chemistry is considered as one of the core subjects for diploma students in engineering and technology for developing in them scientific temper and appreciation of chemical properties of materials, which they have to handle in their professional career. Effort should be made to teach this subject through demonstration and with the active involvement of students.

DETAILED CONTENTS

1. Metallurgy (12 Periods)

A brief introduction of the terms: Metallurgy, mineral, ore, gangue or matrix, flux, slag, concentration (methods of concentrating the ores), roasting calcination and refining as applied in relation to various metallurgical operations
Metallurgy of (i) Aluminum (ii) Iron
Definition of an alloy, purposes of alloying, composition and uses of alloys like magnalium, duralumin, alnico, invar and stainless steel

2. Fuels (16 Periods)

Definition of a 'Fuel', characteristics of a good fuel and classification of fuels with suitable examples
Definition of Calorific value of a fuel and its determination for a solid fuel with the help of Bomb calorimeter with simple numerical problems.
Merits of gaseous fuels over those of other varieties of fuels
Manufacture, composition, properties and uses of (i) Water gas (ii) Oil gas (iii) Biogas (iv) Compressed Natural gas (CNG) Octane Number and Cetane Number

3 Corrosion (08 Periods)

Meaning of the term 'corrosion' and its definition

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Theories of corrosion i.e. (i) direct chemical action theory and (ii) electro chemical theory

Prevention of corrosion by
(a) Alloying
(b) Providing metallic coatings
(c). Sacrificial cathodic protections:

4 Lubricants (08 Periods)

Definition of (i) lubricant (ii) lubrication
Classification of lubricants
Principles of lubrication
(i) fluid film lubrication
(ii) boundary lubrication

Characteristics of a lubricant such as viscosity, viscosity index, volatility, oxidation, oiliness, acidity, emulsification, flash point, fire point and pour point.
Importance of additives in lubricants
Dewaxing and solvent refining of liquid lubricants

5 Cement and Glass (04 Periods)

General introduction to cement and glass

Manufacture of Cement

Manufacture of ordinary glass and lead glass

6. Classification and Nomenclature of Organic Compounds (16 Periods)

Classification of Organic Compounds, functional group, Homologous Series

Physical and Chemical properties, and industrial use of Organic Compound

IUPAC system of nomenclature of Carboxylic acid, Alcohols, Phenols, Aldehydes, Ketones and Amines (first six members of each series only).

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LIST OF PRACTICALS

1. Gravimetric analysis and study of apparatus used there in
2. To determine the percentage composition of a mixture consisting of a volatile and a non-volatile substance
3. Estimate the amount of moisture in the given sample of coal
4. Esterification and ceric ammonium tests of alcohol
5. Sodium carbonate and Ester test of carboxylic acids
6. To determination the amount of copper in the given sample of copper sulphate with the help of N/20 sodium thiosulphate solution.
7. Detection of metal iron in the rust (solution of rust in concentrated HCL may be given)
8. Demonstration to determine calorific value of a solid fuel with the help of Bomb Calorimeter

TEXTBOOK:

1. Applied Chemistry-II by Dr. J K Sharma, Abhishek Publications, Sector 17-C, Chandigarh

RECOMMENDED BOOKS

1. Chemistry in Engineering by J.C. Kuriacose and J. Rajaram; Tata McGraw-Hill Publishing Company Limited, New Delhi
2. Engineering Chemistry by Dr. S. Rabindra and Prof. B.K. Mishra ; Kumar and Kumar Publishers (P) Ltd. Bangalore-40
3. A Text Book of Applied Chemistry-II by SS Kumar; Tata McGraw Hill, Delhi
4. A Text Book of Applied Chemistry-II by Sharma and Others; Technical Bureau of India, Jalandhar
5. Engineering Chemistry by Jain PC and Jain M,
6. Chemistry of Engineering by Aggarwal CV,
7. Chemistry for Environmental Engineers by Swayer and McCarty, McGraw Hill, Delhi
8. Progressive Applied Chemistry –I and II by Dr. G.H. Hugar; Eagle Prakashan, Jalandhar
9. Applied Chemistry-II by Dr. J K Sharma, Abhishek Publications, Sector 17-C, Chandigarh.

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DA205: ENVIRONMENTAL SCIENCE

	L	T	P
Periods/Week	3	-	-

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 eco system and controlling pollution by pollution control measures. He should also be aware of environmental laws related to the control of pollution.

DETAILED CONTENTS

1. Basics of ecology, eco system and sustainable development (03 Periods)

2. Conservation of land reforms, preservation of species, prevention of advancement of deserts and lowering of water table (04 Periods)

3. Sources of pollution - natural and man-made, their effects on living and non-living organisms, Pollution of water - causes, effects of domestic wastes and industrial effluent on living and non-living organisms, Pollution of air-causes and effects of man, animal, vegetation and non-living organisms, Sources of noise pollution and its effects

4. Solid waste management; classification of refuse material, types, sources and properties of solid wastes, abatement methods (06 Periods)

5. Mining, blasting, deforestation and their effects (03 Periods)

6. Legislation to control environment (04 Periods)

7. Environmental Impact Assessment (EIA), Elements for preparing EIA statements (04 Periods)

8. Current issues in environmental pollution and its control, role of non-conventional sources of energy in environmental protection (06 Periods)

TEXTBOOK:

1. Environmental Science by Deswal and Deswal; Dhanpat Rai and Co. (P) Ltd. Delhi.

RECOMMENDED BOOKS

1. Environmental and Pollution Awareness by Sharma BR; Satya Prakashan, New Delhi.
2. Environmental Protection Lqw and Policy in India by Thakur Kailash; Deep and Deep Publications, New Delhi.
3. Environmental Engineering and Management by Suresh K Dhamija; SK Kataria and Sons, New Delhi.
4. Environmental Science by Deswal and Deswal; Dhanpat Rai and Co. (P) Ltd. Delhi.

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DA206: ENGINEERING DRAWING – II

	L	T	P
Periods/Week	-	-	6

RATIONALE

Drawing is said to be the language of engineers and technicians. Reading and interpreting engineering drawing is their day-to-day responsibility. The course is aimed at developing basic graphic skills so as to enable them to use these skills in preparation of engineering drawings, their reading and interpretation

Note:
1. First angle projection is to be followed
2. Minimum of 15 sheets to be prepared by each student
3. SP 46 – 1988 should be followed
4. Instructions relevant to various drawings may be given along with appropriate demonstration, before assigning drawing practice to the students

DETAILED CONTENTS

1. Section of Solids by Different Cutting Planes

2. Development of Surfaces (2 sheets)

   Development of surfaces – cubes, prisms, (square, pentagonal and hexagonal), cylinders, pyramids (square, pentagonal, hexagonal) and cones

3. Detail and Assembly Drawing (2 sheets)

   Principle and utility of detail and assembly drawings
   Wooden joints i.e., corner mortice 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

4. Threads (2 sheets)

   Nomenclature of threads, types of threads (metric), single and multiple start threads
   Forms of various external thread sections such as V, square and acme threads, BA, BSW and Knuckle, Metric, Seller Thread, Buttress Threads
   Simplified conventions of left hand and right-hand threads, both external and internal threads

5. Locking Devices (1 sheet)

   Lock nut, castle nut, split pin nut, sawn nut, slotted nut

6. Nuts and Bolts (3 sheets)
Different views of hexagonal and square nuts; Assembly of hexagonal headed, square headed, square headed with square neck, bolts with hexagonal and square nuts and washers. Foundations bolts – Rag bolt and Lewis's bolt

7. Screws, Studs and Washers (1 sheet)
Drawing various types of machine screws
Drawing various types of studs and set screws

8. Keys and Cotters (2 sheets)
Various types of keys and cotters and their practical application and preparation of drawing of various keys and cotters showing keys and cotters in position
Cotter joints (i) gib and cotter joint (ii) knuckle joint

9. Rivets and Riveted Joints (2 sheets)
Types of structural and general purposes rivet heads
Caulking and fullering of riveted joints
Types of riveted joints – lap, butt (single riveted, double riveted lap joint, single cover plate and double cover plate), chain and zig – zag riveting

10. Welded Joints (1 sheet)
Various conventions and symbols of welded joints (IS 696)
Practical applications of welded joints say joints on steel frames, windows, doors and furniture

11. Couplings (2 sheets)
Muff or Box coupling, half lap muff coupling
Flange coupling (Protected and non-protected)
Flexible coupling

12. AutoCAD (for practical and viva only)

Practice on drawing commands, editing commands
Practice on sectioning and hatching
Practice on preparing simple drawings

TEXTBOOK:

1. A Text Book of Engineering Drawing by Surjit Singh, Dhanpat Rai and Co. Delhi

RECOMMENDED BOOKS

1 Engineering Drawing by C M Verma, Takniki Parkashak, Roorkee.
2. Elementary Engineering Drawing by ND Bhatt, Charotar Publishing House
3. A Text Book of Engineering Drawing by Surjit Singh, Dhanpat Rai and Co. Delhi
4. Engineering Drawing by PS Gill, SK Kataria and Sons, New Delhi
5. Machine Drawing by RB Gupta, Satya Prakashan, New Delhi.

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Note:

1 A minimum of 15 sheets should be prepared by each student

2. No table is suggested for distribution of marks, instead it is emphasized that the examination paper should contain exercises for evaluation of all necessary skills envisaged in the curriculum.

3. It is also suggested that a comprehensive viva of each student should be conducted by an external examiner during or just after the examinations to ascertain understanding of the subject e.g., reading and interpreting drawingsand development of necessary skills etc.

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DAP207: GENERAL WORKSHOP PRACTICE - II

	L	T	P
Periods/Weeks	-	-	6

RATIONALE

Psychomotor skills are mastered through practice, an opportunity therefore, has been extended to students through this course to refine their skills in different trades. The basic skills developed during first semester will be refined during this course by doing higher order skills jobs. In addition to developing general manual and machining skills in the students, the objective of development of sense of dignity of labour, precision, safety at work places, team working and right attitude among the students will also be met.

DETAILED CONTENTS (PRACTICALS)

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. Carpentry and Painting shop-II
2. Fitting and Plumbing Shop
3. Welding shop -II
4. Electric shop -II
5. Electronic shop-II or Machine Shop

Note:

1. The branches e.g., Civil Engineering, Mechanical Engineering, Mechanical (Automobile), Chemical Engineering, Chemical (R&P), Agriculture Engineering, Electrical Engineering and Automobile Engineering will do **Machine Shop** instead of electronic shop- II
2. The branches e.g., Electronics and Communication Engineering, Computer Engineering and Information Technology will do **electronic shop-II** instead of Machine shop.

3 The instructor is to first explain the introductory part given at the beginning under each shop followed by demonstration and practice by students.

1. Carpentry and Painting Shop-II

Introduction to joints, their relative advantages and uses.
Job I Preparation of dovetail joint and glued joint.
Job II Preparation of mitre joint
Job III Preparation of a lengthening Joint
Job IV Preparation of at least one utility job with and without lamination.

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Demonstration of job showing use of rip saw, bow saw and tenon saw, method of sharpening various saws.
Demonstration of job on band saw and circular saw, chain and chisel, universal wood working machine, saw re-sharpening machine, saw brazing unit.
Importance and need of polishing wooden items. Introduction to polishing materials.
Job V Polishing on wooden items.

2. Fitting and Plumbing Shop

Introduction to various types of threads (internal and external)-single start, multi-start, left hand and right-hand threads.
Description and demonstration of various types of drills, taps and dies Selection of dies for threading, selection of drills, taps and reamers for tapping operations.
Job, I Making internal and external threads on a job by tapping and dyeingoperations (manually)
Precautions while drilling soft metals, e.g., copper, brass, aluminum etc.
Job II Drilling practice on soft metals such as aluminum, brass and copper
Job III Preparation of a job by filing on non- ferrous metal up to an accuracy of ± 0.2mm
Job IV Preparation of job involving thread on GI pipe/ PVC pipe and fixing of different types of elbows, tee, union, socket, stopcock, taps etc.

3. Welding Shop – II

3. Introduction to gas welding, spot welding and seam welding and welding techniques. Adjustments of different types of flames in gas welding, demonstration and precautions about handling welding equipment.
Job, I Practice in handling gas welding equipment (Low pressure and Highpressure) and welding and tacking practice on simple jobs.
Common welding joints generally made by gas welding.
Job II Preparation of butt joint by gas welding.
Job III Preparation of small cot frame from conduit pipe by gas welding.
Job IV Preparation of square pyramid from MS rods by welding (type of welding to be decided by students themselves).
Job V Exercise of preparing a job on spot/seam welding machine.
Demonstration and use of TIG and MIG welding equipment

4. Electric Shop ≤ II

Importance and demonstration of three-phase wiring on three-phase panel with the help of a demonstrating panel.
Job, I Laying out 3-phase wiring for an electric motor or any other 3-phase machine.
Job II Connecting single-phase energy meter and testing it. Reading and working out the power consumption and the cost of energy.

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

Job IV Finding fault in simple electric machine and its rectification

Demonstration of dismantling, servicing and reassembling a table fan/ceiling fan/air cooler/mixer/electric iron, electric heater, geyser, electric oven, air conditioner etc.

Job V Testing single phase/three phase electrical motor by using voltmeters, ammeter, clip-on meter, tachometer etc.

Job VI Reversing the rotation of a motor.

5. Electronic Shop- II

Uses of the items mentioned below:

a) Various types of single, multi-cored insulated screened wire and cables - power, audio video, co-axial, general purpose wires/cables

b) Various types of plugs, sockets, connectors suitable for general purpose audio and video use, 2 and 3 pin mains plug and sockets, RF plugs and sockets.

Banana-plugs, and sockets, BNG, RCA, DIN, UHF, ear phone speaker connector, telephone jacks and similar male and female connectors and terminal strips.

c) Various types of switches such as normal/miniature toggle, slide, push button, piano key, rotary, micro switches, SPST, SPDT, DPST, DPDT, band selector, multi way master mains switch.

d) Various types of protective devices such as: wire fuse, cartridge fuse, slow acting/fast acting fuse, HRC fuse, thermal fuse, single/multiple circuit breakers, over and under current relays.

e) Materials: Conducting, insulating and magnetic materials.

f) Demonstration and uses of single beam simple crop, signal generator andfunction-generator

g) Regulated power supply-fixed and variable voltage, single output as well as dual output.

Identification and familiarization with active and passive components; types and color code of resistor, capacitors and potentiometers (including VDR, LDR, and thermistor). Identification of components including diode, LED, transistor, LCD, UJT, FET, coils, relays, read relays, transformers, linear and digital ICs, thyristors.

Demonstrate the following:

- To make perfect solder joints and soldering on PCBs
- To remove components/wires by unsoldering
- To assemble components on boards, chassis, tape strips
- Various laying methods of cables
- Exposure to modern soldering and de-soldering processes

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- Field visits to relevant work-places
- Identification of active and passive components

Use of multimeter and testing of active and passive components.

Job, I Cut, bend, tin components, leads, inserts and solder components(capacitor, diodes, transistor, IFT, ICs etc.) on a PCB.

Job II Soldering practices

Job III Temperature controlled soldering

stationJob IV De-soldering pump

Job V De-soldering strip/wik

Job VI De-solder, remove and clean all the components, wires from a given equipment, a PCB or a tag strip.

Job VII Wiring of a small circuit on a PCB/tag strip involving lacking, sleeving and use of identifier tags

OR

5 Machine Shop

Introduction to various machines used in machine shop

Job I: Exercise on simple turning
Job II: Exercise on taper turning
Job III: Marking a d drilling practice on mild steel piece
Job IV: Marking and drilling practice on aluminum piece
Job V Demonstration of various functions of CNC Machine

TEXTBOOK:

1. Workshop Technology by B.S. Raghuvanshi, Dhan pat Rai and Co., New Delhi

RECOMMENDED BOOKS

1. Workshop Technology I, II, III, by S K Hajra, Choudhary and A K Choudhary. MediaPromoters and Publishers Pvt. Ltd., Bombay
2. Workshop Technology by Manchanda Vol. I, II, III India Publishing House, Jalandhar.
3. Manual on Workshop Practice by K Venkata Reddy; MacMillan India Ltd. New Delhi
4. Basic Workshop Practice Manual by T Jeyapoovan; Vikas Publishing House (P) Ltd., New Delhi
5. Workshop Technology by B.S. Raghuvanshi, Dhan pat Rai and Co., New Delhi
6. Workshop Technology by HS Bawa, Tata McGraw Hill Publishers, New Delhi

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THIRD SEMESTER

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DCS 301 PROGRAMMING IN C

L T P

Periods/week 4 - 2

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.

DETAILED CONTENTS

1. **Algorithm and Programming Development** **(04 Periods)**
   Steps in development of a program, Flow charts, Algorithm development, Debugging

2. **Program Structure** **(06 Periods)**
   I/O statements, assignment statements. Constants, variables and data types, Operators and Expressions, Use of Header files & Library functions, Key word, data Types and Identifiers

3. **Control Structures** **(10 Periods)**
   Introduction, Decision making with IF – statement, IF – Else and Nested IF, While and do-while, for loop, Break and switch statements

4. **Functions** **(10 Periods)**
   Introduction to functions, Function Declaration, Standard functions, Parameters and Parameter Passing, Call by value/reference, Global and Local Variables, Recursion

5. **Arrays** **(08 Periods)**
   Introduction to Arrays, Array Declaration and Initialization, Single and Multidimensional Array. Arrays of characters

6. **Pointers** **(08 Periods)**
   Introduction to Pointers, Address operator, pointer and functions, Declaring and Initializing pointers, Assignment through pointers, Pointers and Arrays

7. **Structures and Unions** **(08 Periods)**
   Declaration of structures, Accessing structure members, Structure Initialization, Arrays of structures, Unions, Memory allocation functions.

8. **Strings** **(05 Periods)**
   Introduction, Declaring and Initializing string variables, Reading and writing strings, String handling functions, Array of strings

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9. **Files** **(05 Periods)**

Introduction, File reading/writing in different modes, File manipulation using standard function types

LIST OF PRACTICALS

1. Programming exercises on executing and editing a C program.
2. Programming exercises on defining variables and assigning values to variables.
3. Programming exercises on arithmetic and relational operators.
4. Programming exercises on arithmetic expressions and their evaluation
5. Programming exercises on formatting input/output using printf and scanf
6. Programming exercises using if statement.
7. Programming exercises using if – Else.
8. Programming exercises on switch statement.
9. Programming exercises on do – while statements.
10. Programming exercises on for – statement.
11. Programs on one-dimensional array.
12. Programs on two-dimensional array.
13. (i) Programs for putting two strings together.
    (ii) Programs for comparing two strings.
14. Simple programs using structures.
15. Simple programs using pointers.
16. Simple programs for reading from a file and writing into a file.

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).

RECOMMENDED BOOKS

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

DCS 302 BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

L T P
Periods/week 3 - 2

Rationale : The objective of this subject is to impart fundamental knowledge and skills regarding basic electrical and electronics engineering and digital electronics which diploma holders will come across in their professional life. This course will enable the students to understand the basic concepts and principles of d.c. and a.c. fundamentals, and batteries. The students will also learn basic electronics including diodes and transistors and their applications and digital electronics devices & systems.

DETAILED CONTENTS

1. **Overview** (04 Period)
   Basic concepts of electrical parameters, AC and DC, Use of Electrical Engineering. Ohm's law, Kirchhoff's Law. Concept of voltages & current sources and their conversion.

2. **AC fundamentals** (04 Period)
   Representation of sinusoidal quantity, Equation of sinusoidal wave form, Simple RLC circuits

3. **Batteries** (06 Period)
   Basic idea about primary and secondary cells, Construction, working and applicants of Lead-Acid, Nickel-Cadmium and Silver oxide batteries, Charging methods used for lead-acid battery(accumulator), Care and maintenance of lead-acid battery, Series and parallel connections of batteries, General idea of solar cells, solar panels and their applications, Introduction to maintenance free batteries.

4. **Semi Conductor Physics** (04 Period)
   Conductors, Insulators, Semiconductors, Idea of Energy Level, Energy Band Diagrams of Insulators, Conductors and Semiconductors, Effect of Temperature, Recombination of holes and electrons, n-type semiconductor, p-type semiconductor, Majority and Minority Carriers.

5. **Semi Conductor Diode & Transistor** (06 Period)
   Mechanism of current conduction and characteristics of ordinary diode, zener diode, LED, Principle of operation characteristics and applications of BJT and concept of configurations.

6. **Electrical & Electronics Measuring Instruments** (06 Period) Operations methods and applications of induction type energy meter, Analog/ Digital multimeter, CRO

7. **Earthing & Discharge** (04 Period)
   Concept of earthing and grounding, importance of Earthing, Mechanism and procedure of earthing provided in computer centre, checking of earthing, Static

Discharge, Methods to reduce discharge, Provision for the safety of computers from high electrical discharge, Magnetic effect etc.

8. Number System (06 Period)

Distinction between analog and digital signal, Applications and advantages of digital signals ,Binary, Octal and hexadecimal number system: conversion from decimal and hexadecimal to binary and vice-versa, binary addition, subtraction, multiplication and division including binary points. 1's and 2's complement method of addition/subtraction.

9. Codes and Parity (04 Period)

Concept of code, weighted and non-weighted codes, examples of 8421, BCD, excess-3 and Gray code, Concept of parity, single and double entry and error detection, Alpha numeric codes : ASCII and EBCDIC

10. Logic Gates and Families (04 Period)

Concept of negative and positive logic, Definition, Symbols and truth tables of NOT, AND, OR, NAND, NOR, EXOR Gates, NAND and NOR as universal gates, Logic family classification: Definition of SSI, MSI,LSI, VLSI,TTL and CMOS families.

11. Logic Simplification (04 Period)

Postulates of Boolean algebra, De Morgan's Theorems . Various identities. Formulation of truth table and Boolean equation for simple problem. Implementation of Boolean (logic) equation with gates. Karnaugh map (upto 4variables) and simple applications in developing combinational logic circuits.

12. Arithmetic Circuits (04 Period)

Half adder and Full adder circuit, design and implementation, Half and Full subtractor circuit, design and implementation, 4 bit adder/subtractor, Adder and Subtractor IC

13. Decoders, Multiplexers and De Multiplexers (04 Period)

Four bit decoder circuits for 7 segment display and decoder/driver ICs, Multiplexers and De-Multiplexers, Basic function and block diagram of MUX and DEMUX. Different types and ICs.

14. Latches and flip flops (04 Period)

Concept and types of latch with their working and applications, Operation using waveforms and truth tables of RS, T, D, Master/Slave JK flip flops, Difference between a latch and a flip flop.

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LIST OF PRACTICALS

1. Verification of Kirchoff's current law and voltage law in a D.C. Circuit.
2. To test a lead – acid storage battery for charged & discharged condition (with hydrometer & to recharge it)
3. Use of analog & digital multimeter and measure resistance, voltage & current.
4. Use of CRO & measurement of frequency & voltage.
5. Verification & interpretation of truth tables for AND, OR, NOT NAND, NOR and Exclusive OR (EX-OR) gates.
6. To design a half adder & full adder using gates and verification of their operation construction of a full adder circuit using XOR and NAND gates and verify its operations.
7. To design a half subtractor & full subtractor circuit with the help of gates & verify their operations.
8. Verify of truth table for decoder ICs.
9. Verification of truth table of JK & JK Master slave flip flops.
10. Verification of MUX & DEMUX using ICs
11. To find the voltage & currant relationship in single phase RLC circuit
12. Draw V.I. characteristics of ordinary semiconductor diode & LED.
13. Draw input & output characteristics of transistor in CB & CE configurations.
14. Demonstration of earthing, provided for computer center & testing of proper earthing.

INSTRUCTIONAL STRATEGY

The Electrical, Analog and digital systems have significant importance in the area of computer. Adequate competency needs to be developed by giving sufficient practical knowledge in Electrical, Electronics and digital circuit. Help may be taken in the form of charts, simulation packages to develop clear concepts of the subject.

LIST OF RECOMMENDED BOOKS

1. Digital Electronics: Principles and Integrated Circuits by A.K Maini, Wiley-India Pvt Ltd. Daryaganj, New Delhi
2. Digital Electronics and Applications by Malvino Leach, Tata McGraw Hill Education Pvt Ltd, New Delhi
3. Digital Logic Designs by Morris Mano, Prentice Hall of India, New Delhi
4. Digital Electronics by Soumitra Kumar Mandal, Tata McGraw Hill Education Pvt Ltd,
5. Digital Electronics by V K Sangar , Raj Publishers, Jalandhar

6. Digital Electronics by Tokheim, Tata McGraw Hill Education Pvt Ltd,
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 Rajiv Sapra, Ishan Publication, Ambala
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. Principle of Electrical Engineering by V.K. Mehta, S Chand Publication.
15. Basic Electrical Engineering by J.B. Gupta, S.K. Kataria & sons
16. Basic Electrical Engineering by Sahdev & Sahdev, Uneek Publication
17. Fundamental of Elex for polytechnics by Subhadeep Chaudhary, Paragon international Publication
18. Electrical machines by S.K. Bhattacharya Tata McGraw Hill Education Private Limited.

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DCS 303 OBJECT ORIENTED CONCEPTS

L T P

Periods/week 3 - 2

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 C++. This course offers the modern programming language C++ 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 C++.

DETAILED CONTENTS

1. **Introduction** **(06 Period)**

   Algorithm, Flow charts, Debugging

2. **Language Constructs** **(18 Period)**

   Introduction C++ : variables, types and type declarations, user defined data types; increment and decrement operators, relational and logical operators; if then else clause; conditional expressions, input and output statement, loops, switch case, arrays, structure, unions, functions, pointers; preprocessor directives

3. **Introduction OOP** **(06 Period)**

   Fundamentals of object oriented programming – procedure oriented programming Vs. object oriented programming (OOP). Object oriented programming concepts – Classes, reusability, encapsulation, inheritance, polymorphism, dynamic binding, message passing, data hiding

4. **Classes and Objects** **(06 Period)**

   Creation, accessing class members, Private Vs Public, Constructor and Destructor Objects

5. **Member Functions** **(06 Period)**

   Method definition, Inline functions implementation, Constant member functions, Friend Functions and Friend Classes, Static functions

6. **Overloading Member Functions** **(06 Period)**

   Need of operator overloading, operator overloading, instream / outstream operator overloading, function overloading, constructor overloading

7. **Inheritance** **(16 Period)**

   Definition of inheritance, protected data, private data, public data, inheriting constructors and destructors, constructor for virtual base classes, constructors and destructors of derived classes, and virtual functions, size of a derived class, order

of invocation, types of inheritance, single inheritance, hierarchical inheritance, multiple inheritance, hybrid inheritance, multilevel inheritance

8. Polymorphism and Virtual Functions **(06 Period)**

Importance of virtual function, function call binding, virtual functions, implementing late binding, need for virtual functions, abstract base classes and pure virtual functions, virtual destructors

9. File and Streams **(06 Period)**

Components of a file, different operation of the file, communication in files, creation of file streams, stream classes, header files, updating of file, opening and closing a file, file pointers and their manipulations, functions manipulation of file pointers, detecting end-of-file.

LIST OF PRACTICALS

1 Programming exercises on control flow statements in C++
2 Programming exercises on arrays, strings, function and pointers in C++
3 Writing programs to construct classes and deriving objects
4 Writing programs for constructors, destructors, using public and private access specifies
5 Programming exercises on operator overloading, type conversions and inheritance
6 Programming exercises on functional overloading
7 Writing programs on stream computation.
8 Implementation of a mini project in C++
9 Introduction to latest ANSI C++ Compiler and elaboration of short comings of Turbo C++ Compiler

INSTRUCTIONAL STRATEGY

Since the entire course is totally practical oriented, it is strongly intended that after discussing the individual concepts in class, the students shall be asked to write the programs for the same in the practical class. The theory and practical shall go hand in hand. It is required that the students make a file of practical exercises which may include the problem definition, algorithms flow charts (wherever required) and the print outs for each listed practical

LIST OF RECOMMENDED BOOKS

1) Mastering C++ by K.R Venugopal and Rajkumar, T Ravishankar; Tata McGraw Hill Education Pvt Ltd , New Delhi
2) Object Oriented Programming in C++, W/CD by Rajesh K. Shukla, Wiley-India Pvt Ltd. Daryaganj, New Delhi
3) Object Oriented Programming in C++ by E. Balaguruswamy, Tata McGraw Hill Education Pvt Ltd , New Delhi
4) C++ by Robert Lafore, Galgotia Publications Pvt. Ltd., Daryaganj, New Delhi
5) Object Oriented Programming and C++ by R Rajaram; New Age International (P) Ltd., Publishers, New Delhi
6) Schaum's Outline of Programming with C++ by John R. Hubbard

7) Object Oriented Programming using C++ by Vipan Arora, Eagle Publication, Jalandhar

8) Object Oriented Programming using C++ by RS Salaria

9) Object Oriented Programming by D Ravi Chandran Tata McGraw Hill

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DCS 304 COMPUTER SYSTEM PERIPHERALS

	L	T	P
Periods/week	3	-	2

RATIONALE

A computer engineer should be able to interface and maintain key-board, printer, mouse, monitor etc along with the computer system. The course provides the necessary knowledge and skills regarding working construction and interfacing aspects of peripherals. The students will get to know how various peripherals communicate with central processing unit of the computer system. The student will be able to maintain keyboard, printer, monitors and Power Supplies (CVTs and UPSs) along with computer system. This subject provides the required background of computer installation, maintenance and testing of peripherals with microcomputers.

DETAILED CONETENTS

1. **Video Display** **(10 Period)**
   The basic principle of working of video monitors (CRT/TFT/LCD/LED), video display adapters, video modes, Video display EGA/VGA/SVGA/PCI adapters and their architecture

2. **Key Board and Mouse** **(08 Period)**
   Types and basic principle of working of wired /wireless key board and wired /optical/wireless mouse, scan codes.

3. **Disk Drivers** **(14 Period)**
   Features and working of hard disk drive, floppy disk drive, optical and DVD disk drives and CD writer, Pen Drive, Logical structure of disk and its organization and boot record

4. **Peripheral Devices, Ports and Connectors** **(14 Period)**
   Working principle of various input devices such as Scanner, Tablets, touch screen, light pen, digitizers and joystick, Serial, Parallel, PS/2, USB, RJ- 45, BNC

5. **Printers** **(14 Period)**
   Principle and working of deskjet, Inkjet, dot matrix and laser printers and plotters

6. **Networks Peripherals (Features and Working)** **(12 Period)**
   Hub, Switches, Gateway, Router, Bridge, Modem, Patch Panel, I/O Box, Patch Cord, Wireless access point, LAN card(wired/wireless access)

7. **Power Supplies (Working Principle)** **(08 Period)**
   SMPS, Constant voltage transformers, Uninterruptible Power Supplies : Classification of UPS, On the basis of their output power, on the basis of their working, ON line UPS, OFF line UPS, Line interactive UPS, Line Interaction UPS or Electronic Generator, Comparison Among Three Types of UPS Systems, and Selection of UPS, Important specifications of UPS.

LIST OF PRACTICALS

1) To identify various components and peripheral devices of computer.
2) Demonstration of different Peripherals of a computer system.
3) To study the operation of SMPS
4) To study the operation of CVT.
5) To study the operation of UPS.
6) To study the Video display Unit
7) To study the Network Connections

INSTRUCTIONAL STRATEGY

While teaching the subject the teacher may take the interfacing devices like disk drives, printers, key-boards, scanners, plotters etc. physically and explain its working. Additional practical exercise on maintenance and repair of peripheral devices will help the students to develop adequate skills.

LIST OF RECOMMENDED BOOKS

1. B. Govinda Rajalu, IBM PC and Clones. Hardware Trouble Shooting and Maintenance, Tata McGraw Hill 1991
2. Robert, S Lai: The waite group writing MS DOS Device, Drives, Addison, Wesley Publishing Co. 2nd Ed. 1992.
3. S.K Bose "Hardware and Software of Personal Computers" Wiley Eastern Limited, New Delhi.
4. Hall, Douglas "Microprocessors and Interfacing" McGraw Hill
5. Uffenbeck, Microprocessors and Interfacing
6. Sukhvir Singh, Fundamental of Computers, Khanna Publishers, New Delhi
7. Levis Hahensteu, Computer Peripherals for Micro Computers, Microprocessor and PC
8. Peter Norton, Inside the PC (Eight Edition), Tech media

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DCS 305 DIGITAL DATA COMMUNICATION

	L	T	P
Periods/week	4	-	-

RATIONALE

The course provides the student with:
i) Principles of modulation, types of modulation and principle of digital data transmission
ii) Communication methods and equipment used in data transmission
iii) Errors in data communication and how to deal with them

DETAILED CONTENTS

1. Modulation (15 Period)

Need for modulation in communication systems. Concepts of AM, FM, PM, PAM, FSK (Frequency Shift Keying), PSK (Phase Shift Key) and PCM (Pulse Code Modulation) (No mathematical treatment) Concepts of bandwidth, noise and channel capacity of different communication system such as radio, microwave, different types of electrical communication lines, optical fiber systems and issues like line characteristics and impedance matching

2. Transmission of Digital Data and Modems (25 Period)

Transmission of binary data, concepts of simplex, half duplex and full duplex modes, two and four line systems. Bit level data transfer, rate of data transfer.
Byte level data communication, synchronous communication, data transfer Efficiency. Asynchronous communication, start-stop bits, data transfer efficiency, relative advantages and disadvantages with synchronous communication.
Frame level communication, data packets, address encoding and decoding of data packets, data encryption and decryption
Serial and parallel data communications, comparison in terms of speed of data transfer.
Modems: Transmission rate, modem standards, traditional modems, 56 K Modems

3. Error Detection (25 Period)

Sources of errors in data communication. Effect of errors, data error rate and its dependency on data transfer rates. 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 checks. Encoding redundant bits and recovery of data

4. Communication Methods and Standards (15 Period)

One-to-one connection, multidrop lines. Methods of implementation, channel capacities.
Types of multiplexing- TDM (Time Division Modulation), FDM (Frequency Division Modulation), WDM (Wave Length Division Modulation)
Direct mode of communication, need for handshake mode of communication, handshake modes

INSTRUCTIONAL STRATEGY

As the subject provides only theoretical concepts, the teacher must explain with reference to practical situations

LIST OF RECOMMENDED BOOKS

1. Data Communication and Networking 2nd edition by Forouzan; Tata McGraw Hill Publishing Co, New Delhi
2. Data and Computer Communications by William Stallings, Prentice Hall of India, New Delhi
3. Data Communication by Schwaber, William; McGraw Hills.
4. Digital, Analog and Data Communications by Willium, Sinnema and Tom; McGraw Hill
5. Data Communication by Tenanbaum, Prentice Hall of India, New Delhi
6. Data Communication by Fred Halsall Addison Wesley (Singapore) Pvt. Ltd., New Delhi
7. Data Communication by Keshav, Addison Wesley (Singapore) Pvt. Ltd., New Delhi
8. Understanding Data Communication, 4th Ed, Gilbert Held, Prentice Hall of India, New Delhi
9. Data Communication by Schweber
10. Data Communication and Network by Black

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DCS 306 OPERATING SYSTEMS

L T P
Periods/week 6 - 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 hand-on experience and good working knowledge to work in DOS and Windows environments. The aim is to gain proficiency in using various operating systems after undergoing this course.

DETAILED CONTENTS

1. **Brief Introduction to System Software** **(04 Period)**
   Compiler, Assembler, Loader, Operating system, Linking, Loading and Executing a Program

2. **Overview of Operating Systems** **(08 Period)**
   Definition of Operating Systems, Functions of Operating System, Types of Operating Systems – Batch Processing, Time Sharing, Multiprogramming, Multiprocessing and Real Time Systems, Distributed Systems, Importance of Operating System

3. **Process Management Functions** **(16 Period)**
   Job Scheduler, Scheduling Criteria, Process Scheduler, Scheduling algorithms, Process synchronization, Critical section

4. **Dead Locks** **(16 Period)**
   Introduction and necessary conditions of dead lock, Dead lock avoidance, Dead lock detection, Dead lock Recovery

5. **Memory Management Function** **(20 Period)**
   Introduction, Logical and Physical address space, Virtual memory, Swapping, Single contiguous memory management, Fixed partition, Contiguous allocation, Paging, Segmentation, Demand paging, Page replacement algorithms, Thrashing

6. **I/O Management Functions** **(16 Period)**
   Dedicated Devices, Shared Devices, Virtual Devices, Storage Devices, Buffering, Spooling

7. **File Management** **(16 Period)**
   File concept, Access Methods, Directory Structure, Protection, File system structure, allocation methods, Directory implementation

LIST OF PRACTICALS

1. Demonstration of all the controls provided on Control Panel, and exercises using Windows
2. Practical exercises involving various internal and external DOS commands
3. Practical exercises involving various UNIX/LINUX commands

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INSTRUCTIONAL STRATEGY

As per the above information, it is clear that the subject is both theory and practical oriented. Therefore, the stress must be given on both the theory and practical teaching. In the practical classes, the laboratory must be equipped with all the basic operating system software i.e DOS, UNIX, LINUX, WINDOWS etc. While imparting instructions, the teachers are expected to lay more emphasis on concepts and principles of operating systems, its features and practical utility.

LIST OF RECOMMENDED BOOKS

1. Operating systems by John J Donovan; Tata McGraw Hill, New Delhi
2. Operating System Concept by Ekta Walia, Khanna Publishers, New Delhi
3. System programming by Dhamdhare
4. Unix operating system by Vijay Mukhi
5. Operating system by C. Ritchie
6. MS DOS by Peter Norton, BPB Publications
7. Microsoft Windows Manual
8. First Course in Computers by Sanjay Saxena; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
9. Operating System by Galvin,silberchatz , Wiley Publication

FOURTH SEMESTER

DCS401 DATA STRUCTURES USING C

	L	T	P
Periods/week	3	-	2

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.

DETAILED CONTENTS

1. **Fundamental Notations** **(08 Periods)**
   Problem solving concept, top down and bottom up design, structured programming, Concept of data types, variables and constants, Concept of pointer variables and constants

2. **Arrays** **(10 Periods)**
   Concept of Arrays, Single dimensional array, Two dimensional array storage strategy of multidimensional arrays, Index Formula for single and multidimensional Array, Operations on arrays with Algorithms (Insertion, deletion), Advantages and disadvantages.

3. **Linked Lists** **(14 Periods)**
   Introduction to linked list and double linked list, Representation of linked lists in Memory, Traversing a linked list, Searching linked list, Insertion and deletion into linked list, Application of linked lists, Doubly linked lists, Traversing a doubly linked lists, Insertion and deletion into doubly linked lists

4. **Stacks, Queues and Recursion** **(10 Periods)**
   Introduction to stacks, Representation of stacks, Implementation of stacks using Array & Link List, Uses of stacks, Introduction to queues, Implementation of queues (with algorithm), Circular Queues, De-queues, Recursion.

5. **Trees, Graph and Table** **(24 Periods)**
   Concept of Trees, Concept of representation of Binary tree, Binary search trees Traversing Binary Trees (Pre order, Post order and In order), Searching, inserting and deleting binary search trees, AVL Tree, B-Tree, Introduction to graphs, types of graphs, Breadth first search, Depth first search, Adjacent matrix,Searching Sequential table, Hash tables

6. **Sorting and Searching** **(14 Periods)**
   Introduction, Search algorithm (Linear and Binary), Concept of sorting, Sorting algorithms (Bubble Sort, Insertion Sort, Quick Sort, Selection Sort, Merge Sort, Heap Sort, Radix Sort) and their comparisons, Complexity Analysis of Sorting Algorithms.

LIST OF PRACTICALS

Write programs in C to implement

1. Inserting and deleting elements in an array
2. Insertion and deletion of elements in linked list
3. Insertion and deletion of elements in double linked list
4. Stack implementation using arrays
5. Stack implementation using pointers
6. Queue implementation using arrays
7. Queue implementation using pointers
8. Linear search in a given list
9. Binary search in a given list
10. Implementation of binary search tree
11. Implementation of bubble sort algorithm
12. Implementation of insertion sort algorithm
13. Implementation of quick sort algorithm
14. Implementation of selection sort algorithm
15. Conversion from infix and post-fix notation
16. Implementation of factorial of a number using recursion
17. Implementation of Fibonacci series using recursions

INSTRUCTIONAL STRATEGY

This subject clears all fundamentals of programming techniques. Teachers should stress on explaining all the techniques and algorithm in detail in theory sessions. The students should be asked to convert their ideas about a problem into and algorithms in theory class and them write programs for the algorithms. Finally all the programs should be run on computers. This will help the students to have clear concepts of programming.

RECOMMENDED BOOKS

1. Data structures – Schaum's Outline Series by Lipschutz; McGraw Hill Education P Ltd , New Delhi
2. Data Structures using C and C++ by Rajesh K. Shukla; Wiley-India Pvt Ltd. Daryaganj, New Delhi
3. Data Structures and Algorithm Using C by RS Salaria; Khanna Book Pub. Co. (P) Ltd. New Delhi
4. Data Structure using C by Manoj Kumar Jambla; Eagle Publishing House, Jalandhar
5. Expert Data Structures with C by R.B. Patel; Khanna Publishers, New Delhi.
6. Data Structure through C by Yashwant Kanekar; BPB Publications
7.

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DCS402 WEB TECHNOLOGIES

	L	T	P
Periods/week	3	-	2

RATIONALE

This course will enable the students to understand the basics of internet and various application of internet like e-mail, FTP, Telnet, Newsgroups and video conferencing In addition, this course develops competency amongst the students to design professional web sites and interactive web pages. They will have overview of different technologies like of HTML, DHTML, XML, CGI, ASP, JSP, Java Scripts, VB Scripts.

DETAILED CONTENTS

1. Internet Basics **(12 Period)**

Specification and technical details for establishing Internet. Types and functions of modems, IP addressing, internet domains, domain name server, TCP/IP protocols, Internet service providers, Intranets, E-mail, Telnet, FTP, IRC, NNTP, Video conferencing, e-commerce, Internet connecting media

2. World Wide Web (WWW): **(12 Period)**

World Wide Web and its evolution, web page, web server, HTTP protocol. Examples of web servers. Navigation Tools: Mozilla Firefox, Google Chrome, Internet Explorer, Uniform Resource Locator (URL). Hypertext, hyperlinks and hypermedia, URL, its registration, browsers, search engines, proxy servers

3. Developing Portals Using HTML **(25 Period)**

Introduction to HTML-5 and CSS-3 Basic structure of HTML, designing a web page, inserting links images, horizontal rules, comments. Formatting text, title, headings, colours, fonts, sizes, simple tables and forms, div, li & ul. HTML tags, hyperlinks. Adding graphics and images, image maps, image files. Using tables, forms, style sheets and frames

4. Client-side Scripting: Using Java Script & JQuery **(15 Period)**

Operator and expression, control statements, loop, array, Java Script Event Modeling, Document Object Model (DOM), Validating Forms using Java script, data base connectivity using Java Script & JQuery, developing interactive website using Java script

5. Server-side Scripting: **(10 Period)**

PHP and ASP.NET : GET POST Method, Control Structures, Introduction to IIS and Tomcat Web server, Configuration and deployment of to IIS and Tomcat Web server with Windows Server.

6. Dream weaver: Basic features of Dreamweaver and Implementation of dream weaver functions / Utility **(05 Period)**

7. Introduction to PHP, Mysql, developing dynamic website using PHP and ASP.NET, Mysql, Implementation of AJAX using PHP and ASP.NET **(17 Period)**

LIST OF PRACTICALS

1. Configuring computer system to access internet
2. Managing social networking profile and e-mail account
3. Using WWW for accessing relevant information
4. To demonstrate the use of TELNET, FTP, IRC
5. Creating Web pages using HTML
6. Creating web pages using Dream Weaver
7. Demonstration of audio-video conferencing
8. Demonstration of e-commerce transaction
9. Validation of user queries and responses in the Forms using Java Script or VB script
10. Create a Homepage with frames, animation, background sound and hyperlinks
11. Develop hitometer for each client i.e. number of visitors. Visit to a site.
12. Designing simple server side program which accept some request from the client and respond
13. Establishing sessions between servers and clients
14. Design fill-out form with text, check box, radio buttons etc and embed Java script to validate users input.
15. Develop simple server side program in Server Script which accept some request from the client and respond.
16. Develop interface with database (MYSQL etc) for online retrieval and storage of data through PHP

INSTRUCTIONAL STRATEGY

Students should be exposed to Internet as the subject is practice oriented, theoretical Instruction may be given during practical session also.

RECOMMENDED BOOKS

1. Internet and Web Technologies by Rajkamal, Tata McGraw Hill Education Pvt Ltd , New Delhi
2. Internet 6-in-1 by Kraynak and Habraken, Prentice Hall of India Pvt. Ltd., New Delhi
3. Using the Internet IV edition by Kasser, Prentice Hall of India Pvt. Ltd., New Delhi
4. Using the World Wide Web, (IInd edition) by Wall, Prentice Hall of India Pvt. Ltd., New Delhi
5. A complete guide to Internet and Web Programming by Deven N. Shah, Wiley-India Pvt Ltd. Daryaganj, New Delhi
6. Internet for Everyone by Alexis Leon and Mathews Leon; Vikas Publishing House Pvt. Ltd., New Delhi
7. Principles of Web Designing Joel Sklar, Web Warrior Series Available with Vikas Publishing House Pvt. Ltd., New Delhi
8. HTML 4.0 Unleashed by Rick Dranell; Tech Media Publications
9. Teach Yourself HTML 4.0 with XML, DHTML and Java Script by Stephanie, Cottrell, Bryant; IDG Books India Pvt. Ltd., New Delhi
10. Dynamic Web Publishing – Unleashed Tech Media
11. Using Active Server Pages by Johnson et.al. Prentice Hall of India, New Delhi
12. Web Development with Visual Basic with CD ROM by Chapman; Prentice Hall of India, New Delhi
13. Java Server Pages (JSP) by Pekowsky Addison Wesley (Singapore) Pvt. Ltd., New Delhi
14. Active Server Pages (ASP) by Keith Morneau Jill Batistick Web Warrier Series Available with Vikas Publishing House Pvt. Ltd., New Delhi

15. ASP Unleashed Tech Media Publication
16. JSP O'Reilly SPD Publishers Hans Bergsten
17. Java Script in 24 hrs Tech Media Publications
18. Java Servlets by O'Reilly SPB Publishers
19. Web Technologies by Ivan Bayross.

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DCS403 COMPUTER ORGANIZATION AND ARCHITECTURE

	L	T	P
Periods/week	3	-	-

RATIONALE

The subject provides the students with the knowledge of architecture and organization of personal computers. Micro programmed control and hardwired control are explained with algorithms for different arithmetic operations

DETAILED CONTENTS

1. Introduction **(05 Period)**

Computer system organization and architecture

2. Register Transfer and Micro Operations **(20 Period)**

Register transfer language, bus and memory transfer, arithmetic logic micro operations. Basic computer organization and design, instructions and instructions codes, computer instruction. Timing and control, instruction cycles, memory reference instruction, input and output and interrupts, complete computer description

3. Programming the basic Computer **(15 Period)**

Machine language, assembly language, assembler, program loops, programming arithmetic, and logic operations, sub routines, input- output programming

4. Micro Programmed Control **(12 Period)**

Control memory, address sequencing, micro programs example

5. Central Processing Unit **(16 Period)**

General register organization, instruction formats, stacks organizations, addressing modes, data transfer and manipulation, programmed control, reduced instructions set computers, pipeline and vector processing, parallel processing, pipelining, arithmetic pipelines, RISC pipelines, Vector processing, array processors.

6. Computer Arithmetic Algorithm **(16 Period)**

Addition and Subtraction algorithm, multiplication algorithms, division algorithms, floating point arithmetic operations

7. Input- Output Organization **(12 Period)**

Peripheral devices, Input Output interface, asynchronous data transfer, modes of transfer, priority interrupt, Direct Memory Access (DMA), Input Output processor

LIST OF RECOMMENDED BOOKS

1. Computer Architecture by Rafiquzzaman, M; Prentice Hall of India, New Delhi
2. Fairhead- 80386/80486, BPB Publication, New Delhi
3. Hardware and Software of Personal Computers by Bose, SK; Willey Eastern Ltd., New Delhi
4. Structured Computer Organization by Tanenbaum, Andrew S; Prentice Hall of India, New Delhi
5. Upgrading and preparing PCs by Scott Muller, Techmedia Publications
6. Computer Organization and Architecture by Linda Labur, Narosa Publishing House Pvt, Ltd., Darya Ganj, New Delhi
7. Computer system architecture, Morris mano Prentice Hall of India, New Delhi
8. Digital Electronics by RP Jain, TMH
9. Digital Logic design by Morris, PHI

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DCS404 DATABASE MANAGEMENT SYSTEM

	L	T	P
Periods/week	4	-	-

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.

DETAILED CONTENTS

1. Introduction **(16 Period)**

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 **(16 Period)**

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

3. Data Modeling using E.R. Model (Entity Relationship Model) **(16 Period)**

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

4. Relational Model: **(14 Period)**

Relational Model Concepts: Domain, Attributes, Tuples 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

5. Normalization **(10 Period)**

Concept of Normalization, Need of Normalization, Non-loss decomposition and functional dependencies, First, Second and Third normal forms, Boyce/ Codd normal form

6. Database Access and Security **(08 Period)**

Database security, process controls, database protection, 2-phase command protocols, 2-phase working protocols, grant and revoke, Locking methods. Replication and Database Mirroring

INSTRUCTIONAL STRATEGY

Explanation of concepts should be done 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.

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) Database systems, Raghu Ramakrishnan
8) An Introduction to Database Systems by Bipin C. Desai, Galgotia Publications Pvt. Ltd., Daryaganj, New Delhi 110 002
9) SQL Unleashed by Hans Ladanyi Techmedia Publications, New Delhi
10) Relational Database Management

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DCS405 SYSTEM AND SOFTWARE ENGINEERING

L T P

Periods/week 4 - -

RATIONALE

This subject will enable the diploma students to have awareness about software engineering, various metrics, planning about software, cost estimation, software design etc.

DETAILED CONTENTS

1. **Study of System** **(06 Period)**
   The system concepts, characteristics of a system, organization, interaction, inter dependence, integration, control objectives

2. **Study of system analysis** **(14 Period)**

   Introduction system development life cycle (SLDC), Phases of SDLC, identification, Preliminary investigation/study, facts gathering and its techniques(Interviews, questionnaires, Background reading, onsite observation, record gathering etc), types of feasibility- operational, technical, economical, System analysis, System design (Data flow diagram, data dictionary) ,testing, implementation

3. **Introduction to Software (S/W) Engineering** **(10 Period)**

   Introduction, size factors. Quality and productivity factors. Management issues, Models: waterfall, spiral, prototyping, fourth generation techniques, s/w process, Introduction to agile technologies

4. **Software Metrics Engineering** **(10 Period)**

   Size, function and design oriented metrics, halstead software science, McCabe's complexity

5. **Planning** **(10 Period)**

   The development process, an organizational structure, other planning activities

6. **Software Cost Estimations** **(10 Period)**

   Cost factors, cost estimations techniques. Staffing level estimation, estimating software maintenance costs, COCOMO

7. **Software Requirements Definition** **(10 Period)**

   Problem analysis, requirement engineering. The software requirements specifications (SRS), formal specifications techniques, characteristics of a good SRS

8. **Software Design and Implementation Issue** **(10 Period)**
   Fundamental design, concept design notations, design techniques, structured coding techniques coding styles, documentation guidelines

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

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DCS406 COMPUTER NETWORKS

	L	T	P
Periods/week	3	-	4

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.

DETAILED CONTENTS

1. Networks Basics (10 Period)

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

2. OSI Model (22 Period)

   Standards, OSI Reference Model, Physical layer concepts, Data-link layer concepts, Networks layer concepts, Transport layer concepts, Session layer concepts, presentation layer concepts, Application layer concepts, Introduction to TCP/IP, Concept of physical and logical addressing, Different classes of IP addressing, special IP address, Sub netting and super netting , Loop back concept, IPV4 and IPV6 packet Format, Configuring IPV4 and IPV6

3. Protocol Suites (08 Period)

   Models and Protocols, Network IPX/SPX ,Intranet Protocols

4. Network Architecture (8 Period)

   ARC net specifications, Ethernet Specification and Standardization: 10 Mbps (Traditional Ethernet), 10 Mbps (Fast Ethernet) and 1000 Mbps (Gigabit Ethernet), Introduction to Media Connectivity (Leased lines, ISDN, PSTN, RF, DSL, VSAT, Optical and IPLC)

5. Network Connectivity (08 Period)

   Network connectivity Devices, NICs, Hubs, switch, Repeaters, Multiplexers, Modems, Routers and Routing Protocols ,Gateways, Amplifiers, Firewall, ATM,VOIP and Net-to-Phone Telephony, Laws and Protocols

6.. Wireless Networking (08 Period)

   Basics of Wireless: Types of Wireless Networks, Wireless MAN, Networking, Wireless LAN, Wi-Fi, WiMax (Broad-band Wireless) and Blue-Tooth technology, Mobile Adhoc Network (MANET)

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. Recognition of network devices (Switches, Hub, Routers of access points for Wifi

4. Making of cross cable and straight cable
5. Install and configure a network interface card in a workstation.
6. Identify the IP address of a workstation and the class of the address and configure the IP Address on a workstation
7. Managing user accounts in windows and LINUX
8. Study and Demonstration of sub netting of IP address
9. Use of Netstat and its options.
10. Connectivity troubleshooting using PING, IPCONFIG, IFCONFIG
11. Installation of Network Operating System(NOS)
12. Visit to nearby industry for latest networking techniques

INSTRUCTIONAL STRATEGY

This subject deals with both theory and practicals. The students should be made to practically establish LAN with various hardware and software and their integration.

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. Networking Essentials – BPB Publications New Delhi
5. Computer Network and Communications By V.K. Jain and Narija Bajaj, Cyber Tech Publications, New Delhi.

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 for a minimum of 4 weeks duration to be organised 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 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.

Internal assessment and external assessment 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 behaviour, 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, if any. 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

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DCS501 DATABASE PROGRAMMING

L T P
Periods/Week 3 - 2

RATIONALE

The Course is aimed to provide the students an exposure of various database management operations and detail about the structured query language which supports different operations in a database. After completion of the course, the students will be able to design the user-friendly modules for different types of databases.

DETAILED CONTENTS

1. Basic Concepts and Installation of SQL Server (08 Periods)
   Installing SQL server, starting and stopping an instance of database engine, SQL server management studio, using management studio with database engine, backup and recovery.

2. SQL Components and Data Definition Language (08 Periods)
   SQL's basic objects, data types, aggregate functions, scalar functions, null values, creating database objects, modifying database objects, removing database objects.

3. SQL (Structured Query Language) (20 Periods)
   SQL * Plus. 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 join.

4. Stored procedures and User defined functions (08 Periods)
   Procedural extensions, IF statement, WHILE statement, local variables, try and catch statements, stored procedures, user defined functions, system catalog.

5. Indexes, Views and Security (06 Periods)
   Guidelines for creating and using indexes, creating and using views, advantages and disadvantages of views, security system of database engine, database security, roles, authorization: grant, deny, revoke statements, implementation of database concurrency.

6. Triggers and Cursor (06 Periods)
   Introduction to triggers, creating and using triggers, database level triggers, server level triggers, Cursor and recursive iteration

7. Introduction to Distributed Databases, Parallel databases, Object Oriented and Object Relational Databases (08 Periods)

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LIST OF PRACTICALS

1. Installing and Uninstalling SQL Server.
2. Performing backup and recovery procedures using SQL Server.
3. Using and Understanding SQL server management studio.
4. Creating, modifying and removing database objects.
5. Working with queries involving joins, correlation, sub-queries, set operators.
6. Creating and using stored procedures and user defined functions.
7. Creating indexes
8. Creating and using views.
9. Using and understanding grant, revoke and deny statements
10. Creating and using database triggers.

INSTRUCTIONAL STRATEGY

Teacher has to explain the basic concepts of SQL (Structured Query Language), its installation and commands. Further, the advanced topics would be detailed like Indexes, Views, Triggers etc. The students may be asked to design a working examples developed using the various database commands learnt.

RECOMMENDED BOOKS

1. Fundamentals of Database Systems by Ramez Elmasri, Shamkant Navathe;Pearson Education.
2. Data Base Management System By Ivan Byross
3. A Database System Concepts by Abraham Silberschatz, Henry F. Korth, S. Sudarshan; Tata McGraw Hill.
4. Advanced Database Management Systems by Rini Chakrabarti Dasgupta, Wiley-India Pvt Ltd. Daryaganj, New Delhi
5. Database System Concepts: Design and Applications by S.K. Singh; Pearson Education.
6. Beginning Microsoft SQL Server 2008 Programming by Robert Vieira, Wrox.
7. Microsoft SQL Server 2008 Bible by Paul Nielsen, Uttam Parui; Wiley India Publication.

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DCS502 VISUAL PROGRAMMING WITH C#

	L	T	P
Periods/Week	3	-	2

RATIONALE

Visual programming technique based on Object Oriented Concepts. This subject will give the students an in depth understanding the features of NET. The practical exercise of C# and ASP.NET during the course of study will reinforce the understanding of the subject.

DETAILED CONTENTS

1 Introduction to Microsoft. Net Framework (06 Periods)
Introduction to client server architecture, Introduction to .NET framework, feature of .Net framework, architecture and component of .Net, elements of .Net. Common Language Runtime (CLR), Common Type System (CTS), Common Language Specifications (CLS), Microsoft Intermediate Language (MSIL), Just In Time Compiler.

2 Introduction (10 Periods)
C# variable, function, visual programming, object oriented concept: abstraction, Inheritance, Polymorphism, Classes, collections, Debugging

3 Graphical user Interface Concepts (16 Periods)
Windows forms, Control Properties and Layout, Using common Dialogs, Event Handling: mouse and Keyboard, Labels, Textboxes, Buttons, Group Boxes, Panels, Check Boxes and Radio Buttons , Picture Boxes , tooltips, Menus, Control: Month Calender , Data Time Picker , Link Labe , List Box , Checked List Box, Combo Box, Tree View, List View, data grid, Grid View, Tab control, Multiple Document Interface(MDI) Window, Multithreading : Thread States, Lifecycle of a Thread, Thread Priorities and scheduling, creating and executing Thread , Synchronization and Class Monitor , Exception Handling

4 Graphics and Multimedia (06 Periods)
Drawing classes and the coordinate system , graphics context and graphics objects ,color and font control, drawing lines, rectangle, ovals ,Arcs , Loading , Displaying and scaling images , animating a series of images, introduction to WPF, Animation and Media using WPF

5 File Processing and Streams (06 Periods)
Data hierarchy, files and streams, classes file and directory, reading and writing sequential access file, Serialization

6 Data Access (06 Periods)
Data access techniques, XML, LINQ, SQL , ADO.NET object Model ,LINQ to SQL, ADO.NET and LINQ, LINQ to XML, Introduction to ORM using nhibernate, LINQ with nhibernate

7. Windows Communication Foundation (14 Periods)
Describing WCF, advantage over Web services, Interoperability with Applications Built on Other Technologies creating WCF implementing service class, selecting host defining endpoint creating WCF client, messaging Options, Controlling Local Behavior, Security, transaction in WCF, Restful communication, communication with POX RSS and ATOM, Queuing, creating workflow services

LIST OF PRACTICALS

1. Exercise on opening projects.
2. Exercise on all the menus
3. Exercise on all basic Controls.
4. Exercise on designing form.
5. Exercise on LINQ.
6. Creating Web services and consuming the same
7. Creating WCF and consuming the same.

INSTRUCTIONAL STRATEGY

Since the subject is comparatively new and the students are required some background of programming language, thus, with the coverage of both theory and practicals more stress should be given to practical work.

RECOMMENDED BOOKS

1. Beginning Visual C#,2012 by Watson; Wiley India Publications
2. Applications of .NET Technologies, by ISRD Group, Tata McGraw Hill Education Pvt Ltd , New Delhi
3. Programming Microsoft C#-Francesco Balena
4. The complete Reference-C#- Jefrey R. Shapiro

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DCS503 COMPUTER AND NETWORK TROUBLESHOOTING

	L	T	P
Periods/Week	3	-	2

RATIONALE

This subject gives the knowledge and competency to diagnose the faults for trouble shooting for systematic repair and maintenance of computers and computer peripherals.

DETAILED CONTENTS

1. Installation & Servicing (18 Periods)

   Environmental requirements for computer system and peripherals, Site preparation and design of computer room, Installation of computer system (Window/open source/Desktop/Server) and peripherals. Preventive and corrective maintenance, concept of grounding shielding, Power supply requirements and considerations for computer and its peripherals. Study of Motherboard ,Testing and specifications of computer system, Repair and replacement of parts of computer, understanding PC specifications.

2. Networking (15 Periods)

   LAN configurations failure, cabling connectivity, hub, bridge, switches, managing network services TCP/IP, Address management, DNS, Domain, Work Group

3. Trouble shooting of computers, component and peripherals (15 Periods)

   Managing Network Services: TCP/IP, address Management, DNS, DOMAIN, Workgroup (Create workgroup), Network addresses Management of Gateway, Map Network drive, client-server technology, Network Neighborhood. Installation and troubleshooting of Routers, Access Point, LAN Cards Input/output channels, Hub, Switches,

4. Sharing of devices on Networks, Installation and management of network sharing tools i.e squidpoxy, managing IP addresses, 2-Tier, 3-Tier Network Architecture (08Periods)

5. Establishment of LAN/WAN: (08 Periods)

   Sub-netting of IP address, Access Point Configuration, Router Configuration, Configuration of manageable switch

LIST OF PRACTICALS

1. Installation of modems and startup a new internet connection in a standalone machine.
2. Study of troubleshooting and maintenance of computer systems
3. Installation and study of ISDN, PSTN lines, V-sat, RF-link
4. Study of BNC, RJ-45 connectors
5. Study of cables and their connecting structure (i.e simple or cross cable (color coding of cables)
6. Study and management of Network resources.

7. Study and Installation of Firewall in your system
8. Sharing of resources on LAN

INSTRUCTIONAL STRATEGY

While taking the theory classes, the teachers should lay emphasis on the practical aspects of trouble shooting and maintenance. As the given subject is based on hardware aspects of computer system, it needs lot of technical skills to study it thoroughly, field visit to maintenance repair and assembly centres will be beneficial to the students.

RECOMMENDED BOOKS

1. PC Upgrading , Maintenance and Troubleshooting Guide by SK Chauhan, SK Kataria and Sons, New Delhi
2. Troubleshooting and Maintenance of electronic Equipment by K. Sudeep Singh: SK Kataria and Sons, New Delhi
3. Troubleshooting Computer System by Robert C Benner
4. IBM PC and Clones Govinda Rajalu
5. Computer Maintenance and Repair – Scholi Muller
6. Upgrading your PC by Mark Minersi
7. TCP/IP by Miller; Wiley India Publications.

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DCS504 CRYPTOGRAPHY AND NETWORK SECURITY

	L	T	P
Periods/Week	3	-	-

RATIONALE

This course has been designed by keeping in view the basic computer users and information system managers. The concepts needed to read through the ripe in the market place and understanding risks and how to deal with them. It is hoped that the student will have a wider perspective on security in general and better understanding of how to reduce and manage the security risks.

DETAILED CONTENTS

1. Introduction (12 Periods)

   Need for securing a network; attacks from within and external, introduction to cyber crime, cyber law-Indian Perspective (IT Act 2000), cyber ethics, ethical hacking. What is hacking. attacker, phreaker etc.

2. Securing Data over Internet (12 Periods)

   Introduction to basic encryption and decryption, concept of symmetric and asymmetric key cryptography, Cipher technique PPTP/L2TP, overview of DES, RSA and PGP. Introduction to Hashing: MD5, SSL, SSH, HTTPS, Digital Signatures.

3. Virus, Worms and Trojans (10 Periods)

   Definitions, preventive measures – access central, checksum verification, process neutering, virus scanners, neuristic scanners, application level virus scanners, deploying virus protection.

4. Computer Network Attacks: (08 Periods)

   Active Attacks, Passive Attacks, Stealing Passwords, Social Engineering, Bugs and Backdoors, Authentication Failures, Protocol Failures, Information Leakage, Denial-of-Service Attacks, Botnets, Phishing Attacks

5. Firewalls (08 Periods)

   Definition and types of firewalls, defining access control policies, address translation, firewall logging, firewall deployment

6. Intrusion Detection System (IDS) (06 Periods)

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

7 Virtual Private Network (VPN) (08 Periods)

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

INSTRUCTIONAL STRATEGY

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

RECOMMENDED BOOKS

1. Cryptography and Network Security by Forouzon, Tata Mc Graw Hill Education Pvt Ltd, New Delhi
2. Cryptography and Network Security by Atul Kahate, Tata Mc Graw 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

DCS505 SOFTWARE QUALITY AND TESTING

	L	T	P
Periods/Week	3	–	2

RATIONALE

The Course is aimed at teaching different techniques of testing a software after it is developed and to teach about various quality standards of a product. After completion of the course, the students will be able to design efficient test-cases for different software and compare it to the standard quality measures.

DETAILED CONTENTS

1. Introduction (08 Periods)

   Review of Software Engineering, Software Process Models, Metrics, Importance of Software Testing and Quality Assurance.

2. Software Quality Assurance Concepts and Standards (10 Periods)

   Definition of Quality, Quality Concepts, Quality Control, Quality Assurance, SQA Activities, Software Reviews, Inspections, Walkthroughs, Formal Technical Reviews, Review Guidelines, Quality Assurance Standards, ISO 9000, ISO 9001:2000, ISO 9126, CMM, TQM, TQM principles, Six Sigma, SPICE.

3. Risk Management and Configuration Management (10 Periods)

   Types of Software Risks, Risks Identification, Risk Projection, Risk Refinement, The RMMM Plan, Software Configuration Management, Baselines, Software Configuration Items, SCM Process: Version Control, Change Control.

4. Software Testing (10 Periods)

   Testing Fundamentals, Verification and Validation, Test Strategies for Conventional and Object Oriented Software, Unit Testing, Integration Testing, Validation Testing, Alpha and Beta Testing, Recovery Testing, Security Testing, Stress Testing, Performance Testing, Debugging Process, Debugging Strategies.

5. Testing Techniques (10 Periods)

   Black Box and White Box Testing techniques, Flow Graph Notation, Basis Path Testing, Control Structure Testing, Equivalence Partitioning, Boundary Value Analysis, Object Oriented Testing Methods: Applicability of Conventional Test Case Design Methods, Fault-Based Testing, Scenario-Based Testing, Random Testing and Partition Testing for Classes, Interclass Test Case Design.

6. Testing Process (08 Periods)

   Test Plan Development, Requirement Phase, Design Phase and Program Phase Testing, Testing Tools, Features of test tools, guidelines for selecting a test tool, advantages and disadvantages of using testing tools, testing using automated tools.

7. Testing Specialized Systems (08 Periods)

   Testing Client/Server Systems, Testing Web based Systems, Testing Off-the-Shelf software.

LIST OF PRACTICALS

1. Study of open source quality assurance and software testing tools.
2. Use of software testing tools like CPPUnit, JUnit.
3. Use of configuration management tools like CVS, VSS.
4. Study of test cases/design of TC
5. Study of test plan/preparation of TP
6. Study of Bug report/preparation of BR
7 Study and preparation of SRS

INSTRUCTIONAL STRATEGY

Since the subject has wider industrial scope, students need exposure to various open source testing tools and teachers should also be exposed in testing tools. Visits may be organized in software and testing industries.

RECOMMENDED BOOKS

1. Software Testing: Principles, Techniques and Tools by M.G. Limaye; Tata McGraw Hill
2. Software Engineering: A Practitioner's Approach by R.S. Pressman; Tata McGraw-Hill.
3. Effective Methods for Software Testing William E.Perry; John Wiley & Sons.
4. Software Engineering by Ian Sommerville; Pearson Education.
5. Software Engineering by K.K. Aggarwal, Yogesh Singh; New Age International.
6. Software Quality Assurance-Principles and Practice by Nina S Godbole; Narosa.
7. Software Testing Techniques by Boris Beizer,Dreamtech
8. Software Engineering by Rajiv Mall
9. Software Engineering by Pankaj Jalole
10. Software Testing and Quality Assurance by Naik; Wiley India Publications

DCS506
MICROPROCESSOR

	L	T	P
Periods/Week	3	-	2

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 them face-to-face with mainframe finding 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.

DETAILED CONTENTS

1. Evolution and Architecture of a Microprocessor (with reference to 8085 microprocessor) (10 Periods)
   Typical organization of a microcomputer system and functions of its various blocks. 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

2. Programming (with respect to 8085 microprocessor) (16 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).

3. Memories and I/O interfacing (10 Periods)
   Memory organization, Concept of memory mapping, partitioning of total memory space. Address decoding, concept of I/O mapped I/O and memory mapped I/O. Interfacing of memory mapped I/O devices. Concept of stack and its function. Basic RAM Cell, N X M bit RAM, Expansion of word length and capacity, static and dynamic RAM, basic idea of ROM, PROM, EPROM and EEPROM.

4. Instruction Timing and Cycles (06 Periods)
   Instruction cycle, machine cycle and T-states, Fetch and execute cycle.

5. Interrupts (05 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

6. Peripheral devices (Introduction) (06 Periods)
   8255 PPI and 8253 PIT, 8257 DMA controller, 8279 Programmable KB/Display Interface, 8251 Communication Interface Adapter, 8155/8156

8. Introduction of 16 Bit Microprocessor (06 Periods)
   Salient features of 8086 microprocessor, block diagram, register organization. Limitation of 16 bit microprocessor

9. Introduction of 80386, 80486, Motoroia, 32 bit microprocessor. Intel, Pentium microprocessor, dual core, core2 dual, corei3, core i5, core i7, latest processor.

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 of two 8 bit numbers
4. Writing and execution of ALP for sub station of two 8 bit numbers
5. Writing and execution of ALP for multiplication of two 8 bit numbers
6. Writing and execution of ALP for division of two 8 bit numbers
7. Writing and execution of ALP for arranging 10 numbers in ascending order
8. Writing and execution of ALP for arranging 10 numbers in descending order

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.

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. Digital Logic and Computer Design by Mano, M Morris; Prentice Hall of India, New Delhi
7. Digital Electronics and Applications by Malvino Leach; Publishers McGraw Hills, New Delhi
8. Digital Integrated Electronics by Herbert Taub and Donals Sachilling; Prentice Hall of India Ltd., New Delhi
9. Digital Electronics by Rajaraman; Prentice Hall of India Ltd., New Delhi
10. Digital Electronics and Microprocessor by Rajiv Sapra, Ishan Publication, Ambala
11. 8086 Microprocessor by MT Savaliya, Wiley India Publications.

DCS508 MINOR PROJECT WORK

	L	T	P
Periods/Week	-	-	4

Minor project work aims at exposing the students to the various industries dealing with computers. It is expected from them to get acquainted with computer environment possess desired attitudes. For this purpose student during middle of the course are required to be sent for a period of two to four weeks at a stretch in different establishments. Depending upon the interest of students they are sent for exposure to:

1) Industrial practices in installation and maintenance of computers and computer networks
2) Fabrication of computers
3) Fault diagnosis and testing of computers
4) Industrial practices in respect of documentation and fabrication
5) A variety of computers and peripherals in assembly organizations
6) Software package development organizations
7) Maintenance of database
8) Write be stored procedure or functions which can be attached as the library objects to the main projects
9) Write a procedure function to convert number of words.
10) Write a procedure function to convert all data function (create your own) Database connectivity, (SQL server, Oracle, Access), use of graphics, Encryption decryption program.

Note: The teachers may guide /help students to identify their minor project work and chalk out their plan of action well in advance.

As a minor project activity each student is supposed to study the operations at site and prepare a detail project report of the observations/processes/activities by him/her. The students should be guided by the respective subject teachers; each teacher may guide a group of 4 to 5 students.

The teachers along with field supervisors/engineers will conduct performance assessment of students. Criteria for assessment will be as follows:

	Criteria	Weightage
(a)	Attendance and Punctuality	15%
(b)	Initiative in performing tasks/creating new Things	30%
(c)	Relation with people	15%
(d)	Report Writing	40%

SIXTH SEMESTER

DCS601 OBJECT ORIENTED PROGRAMMING USING JAVA

	L	T	P
Periods/Week	3	-	2

RATIONALE

Today, the most likely place you will find Java is on World Wide Web. The web acts as convenient transport mechanism for Java programs and the web's ubiquity has popularized Java as an Internet development tool. Java has shifted the programming paradigm of single machine to distributed network of machines. Any application on World Wide Web can be easily implemented. Internet can have numerous applications and various protocols. This course will enable the students to learn in detail network programming language Java.

DETAILED CONTENTS

1. Introduction to Java (08 Periods)
   A brief history, how Java works?, Java Virtual Machine (JVM), Java In Time (JIT) compiler, Java features, using Java with other tools, native code, Java application types, comparison with C and C++

2. Working with data types, control flow statements, arrays, casting, command line arguments (10 Periods)

3. Java Classes and Memory Management (08 Periods)
   Introduction to Classes, inheritance, encapsulation and polymorphism, constructors and finalizers, garbage collection, access specifier

4. Interfaces and Packages (08 Periods)
   Using Java interface, using Java packages

5. Exception Handling and Stream Files (08 Periods)
   Over view of exception handling, method to use exception handling, method available to exceptions (The throw statement, the throws class, finally class), creating your own exception classes

6. Threads and Multi-threading (08 Periods)
   Overview, thread basics – creating and running a thread, The thread control methods, The threads life cycle and synchronization

7. Introduction to Applet, Application and JD (08 Periods)
   Java applets Vs Java applications, building application with JDK, building applets with JDK, HTML for Java applets, managing input-output stream

8. Java Data Base Connectivity (JDBC) (06 Periods

LIST OF PRACTICALS

1. Programming exercise on control flow statements in Java
2. Programming exercise on Arrays and String
3. Programming exercise on inheritance
4. Write Program for exception handling
5. Write programs for Multithreading
6. Programming exercise on Java applets
7. Write program for Java Data base connectivity
8. Mini project on Java

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INSTRUCTIONAL STRATEGY

The subject deals with object oriented concept. As the subject has both theory and practicals, more stress should be given to practical work.

RECOMMENDED BOOKS

1. The Complete Reference Java by Herbel Schildt; McGraw Hill, New Delhi
2. Java Programming by Balagurusamy, Tata McGraw Hill Education Pvt Ltd , New Delhi
3. Computer Programming in Java, W C/D by Junaid Khateeb, Wiley-India Pvt Ltd. Daryaganj, New Delhi
4. The Complete Reference by Patrick Naughton, Tata McGraw Hill Education Pvt Ltd , New Delhi
5. Set of Books on Java by Sun Microsystems
6. Java 2 Programming Bible by Aaron Walsh, Justin Couch, Daniel Steinberg, IDG Books India Pvt. Ltd., Netaji Subhash Marg, Darya Ganj, New Delhi
7. Java Pogramming- "How to Program Java" by Dietal and Dietel
8. An Introduction to Java Programming by Y Daniel Liang; Prentice Hall of India
9. Core Java by Cay S Horseman and Lray Carnell.
10. Introduction to Cryptography with applets by David Bishop, Narosa Publishing House Pvt Ltd, Darya Ganj, New Delhi
11. OOPS Using Java by Thampi; Dream Tech. Press.

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DCS602 COMPUTER GRAPHICS

	L	T	P
Periods/Week	3	-	2

RATIONALE

This subject will enable the students to have awareness about fundamental graphics which can be generated through computers using programming language C. He will be able to make picture and introduce motion in them using basic transformation.

DETAILED CONTENTS

1. Graphic Systems (06 Periods)
   Display devices, Bit map and vector graphics, resolution, aspect ratio,physical input and output devices,display processors graphics software coordinate representation, graphics functions and standards.

2. Scan conversion and Output Primitives (14 Periods)
   Scan converting the point, Scan converting the straight line - Bresenham's line algorithm, Scan converting a circle - Defining a circle, Bresenham's circle algorithm, Region filling - introduction, flood filling, boundary filling, Side effects of scan conversion. Graphic primitives in C, Point plotting, line drawing algorithms – DDA algorithms, Bresenham's line algorithms, circle-generating algorithms

3. Two-Dimensional Transformations (14 Periods)
   Basic transformations-translation, scaling, rotation, matrix representations and homogeneous coordinates, composite transformations – scaling relative to a fixed pivot, rotation about a fixed pivot point, general transformation equations, other transformation – reflection and shearing.

4. Windowing and Clipping Techniques (10 Periods)
   Windowing concepts, clipping algorithms, area clipping, line clipping, polygon clippings, text clipping, blanking, window to-viewpoint transformation, Cohen Sutherland clipping algorithm.

5. Three Dimensional Graphics (12 Periods)
   Three dimensional transformation, wire frame model, hidden line and hidden surface elimination (z-buffer algorithm), curve fitting and tracing

6. Perspective and Transformations (08 Periods)
   Perspective and Parallel transformations, vanishing points, perspective anomalies

LIST OF PRACTICALS

Write programs for following:

1. To draw a line
2. To move a character about a line
3. To move two characters in. opposite direction
4. To draw a circle
5. To move a character along circumference
6. To move along radius.
7. To use 2-D & 3-D translation technique,
8. To use 2-D & 3-D scaling technique
9. To use 2-D & 3-D rotation technique.
10. To use 2-D & 3-D reflection technique

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INSTRUCTIONAL STRATEGY

As the subject deals with Core Graphics Packages and techniques with vast applications in Medical Science, Animation Software, Image Processing, Compression techniques. Teacher is required to expose basic idea of graphics and implementation of various algorithms in C Programming language. The teacher should make the students to write the algorithm first and then based on those algorithms make them implement.

RECOMMENDED BOOKS

1. Computer Graphics with Virtual Reality Systems by Rajesh K. Maurya, Wiley India Pvt Ltd. Daryaganj, New Delhi
2. Computer Graphics by Donald Hearn and M Pauline Baker
3. Theory and problems of Computer Graphics by Roy A Plastock and Gordon Kalley. McGraw Hill
4. Publishers, Schaum's Outline series.
5. Interactive Computer Graphics by Harengton
6. Computer Graphics Programming Approach by Steven Harrington
7. Principles of Interactive Computer Graphics by WM Newman and RF Spraull
8. Computer Graphics for Engineers by A Rajaraman, Narosa Publishing House Pvt Ltd Daryaganj, New Delhi 110002

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DCS603 DATA WAREHOUSE AND MINING

L T P
Periods/Week 3 - -

RATIONALE

Data Mining and Warehousing enables middle and top managers to analyze data and explore relationships among the data items which helps them to take right decisions in right time. After going through this course, students can understand the concepts, functions and various techniques of data mining and warehousing and appreciate them through various case studies.

DETAILED CONTENTS

1. Introduction to Data Mining (08 Periods)
   - What is data mining? Data mining background
   - Inductive learning, statistics, machine learning
   - Difference between data mining and machine learning, data mining models, verification model, discovery model
   - Data mining problems/issues

2. Introduction to Data Warehousing (15 Periods)
   - Concept and benefits of data warehousing, type of data, characteristics of a data warehouse, processes in data warehousing
   - Data warehousing and OLTP systems
   - The data warehouse architecture, problems with data warehousing, criteria for a data warehouse
   - Data marks

3. Data Mining Functions (15 Periods)
   - Classification
   - Associations
   - Sequential/temporal patterns
   - Clustering/segmentation

4. Data Mining Techniques (20 Periods)
   - Cluster analysis
   - Induction, decision trees, rule induction
   - Neural networks
   - On-line analytical processing, OLAP (Online Analytical Processing) examples
   - Comparison of OLAP and OLTP (Online Transaction Processing)
   - Data visualization

5. Case Studies on Data Mining Applications and recent trends in data mining (06 Periods)

INSTRUCTIONAL STRATEGY

As the subject is theoretical one, the concepts of data warehousing and data mining and their applications must be introduced to students with appropriate case studies and examples

RECOMMENDED BOOKS

1. Data Mining Concepts and Techniques by J. Han, M Kamber, Morgan Kaufmann, 2001, ISBN 1-55860-489-8
2. Introduction to Data Mining by Hand, Mannila, and Smyth, MIT Press, Cambrdge, MA, 2000
3. OLAP Solutions: Building Multidimensional Information Systems by Erik Thomsen, John Wiley & Sons, Inc., 1997 (ISBN 0471014931-4)
4. Data Warehousing for IT Professionals by Poonia; Wiley India Publications
5. Data Mining Techniques by Linos; Wiley India Publications.

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DCS604 OPEN SOURCE TECHNOLOGIES

	L	T	P
Periods/Week	3	–	2

RATIOANLE

This course is aimed at providing the students with a fairly good knowledge and understanding of Open Source Software. After completion of this subject students will be able to use copyright free Open Source Software products in research and collaborate in enhancement of these OSS products.

DETAILED CONTENTS

1. Introduction (06 Periods)

   Open Source Origins, Differences among Open Source, freeware, proprietary and other software. Principle and Techniques of Open Source Development, Issues in Open Source Software Development.

2. Legal Issues (06 Periods)

   Copyright and IPR, Open Source Licenses, Open Standards

3. Open Source Operating Systems (18 Periods)

   Linux's History and flavors, Installation of Libux: File system of linux, Network & packages Configuration, LILO, GRUB, Linux's fdisk. Overview of Linux structure, general purpose Linux commands; working with editor. Introduction to Open Office, Introduction to C/C++ programming in Linux environment, shell programming, Installation of Linux server

4. Internet-The Technology (06 Periods)

   Open standards, W3C Protocols, Role of XML in Open Source Software Development.

5. Open Source Database (10 Periods)

   Introduction to MySQL, Database design and development using MySQL

6. Open Source Web Development Tools (12 Periods)

   PHP syntax (variables, control structures, functions), File Handling: Uploading files, Using PHP to open read, write and close external files and manipulate data. Security: Avoiding security pitfalls by careful coding.

7. Case studies related to successful implementation of open source software. (06Periods)
   C/C++,PHPMySQL, Java, Linux, LaTeX, Python, Scilab, Blender, GIMP, Open FOAM, Oscad ,Q-CAD, firefox etc.

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LIST OF PRACTICALS

1. To install linux/Fedora/ ubuntu and understand its file system i.e. ext2, ext3.
2. To configure LINUX OS using LILO, Grub.
3. Introduction of LINUX shell-(Korn, Bourne, C Shell) and using shell commands.
4. To use XML and prepare database in XML.
5. To use MySQL and create tables in MySQL.
6. To prepare Web page using PHP.
7. To prepare Web forms using PHP and store database in MySQL.
8. To install, use open office and compare its features with MS Office.

INSTRUCTIONAL STRATEGY

Since Open Source Software has wider scope, thus open source software lab need to be established and more practicals and exposures can be conducted through case studies and industrial visits.

RECOMMENDED BOOKS

1. Beginning PHP5, Apache, MySL, Web Dvelopment by Elizabeth Naramore, Jason Gerner, Yann Le Scouarnec, Jeremy Stolz, Michael K. Glass; Wiley Publishing Inc.
2. Open Source SOA by Jeff Davis, Wiley-India Pvt Ltd. Daryaganj, New Delhi.
3. Unix for Programmers and Users by Graham Glass, King Ablas; Pearson Education

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Internet sites:

1. www.opensource.org
2. www.w3.org
3. www.spoken-tutorial.org
4. www.fosscommunity.wordpress.org
5. www.sf.net
6. www.githeeb.org
7. www.yolinux.org
8. www.disfrowatch.com

DCS605 MOBILE COMPUTING

	L	T	P
Periods/Week	3	-	-

RATIONALE

The ubiquity of wireless communication technologies and the proliferation of portable computing devices have made possible a mobile computing era in which users, on the move, can seamlessly access network services and resources, from anywhere and at anytime. This course provides an introduction to the fundamentals of mobile computing. A background in computer networks and wireless communication is required.

DETAILED CONTENTS

1. Introduction (08 Periods)

   Evolution of wireless networks, wireline and wireless data networks, advantages of mobile computing, networks, middleware and gateways, application, services and security, Evolution of mobile communication system, paging system

2. Mobile Computing Architecture (10 Periods)

   3-tier architecture, design considerations for mobile computing, mobile computing through internet, FDMA, TDMA, CDMA, SDMA

3. Cellular Networks (10 Periods)

   GSM principles and architecture, GPRS architecture, EDGE, 2G cellular network, 2.5 G wireless network, HSCSD,UMTS, 3G, CDMA Technologies

4. System design fundamentals (10 Periods)

   Frequency reuse, channel alignment strategies, handoff strategies, interference and system capacity, improving converge and capacity in cellular system, parameters for mobile multipath channel, small scale fading

5. Wireless System and Standards (15 Periods)

   Difference between wireless and wired telephone network, ISDN, development of wireless network, Bluetooth, RFID, IEEE 802.11.a/b/g/n, Mobile IP, IPV6, JAVA Card, Features of WIMAX,CDMA digital cellular standard

6. Wireless Application Protocol (WAP) (06 Periods)
   WAP, MMS, GPRS Applications

7. Operating Systems for Mobile Devices (05 Periods)
   Design constraints in applications for handheld devices, palm and symbian OS features and architecture, introduction to J2ME technology, Android OS

INSTRUCTIONAL STRATEGY

Since the subject is comparatively new and the students are required some background of other subjects like computer networks and wireless communication. So while explaining of concepts, real-time examples and case studies may be used. In addition, institute may arrange visits to places

RECOMMENDED BOOKS

1. Mobile Computing: Technology, Applications and Service Creation by Asoke K. Talukdar and Roopa R. Yavagal, Tata McGraw Hill Education Pvt Ltd , New Delhi
2. Handbook of Wireless Networks and Mobile Computing by Stojmenovic, Wiley India Pvt Ltd. Daryaganj, New Delhi
3. Wireless Communication: Principles and Practice by Theodok S. Rappaport, Pearson Education Asia, 2nd Edition.
4. Principles of Mobile Computing by Owe Hansman, Lothar Merk, Martin S Nicklous and Thomas Stober, Springel-Verlag, 2nd Edition, 2003, New Delhi
5. Mobile Computing by Hansman; Wiley India Publications.

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DCS606 ENTREPRENEURSHIP DEVELOPMENT AND MANAGEMENT

	L	T	P
Periods/Week	4	-	-

RATIONALE

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

DETAILED CONTENTS

SECTION – A ENTREPRENEURSHIP

1. Introduction (23 periods)

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

2. Market Survey and Opportunity Identification (17 periods)

- Scanning of business environment
- Salient features of National and 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

3. Project report Preparation (14 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

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SECTION –B MANAGEMENT

4. Introduction to Management (06 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

a) Line organisation
b) Line and staff organisation
c) Functional Organisation

5. Leadership and Motivation (05 periods)

a) Leadership

- Definition and Need
- Qualities and functions of a leader
- Manager Vs leader
- Types of leadership

b) Motivation

- Definitions and characteristics
- Factors affecting motivation
- Theories of motivation (Maslow, Herzberg, McGregor)

6. Management Scope in Different Areas (10 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

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- Elementary knowledge of income tax, sales tax, excise duty, custom duty and VAT

7. Miscellaneous Topics (05 periods)

a) Customer Relation Management (CRM)

- Definition and need
- Types of CRM

b) Total Quality Management (TQM)

- Statistical process control
- Total employees Involvement
- Just in time (JIT)

c) Intellectual Property Right (IPR)

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

Note: In addition, different activities like conduct of entrepreneurship awareness camp extension lecturers by outside experts, interactions sessions with entrepreneurs and industrial visits may also be organised.

INSTRUCTIONAL STRATEGY

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

RECOMMENDED BOOKS

1. A Handbook of Entrepreneurship, Edited by BS Rathore and Dr JS Saini; Aapga Publications, Panchkula (Haryana)
2. Entrepreneurship Development published by Tata McGraw Hill Publishing Company Ltd., New Delhi
3. Entrepreneurship Development in India by CB Gupta and P Srinivasan; Sultan Chand and Sons, New Delhi
4. Entrepreneurship Development - Small Business Enterprises by Poornima M Charantimath; Pearson Education, New Delhi
5. Entrepreneurship : New Venture Creation by David H Holt; Prentice Hall of India Pvt. Ltd., New Delhi
6. Handbook of Small Scale Industry by PM Bhandari
7. Principles and Practice of Management by L M Prasad; Sultan Chand & Sons, New Delhi.
8. Entrepreneurship by Alpana Trehan; Dream Tech. Press
9. Entrepreneurship by Manimali; Viz Tantra Publications
10. Patterns of Entrepreneurship by Kalpana; Wiley India Publications.

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DCS607 EMPLOYABLE SKILLS

	L	T	P
Periods/Week	-	-	4

RATIONALE

Diploma holders are required to not only possess subject related knowledge but also soft skills to get good jobs and to rise steadily at their workplace. This subject is included to develop employability skills amongst the students

DETAILED CONTENTS

1. Industrial Scenario Engineering Education and expectations of competences from an engineer by employer (04 periods)

2. Personality types, characteristic and features for a successful engineer (04 periods)

3. Professional Engineer desirable values and ethics and their development. Relation between engineering profession, society and environment (04 periods)

4. Managing project (16 periods)

   - Leadership
   - Motivation
   - Time management
   - Resource management
   - Computer Software
   - Interpersonal relationship
   - Engineer economics and fundamentals

5. Effective Communication (08 periods)

   - Listening
   - Speaking
   - Writing
   - Presentation Technique/Seminar
   - Group discussion

6. Preparing for Employment (08 periods)

   - Searching for job/job hunting
   - Resume Writing
   - Interview technique in personal interview telephonic interview, panel interview, group interview, video conference

7. Managing Self (06 periods)

   - Managers body, mind, emotion and spirit
   - Stress Management
   - Conflict resolution

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8. Continuing professional development (04 periods)

   - Organising learning and knowledge

- Use of computer for organising knowledge resource

9. Creativity, Innovation and Intellectual property right (06 periods)

- Concept and need in present time for an engineer

10. Basic rules, laws and norms to be adhered by engineers during their working (04 period)

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DCSPR608 MAJOR PROJECT WORK

	L	T	P
Periods/Week	-	-	4

RATIONALE

Major Project Work aims at developing innovative skills in the students whereby they apply in totality the knowledge and skills gained through the course work in the solution of particular problem or by undertaking a project. 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. It is also essential that the faculty of the respective department may have a brainstorming 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 students should identify themselves or accept the given project assignment at least two to three months in advance. The project work identified in collaboration with industry should be preferred. Each teacher is expected to guide the project work of 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 (Cabling, Hubs, Switch etc)
- 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)

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A suggestive criterian for assessing student performance by the external (personnel 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

	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

In order to qualify for the diploma, students must get "Overall Good grade" failing which the students may be given one more chance of undergoing 8 -10 weeks of project oriented professional training in the same industry and re-evaluated 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.

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 100 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.**

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

The students must submit a project report of not less than 50 pages (excluding coding). The report must follow the steps of Software Engineering Concepts

It is proposed that the institute may organize an annual exhibition of the project work done by the students and invite leading Industrial organizations in such an exhibition. 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 industries are approached for instituting such awards.

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