

Dr. Babasaheb Ambedkar Technological University,
Lonere - 402 103

Institute of Petrochemical Engineering
(Diploma Wing)



Revised Curriculum

For

First Year Diploma in Engineering
w.e.f. A.Y. 2017-18



Dr. Babasaheb Ambedkar Technological University's Institute of Petrochemical Engineering
First Year Diploma Program (Proposed Curriculum W. E. F. 2017-18)

Semester-I

Group A: Diploma in Electrical, Electronics and Telecommunication, Information Technology and Computer Engineering

Sr. No.	Course Code	Course Title	Teaching Scheme/Contact Hours			Examination Scheme					
			TH	TU	PR	Credits	MSE	ESE	TW	PR/OR	Total
1	DEN1101	English	03		-	03	30	70	-	-	100
2	DMA1101	Basic Mathematics	04	03	-	07	30	70	-	-	100
3	DPH1101	Applied Physics	04	-	-	04	30	70	-	-	100
4	DME1101	Engineering Drawing	03	-	-	03	30	70#	-	-	100
5	DCE1101	Fundamentals of ICT (lab)	02 (##)	-	02	04	-	-	25	25 @	50
6	DPH1102	Applied Physics (Lab)	-	01	03	04	-	-	50	50 (€)	100
7	DME1102	Engineering Drawing (Lab)	-	--	04	04	-	-	50	-	50
8	DEN1102	English (Lab.)	-	01	-	01	-	-	25	25 @	50
Total			16	05	09	30	120	280	150	100	650

@ : Internal evaluation (Oral exam); (€) : External Practical Examination. (##): No theory Examination.

In case of term work there will be continuous assessment. Examination Duration: MSE: 90 Min, ESE: 3Hrs, # ESE: 4Hrs
 TH: Theory Lecture, TU: Tutorial, PR: Practical, MSE: Mid semester Exam., ESE: End Semester Exam ,
 TW: Term Work; OR: oral



Dr. Babasaheb Ambedkar Technological University's Institute of Petrochemical Engineering
First Year Diploma Program (Proposed Curriculum W. E. F. 2017-18)

Semester-I

Group B: Diploma in Chemical, Petrochemical, Polymer and Plastic Engineering, and Instrumentation

Sr. No.	Course Code	Course Title	Teaching Scheme/Contact Hrs			Examination Scheme					
			TH	TU	PR	Credits	MSE	ESE	TW	PR/OR	Total
1	DEN1101	English	03		-	03	30	70			100
2	DMA1101	Basic Mathematics	04	03	-	07	30	70	-	-	100
3	DCY1101	Applied Chemistry	04	-	-	04	30	70	-	-	100
4	DEE1101 DEE1102	Basic Electrical Engineering (Instru)	04	-	-	04	30	70			100
		Electrical and Electronics Engg. (Chem/petro/poly)	04	-	-						
5	DME1103	Workshop Practices (Lab)	01 (#)	-	04	05	-	-	50	50@	100
6	DCY1102	Applied Chemistry (Lab)	-	01	03	04	-	-	25	25 (€)	50
7	DEN1102	English (Lab)	-	01	-	01	-	-	25	25 @	50
8	DEE1103 DEE1104	Basic Electrical Engineering Lab(Instru)	-	-	02	02	-	-	25	25 (€)	50
		Electrical and Electronics Engg Lab (Chem/petro/poly)	-	-	02						
Total			16	05	09	30	120	280	125	125	650

@ : Internal evaluation (Oral exam); (€) : External Practical Examination. (#): No theory Examination.

In case of term work there will be continuous assessment. Examination Duration: MSE: 90 Min, ESE: 3Hrs,
 TH: Theory Lecture, TU: Tutorial, PR: Practical, MSE: Mid Semester Exam., ESE: End Semester Exam ,
 TW: term Work; OR: oral



Dr. Babasaheb Ambedkar Technological University's Institute of Petrochemical Engineering
First Year Diploma Program (Proposed Curriculum W. E. F. 2017-18)
Semester-II

Group A: Diploma in Electrical, Electronics and Telecommunication, Information Technology and Computer Engineering

Sr. No.	Course Code	Course Title	Teaching Scheme/Contact Hours			Examination Scheme					
			TH	TU	PR	Credits	MSE	ESE	TW	PR/OR	Total
1	DMA1201	Applied Mathematics	04	02	-	06	30	70	-	-	100
2	DCY1201	Applied Chemistry	04	-	-	04	30	70	-	-	100
3	DEN1201	Language Lab	-	-	02	02	-	-	25	25@	50
4	DEE1201	Basic Electrical Engineering (Electrical/ ETC)	04	-	-	04	30	70	-	-	100
	DET1202	Electrical and Electronics Engg (Comp/IT)									
5	DET1201	Elements of Electronics (Electrical/ETC)	03	-	-	03	30	70	-	-	100
	DCE1202	Programming in C (Computer/IT)									
6	DME1203	Workshop Practices (Lab)	01(##)	-	04	05	-	-	50	-	50
7	DCY1202	Applied Chemistry (Lab)	-	-	02	02	-	-	25	25 (€)	50
8	DEE1202	Basic Electrical Engineering (Lab)(Electrical/ETC)	-	-	02	02	-	-	25	25 (€)	50
	DET1204	Electrical and Electronics Engg (Lab) Comp/IT)									
9	DET1203	Elements of Electronics(Lab) (Electrical/ETC)	-	-	02	02	-	-	25	25 (€)	50
	DCE1203	Programming in C (Lab) (Computer/IT)									
Total			16	02	12	30	120	280	150	100	650

@ : Internal evaluation based on oral examination; (€) : External Practical Examination ; (##) : No theory Examination
 In case of term work there will be continuous assessment. Examination Duration: MSE: 90 Min, ESE: 3Hrs, TH: Theory Lecture, TU: Tutorial, PR: Practical , MSE: Mid Semester Exam. ESE: End Semester Exam TW: term Work, OR: oral



Dr. Babasaheb Ambedkar Technological University's Institute of Petrochemical Engineering
Group B: Diploma in Chemical, Petrochemical, Polymer and Plastic Engineering, and Instrumentation

Semester II

Sr. No.	Course Code	Course Title	Teaching Scheme / Contact Hours			Examination Scheme					
			TH	TU	PR	Credits	MSE	ESE	TW	PR/OR	Total
1	DMA1201	Applied Mathematics	04	02	-	06	30	70	-	-	100
2	DPH1201	Applied Physics	04	-	-	04	30	70	-	-	100
3	DME1201	Engineering Drawing	03	-	-	03	30	70(#)	-	-	100
4	DET1201	Elements of Electronics (Instru)	03	-	-	03	30	70	-	-	100
	DCY1203	Chemistry of Engineering Material (Chem/Petro/Poly)	03	-	-						
5	DEN1201	Language Lab	-		02	02	-	-	25	25 @	50
6	DCE1201	Fundamentals of ICT (lab)	02 (##)	-	02	04	-	-	25	25 @	50
7	DPH1202	Applied Physics (Lab)	-	-	02	02	-	-	25	25 (€)	50
8	DME1202	Engineering Drawing (Lab)	-	--	04	04	-	-	50	-	50
9	DET1203	Elements of Electronics Lab (Instru)	-	-	02	02	-	-	25	25(€)	50
	DCY1204	Chemistry of Engineering Material Lab (Chem/Petro/Poly)	-	-	02						
Total			16	02	12	30	120	280	150	100	650

@ : Internal evaluation based on oral examination; (€): External Practical Examination ; (##) : No theory Examination

In case of term work there will be continuous assessment.Examination Duration: MSE: 90 Min, ESE: 3Hrs, # ESE: 4Hrs.

TH: Theory Lecture TU: Tutorial PR: Practical , MSE: Mid semester Exam. ESE: End Semester Exam TW: Term Work; OR: Oral

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GROUP A (Electrical/ Electronics & Telecomm./Computer/ Information Tech.) SEMESTER-I			
Sr.No.	Course Code	Course Title	Page No.
1	DEN1101	English	08
2	DMA1101	Basic Mathematics	11
3	DPH1101	Applied Physics	14
4	DME1101	Engineering Drawing	18
5	DCE1101	Fundamentals of ICT (lab)	20
6	DPH1102	Applied Physics (Lab)	23
7	DME1102	Engineering Drawing (Lab)	24
8	DEN1102	English (Lab.)	25
GROUP B (Chemical/Petrochemical/ Polymer & Plastics/ Instrumentation engg.) SEMESTER-I			
1	DEN1101	English	26
2	DMA1101	Basic Mathematics	28
3	DCY1101	Applied Chemistry	31
4	DEE1101	Basic Electrical Engineering (Instru)	34
	DEE1102	Electrical and Electronics Engg. (Chem/petro/poly)	38
5	DME1103	Workshop Practices (Lab)	40
6	DCY1102	Applied Chemistry (Lab)	43
7	DEN1102	English (Lab)	44
8	DEE1103	Basic Electrical Engineering Lab(Instru)	45
	DEE1104	Electrical and Electronics Engg Lab (Chem/petro/poly)	46

GROUP A (Electrical/ Electronics & Telecomm./ Computer/ Information Tech.) SEMESTER-II			
1	DMA1201	Applied Mathematics	47
2	DCY1201	Applied Chemistry	50
3	DEN1201	Language Lab	53
4	DEE1201	Basic Electrical Engineering (Electrical/ETC)	55
	DET1202	Electrical and Electronics Engg (Comp/IT)	57
5	DET1201	Elements of Electronics (Electrical/ETC)	61
	DCE1202	Programming in C (Computer/IT)	63
6	DME1203	Workshop Practices (Lab)	65
7	DCY1202	Applied Chemistry (Lab)	68
8	DEE1202	Basic Electrical Engineering (Lab)(Electrical/ETC)	69
	DET1204	Electrical and Electronics Engg (Lab) Comp/IT)	70
9	DET1203	Elements of Electronics(Lab) (Electrical/ETC)	71
	DCE1203	Programming in C (Lab) (Computer/IT)	72
GROUP B (Chemical/Petrochemical/ Polymer & Plastics / Instrumentation Engg.) SEMESTER-II			
1	DMA1201	Applied Mathematics	74
2	DPH1201	Applied Physics	77
3	DME1201	Engineering Drawing	80
4	DET1201	Elements of Electronics (Instru)	83
	DCY1203	Chemistry of Engineering Material (Chem/Petro/Poly)	85
5	DEN1201	Language Lab	88
6	DCE1201	Fundamentals of ICT (lab)	90
7	DPH1202	Applied Physics (Lab)	93
8	DME1202	Engineering Drawing (Lab)	94
9	DET1202	Elements of Electronics Lab (Instru)	95
	DCY1204	Chemistry of Engineering Material Lab (Chem/Petro/Poly)	96

GROUP A SEM.-I

Course Code:DEN1101

English

Teaching Scheme

Examination Scheme

Lectures : 3 Hrs. /Week

Credits: 6 MSE: 30 ESE: 70 Marks

Course Outcomes:

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following *industry oriented* COs associated with the above mentioned competency:

- Formulate grammatically correct sentences.
- Summarise comprehension passages.
- Formulate different types of dialogues.
- Use relevant vocabulary to compose paragraphs to express ideas, thoughts and emotions.
- Use relevant words in writing and delivering short and long speeches.

Units	Content	Hrs.	Marks
Unit - 1 Applied Grammar	1.1. Articles: definite and indefinite 1.2. Prepositions: Types and usage 1.3. Conjunctions: coordinating and subordinating 1.4. Active and Passive voice 1.5. Subject Verb Agreement 1.6. Tenses - Present Tense (Simple, Continuous, Perfect) - Past Tense (Simple, Continuous, Perfect)- Future Tense (Simple) 1.7. Connectors : And, But, Or, Nor, Though, Although, If, Unless, Otherwise,	10	20
Unit-2 Comprehension Passages	2.1 Seen passages from MSBTE text book. 2.2 Unseen passages from different sources	15	30
Unit-3 Paragraph and Dialogue Writings	3.1 Paragraph writing 3.2 Types of paragraph i. Technical ii) Descriptive iii. Narrative iv) Compare and contrast	08	17
	3.3 Dialogue writing i. Greetings ii. Development of dialogue iii. Closing sentence		
Unit- 4	4.1. Words often confused	08	16

Vocabulary Building	4.2. Collocations 4.3. Prefix and suffix 4.4. Synonyms and Antonyms		
Unit - 5 Speeches	5.1. Welcome speech 5.2. Farewell speech 5.3. Summarise an event 5.4. Summarise debates 5.5. Summarise panel discussions. 5.6. Compere panel discussions 5.7. Introducing a guest 5.8. Vote of thanks	07	17
Total		48	100

Note

i. A suggestive list of practical LOs is given in the above table, more such practical LOs can be added to attain the COs and competency. A judicious mix of minimum 12 or more practical LOs/tutorials need to be performed, out of which, the practicals marked as ‘’ are compulsory.*

SUGGESTED LEARNING RESOURCES:

Sr No	Title of Book	Author	Publication
1	English	MSBTE	MSBTE, Mumbai, 2008
2	Effective English with CD	Kumar, E. Suresh; Sreehari,P.; Savithri, J.	Pearson Education, Noida, New Delhi, 2009 ISBN: 978-81-317-3100-0
3	English Grammar at Glance	Gnanamurali, M.	S. Chand and Co. New Delhi, 2011 ISBN:9788121929042
4	Essential English Grammar	Murphy, Raymond	Cambridge University Press, New Delhi, Third edition, 2011, ISBN: 9780-0-521-67580-9
5	Living English Structure	Allen, W.S.	Pearson Education, New Delhi, Fifth edition, 2009, ISBN:108131728498,99

SOFTWARE/LEARNING WEBSITES

- a. <https://www.britishcouncil.in/english/learn-online>
- b. <http://learnenglish.britishcouncil.org/en/content>
- c. <http://www.talkenglish.com/>
- d. languagelabsystem.com
- e. www.wordsworthelt.com

Course Code: DMA1101 Basic Mathematics**Teaching Scheme Examination Scheme****Lectures:** 4 Hrs. /Week **Credits: 11****Tutorials:** 3 Hrs. /Week **MSE: 30 Marks ESE: 70 Marks****Course Outcomes:**

- 1) Apply the concepts of algebra to solve engineering related problems.
- 2) Use the types of determinant and matrices to solve basic problems in engineering.
- 3) Utilize basic concepts of trigonometry to solve elementary engineering problems.
- 4) Solve basic engineering problems under given conditions of straight lines.
- 5) Solve the problems based on measurement of regular closed figure and regular solids. Use basic concepts of statistics to solve engineering related problems.
- 6) Use numerical methods to solve engineering problems.

Unit	Contents	Hrs	Marks
1	Logarithm: Concept and laws of logarithm, examples on them.	2	5
	Partial Fractions: Definition of fraction, proper, improper fraction and partial fraction, partial fraction of proper and improper fraction, resolve proper fractions into partial fraction with denominator containing (i) non-repeated linear factors, (ii) repeated linear factors, (iii) non-repeated quadratic irreducible factors. Resolve improper fraction in to partial fraction	4	5
	Complex Numbers: Definition of complex number, cartesian, polar and exponential form of complex number, algebra of complex numbers	3	5
2	Determinant: Definition of a determinant, value of determinant of order 3x3, solution of simultaneous equations in three unknowns by Cramer's rule	2	5
	Matrices: Definition of a matrix of order m x n, types of matrices, algebraic operations on matrices, algebra of matrices with properties and examples, determinant of a square matrix, transpose of a matrix with properties, minor and cofactor of an element of a matrix, adjoint of a matrix and inverse of a matrix by adjoint method, solution of simultaneous equations containing	8	10

	two or three unknowns.		
3	Trigonometry: Definition of trigonometric ratio, trigonometric ratios of compound, allied, multiple and sub-multiple angles (without proof), factorization and de-factorization formulae (without proof), inverse trigonometric functions, principal values and examples on them.	10	20
4	Straight line: Slope of a straight line, angle between two lines, condition for parallel and perpendicular lines. Various forms of straight lines: Slope-point form, two-point form, two-intercept form, general form, perpendicular distance from a point on a line, perpendicular distance between two parallel lines.	9	10
5	Mensuration: Definition of mensuration, area of regular closed figures, area of triangle, square, parallelogram, rhombus, trapezium and circle, volume of cuboids, cone, cylinders and sphere and examples on them.	3	10
	Statistics: Definition of statistics, range, coefficient of range of discrete and grouped data, mean deviation and standard deviation from mean of grouped and ungrouped data, weighted means, variance and coefficient of variance, comparison of two sets of observation and examples on them.	6	15
6	Numerical Methods Solution of algebraic equations: a) Bisection Method, b) Regula-falsi Method, c) Newton-Raphson Method Numerical solutions of simultaneous equations: a) Gauss-elimination Method, b) Jacobi's Method, c) Gauss-Seidal Method	9	15

Tutorials:

Sr.No.	Tutorials	Unit	Hour
1	Solve simple problems of logarithm based on definition and laws.	I	2
2	Resolve algebraic expressions into partial fractions.	I	2
3	Solve examples on algebra of complex numbers.	I	2
4	Solve examples on determinant to find area of triangle and solution of simultaneous equations by Cramer's rule.	II	2
5	Solve examples on types of matrices and find inverse of a matrix.	II	2
6	Solve examples on compound, allied, multiple and sub-multiple angles.	III	2

7	Solve examples on factorization and defactorization	III	2
8	Solve examples on inverse circular functions.	III	2
9	Solve examples on equation of straight lines using different forms.	IV	2
10	Solve examples on perpendicular distance, distance between two parallel lines and angle between two lines.	IV	2
11	Solve examples on area of triangle, rectangle and circle.	V	2
12	Solve examples on surface area and volume of sphere, cylinder and cone.	V	2
13	Solve examples on applications of surface area and volume.	V	2
14	Solve examples on range and coefficient of range.	V	2
15	Solve examples on mean deviation.	V	2
16	Solve examples on weighted arithmetic mean.	V	2
17	Solve examples on standard deviation.	V	2
18	Solve examples on coefficient of variation and comparison of two sets.	V	2
19	Solve examples on Bisection Method and Regula-falsi Method.	VI	2
20	Solve examples on Newton-Raphson Method and Gauss-elimination Method.	VI	2
21	Solve examples on Jacobi's Method and Gauss-Seidal Method.	VI	2

Text Books

G.V. Kumbhojkar	A Textbook of Engineering Mathematics,	PhadakePrakashan, Kolhapur
S.P.Deshpande	Mathematics for Polytechnic, Pune	Vidyarthee GruhaPrakashan,Pune

Reference Books

H. K. Dass	Advanced Engineering Mathematics.	S. Chand Publication, New Delhi
Dr. B. S. Grewal	Higher Engineering Mathematics.	Khanna Publication, New Delhi

Apps

Following apps are available free on the website.

Sr.No.	Mobile Apps	Developer	Website
1	MathsRK2	Dr.R.K.Jadhav	www.amazon.com
2	MathRK 3-4	Dr.R.K.Jadhav	www.amazon.com

III) Website

1	www.mathsrk.weebly.com	Dr.R.K.Jadhav
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Course Code: DPH1101/ DPH1201

Applied Physics

Teaching Scheme

Examination Scheme

Lectures 04 hrs/weeks

Credits: 8

Papers Hrs : 03

MSE: 30 Marks

ESE: 70 Marks

Course Outcomes: Students will able to:

1. Understand laws and principles of electrical circuits.
2. Classify solids on the basis of Band theory.
3. Understand principle of LASER and its applications in engineering field.
4. Understand applications of viscosity in engineering field.
5. Understand method of selection of material for intended purpose.
6. Apply knowledge of good and bad conductors of heat in various engineering concepts.

Course Contents

Unit	Contents	Hrs.	Marks
1	<p><u>General Physics</u></p> <p>1.1) Properties of solids:</p> <ul style="list-style-type: none">• Elasticity: Definitions of deforming force, restoring force, elasticity, plasticity, Factors affecting elasticity.• Stress: Tensile, Compressive, Volumetric and Shear stress.• Strains: Tensile, Volumetric and Shear strain., Elastic limit, Hook's law.• Elastic co-efficient: Young's modulus, bulk modulus, modulus of rigidity and relation between them.• Stress-strain diagram, behaviour of wire under continuously increasing load, yield point, ultimate stress, breaking stress, factor of safety, compressibility, Poisson's ratio. <p>1.2) Properties of liquids</p> <p>Fluid friction:</p> <ul style="list-style-type: none">• Viscous force, definition of viscosity, velocity gradient, Newton's law of viscosity, coefficient of viscosity and its SI unit.• Streamline and turbulent flow with examples, critical velocity, Reynolds's number and its significance.• Up thrust force, terminal velocity, stroke's law and derivation of coefficient of viscosity by Stroke's method, effect of temperature and adulteration on viscosity of liquid. <p>Surface Tension:</p> <ul style="list-style-type: none">• Cohesive and adhesive force, Laplace's molecular theory of surface tension, Surface Tension: definition and unit, effect of temperature on surface tension. Angle of contact, Capillarity and examples of capillary action, derivation of expression for surface	12	20

	tension by capillary rise method, applications of surface tension.		
2	<p>Thermal properties of matter:</p> <p>2.1) Modes of transformation of heat:</p> <ul style="list-style-type: none"> • Difference between heat and temperature, definition of calorie, Absolute zero, units of temperature: °C, °F, °K, with their conversion. • Conduction, law of thermal conductivity, coefficient of thermal conductivity, good conductors of heat & insulators with suitable examples, applications of conduction. Convection, applications of convection. Radiation, applications of radiation <p>2.2) Gas laws: Boyle's law, Charles's law, Gay lussac;s law (statement and mathematical equation only)Perfect gas equation ($PV=RT$) (No derivation), specific heat of a substance, SI unit, specific heat of gas at constant volume (C_v), specific heat of gas at constant pressure (C_p), ratio of specific heat, Mayer's relation between C_p and C_v, isothermal process, adiabatic process, difference between isothermal process and adiabatic process.</p>	9	16
3	<p>Optics</p> <p>3.1 Refraction of light:</p> <ul style="list-style-type: none"> • Refraction of monochromatic light, Snell's law, derivation of prism formula, total internal reflection, critical angle. • Elementary ideas of Scattering, interference, diffraction, birefringence phenomenon. • Optical fibre: principle, structure of optical fibre, propagation of light wave through optical fibre, derivation of numerical aperture and acceptance angle. <p>3.2 Laser:</p> <ul style="list-style-type: none"> • Laser, properties of laser, spontaneous and stimulated emission, population inversion, optical pumping. <p>He-Ne Laser: principle, construction and working, engineering applications of Laser.</p>	8	16
4	<p>Wave motion</p> <p>4.1 Wave motion:</p> <ul style="list-style-type: none"> • Definition of wave, wave motion, wave velocity, wave period, wave frequency, wave length, vibratory motion, periodic motion, amplitude of a vibrating particle, derivation of $v = n\lambda$. • Simple harmonic motion (SHM), examples of SHM, characteristics of SHM. • Types of progressive waves: transverse and longitudinal waves with examples. <p>4.2 Resonance: Stationary wave, formation of stationary wave, examples Of stationary waves, characteristics of stationary waves, free</p>	8	16

	and Forced vibrations with examples. Resonance: definition of resonance, examples of resonance, formula To calculate velocity of sound by resonance method.		
5	<p>Basic Electric circuits & Electromagnetism</p> <p>5.1 Simple D.C. electric circuits:</p> <ul style="list-style-type: none"> • Electric current: definition, symbol and unit, Ohm's law: statement, mathematical expression, resistivity: definition, unit, conductivity: definition, unit. <p>5.2 Whetstone's network and potentiometer:</p> <ul style="list-style-type: none"> • Wheatstone's network, working principle, balancing condition, principle of potentiometer, potential gradient. <p>5.3 Electromagnetism:</p> <ul style="list-style-type: none"> • Magnetism, Magnetic effect of electric current, Ampere's thumb rule, Biot-Savart's law, statement, force experienced by a current carrying straight conductor kept in a magnetic field. Fleming's left hand rule, couple acting on a rectangular coil kept in a magnetic field. • Principle of galvanometer, construction & working of galvanometer, conversion of galvanometer into ammeter and voltmeter. 	10	16
6	<p>Semiconductor Physics & modern Physics</p> <p>6.1 Semiconductor Physics</p> <ul style="list-style-type: none"> • Classification of solids on the basis of band theory: forbidden energy gap, conductor, insulator, and semiconductor. • Classification of semiconductors, P-N junction diode, forward characteristics of P-N junction diode, reverse characteristics of P-N junction diode, photodiode, its symbol, principle and applications. <p>6.2 Photo electricity:</p> <ul style="list-style-type: none"> • Photon (quantum), Plank's hypothesis, energy of photon, properties of photons. • Magneto-optic effect. • Photo electric effect: circuit diagram, process of photoelectric emission, definitions:- threshold frequency, threshold wavelength, stopping potential, characteristics of photoelectric effect. • Work function, Einstein's photoelectric equation, photo resistor (LDR):- symbol, principle, applications, photoelectric cell:- principle. <p>6.3 X-rays:</p> <ul style="list-style-type: none"> • Origin of X-rays, production of X-rays using Coolidge's X-ray tube, minimum wavelength of X-ray, properties of X-rays, applications of X-rays: engineering, medical and scientific. 	9	16

Text Books

	Physics std.XI & XII	HSC Board /CBSE Board
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Reference Books

B .L. Theraja	Engineering Physics	S. Chand Publishers
V. Rajendran	Engineering Physics	Tata McGraw-Hill
P. G. Hewitt	Conceptual Physics	New Age international
D. K. Bhattacharya & A. Bhaskaran	Engineering Physics	Oxford University Press

Course Code: DME1101 / DME 1201

Engineering Drawing

Teaching Scheme

Examination Scheme

Lectures: 3hrs/week

Credits: 6 Papers : 04 hrs

MSE: 30 Marks ESE: 70 Marks

Course Outcomes:

1. To understand the concepts of Engineering Drawing used to develop, express the ideas, and convey the instructions which are used to carry out jobs in the engineering field.
2. To get familiar with drawing Instruments, use them to draw an object on sheet, Lettering and types of lines.
3. To know the dimensioning rules and techniques.
4. To study orthographic projections of different objects.
5. To have an idea of Visualizing three dimensional objects and draw Isometric Projections and to find dimensions for various types of Riveted joints.
6. To find dimensions for various types of Riveted joints.
7. To Know screw thread terms, I.S. conventions, forms of threads, types of threads and fasteners.
8. To understand how to use CAD package, its advantages, capabilities and features.

Course Content:

Unit	Contents	Hrs.	Marks
1	Introduction to Engineering lines, Lettering and Dimensioning. Introduction to Engineering Drawing, Use of drawing instruments, lettering and types of lines as per B.S.I., Introduction and types of dimensions, dimensioning terms & notations, general rules of dimensioning.	06	15
2	Orthographic Projections: Introduction to orthographic projections, Orthographic projections using First angle and Third angle method of projection and its symbols.	08	20
3	Isometric Projections: Introduction to Isometric Projection. Isometric axes, lines and planes. Use of Isometric scale for rectilinear objects. Advanced	07	15

	problems with nonlinear and random curved objects in Isometric view and Isometric projection.		
4	Riveted Joints: Forms of rivet heads, Failure of riveted joints, Dimensions of riveted joints, Design of single & double riveted Lap Joint and Single riveted single strap & double strap Butt joint.	06	15
5	Screw Threads and Fasteners: Screw thread terminology, forms of threads, conventional representation of threads as per I.S.I., Left hand threads and Right hand threads, Multi start square threads. Drawing of Bolts, Nuts, Studs, Washers and set-screws of different types	08	20
6	Introduction to AutoCad: Introduction to Computer Aided Drafting and its advantages. AutoCAD, its capabilities and main features. Drawing of Various entities like point, line, rectangle, circle, ellipse, arc and polygon. Introduction to 3D modeling.	07	15

Reference Books

N. D. Bhatt	Elementary Engineering Drawing.	Charotar Publishing House
Mali & Chaudgari	Engineering Drawing	Vrinda Publications
P. H. Jain	Engineering Graphics	Soham Publications
AutoCad software	Educational Edition	-----
T. Jeyapoovan	Engineering Drawing And Graphics using AutoCad.	Vikas Publications.

Course Code: DCE1101/DCE1201

Fundamentals of ICT (LAB)

Teaching Scheme

Examination Scheme

Theory : 2 Hrs. /Week

Credits: 04

Practical : 2 Hrs. /Week

PR/ OR: 25 Marks TW: 25 Marks

Course Outcomes:: On successful completion of this course, the student will be able to

1. Use computer system and identify its peripherals.
2. Prepare business documents using word processing tools.
3. Interpret data and represent it graphically using spreadsheets.
4. Prepare professional presentations.
5. Draw flowcharts and develop algorithms.
6. Use web browsers to access internet services.

Course Contents

Unit	Contents	Hrs.	Marks
1	Basics of Computer: Functionalities of a computer, definition, advantages, applications, Generations of computer, Types of computer Components: Input, output units, CPU, Input devices, output devices, storage devices, memory and its types. Definition of computer hardware and software, Data and information, Operating system(definition, objectives and characteristics)	4	5
2	Word Processing: Basic Operations, Creating and Editing documents, Formatting documents, Enhancing documents, Applying Page Setup, Working with various objects like shapes, SmartArt, Pictures and Tables, Inserting Header and Footers, Linking and embedding documents, Previewing and Printing documents, Advanced Word Processing , Creating and Editing PDF documents, Comparing two versions of a document Proofreading of a document, Using track changes, Including Digital Signature into the document, Inserting ActiveX controls, Using Table of Contents, Using Mail Merge, Protecting a document, Sharing document online	4	10

3	Spreadsheets: Creating and editing workbook, Organizing and formatting worksheets, Data analysis and management, Using formulas and functions, Previewing and printing worksheets, Advanced Spreadsheet, Managing multiple worksheets, Producing and designing charts , Creating Pivot tables and pivot charts, Importing and exporting data between spreadsheets and other applications, Using advanced functions, Applying conditional formatting, Using data validation, Using sort and filter.	4	10
4	Presentation Tools: Creating and Editing Presentations, Designing and Enhancing Presentation, Delivering Presentation, Advanced Presentation Graphics, Creating videos of presentations, Saving presentation in various formats, Importing and exporting presentations Using templates, Working with slide master, Creating Socially Useful and Productive Works.	4	10
5	Flowcharts and algorithm development: Define flowchart and algorithm. Flowchart Symbols. Problem definition. Drawing of flowchart and Algorithm development to solve a given problem.	4	5
6	Basics of Internet: World Wide Web: Introduction, Internet, Intranet, Cloud, Web Sites, web pages, URL, web servers, basic settings of web browsers- history, extension, default page, default, search engine, creating and retrieving, bookmarks, use search engines effectively for searching the content. Web Services: e-Mail, Chat, Video Conferencing, e-learning, e-shopping, e- Reservation, e-Groups, Social Networking.	4	10

List of Experiments:

1.	Draw the functional diagram of a computer.
2.	Identify the different computer peripherals.
3.	Create a word document and enhance the same using various formatting features.
4.	Create a word document and insert objects like tables, pictures, SmartArts etc.
5.	Create a spreadsheet and use various formulae and functions.
6.	Create a spreadsheet and perform data analysis to produce various types of Charts.
7.	Create a presentation using various multimedia techniques.
8.	Create a presentation and insert objects like tables, pictures, charts, etc.
9.	Draw a flowchart to solve a given problem.
10.	Write an algorithm to solve a given problem.
11.	Configure web browsers.
12.	Use web services for online shopping, online reservation, etc.

At least ten experiments should be performed attaining all the course outcomes.

Text Books:

Author	Title	Publisher
V. Rajaraman	Fundamentals of Computers	PHI publications
Peter Weverka	Microsoft Office 2016 All in One Dummies	Wiley publications

Reference Books:

Author	Title	Publisher
Alvaro, Felix	Linux: Easy Linux for Beginners	CreatevSpace Independent Publishing Platform- 2016

SOFTWARE/LEARNING WEBSITES

- a. <https://www.microsoft.com/en-in/learning/office-training.aspx>
- b. <http://www.tutorialsforopenoffice.org/>
- c. https://s3-ap-southeast-1.amazonaws.com/r4ltue295xy0d/Special_Edition_Using_StarOffice_6_0.pdf
- d. <https://www.libreoffice.org>

Course Code:DPH1102

Applied Physics (lab)

Teaching Scheme

Examination Scheme

Credits: 04

Practical 3Hrs. /Week

PR/ OR: 50 Marks

Total:100 Marks

Tutorial 1 Hrs. /Week

TW : 50 Marks

Course Outcomes:

1 Intellectual skills:-

- Select proper measuring instruments.
- Verify the principles, laws, using given instruments under different conditions.
- Read interpret the graph.
- Interpret the results from observations and calculations.

2 Motor skills:-

- Handle the instruments.
- Measuring physical quantities accurately.
- Observe the phenomenon and to list the observations in a tabular form.

List of experiments

1. Determine Young's modulus of elasticity of metal wire by using Searle's apparatus.
2. Measure the dimensions of given objects using vernier caliper & micrometer screw gauge.
3. Determine coefficient of viscosity of given liquid using Stoke's method.
4. Determine surface tension of liquid by capillary rise method using travelling microscope.
5. Determine the coefficient of thermal conductivity of copper by Searle's method.
6. Determine specific resistance by voltmeter ammeter method.
7. Verify law of resistances in series by using meter bridge.
8. Verify principle of potentiometer.
9. Plot characteristics of P-N junction diode.
10. Determine Joule's constant (J) by electrical method.
11. Determine temperature coefficient of resistance of metal (conductor) using platinum resistance thermometer.
12. Determine wavelength of He-Ne gas laser.

Course Code:DME1102 / DME1202

Engineering Drawing (Lab)

Teaching Scheme

Practical: 4 hrs/week

Examination Scheme

Credits: 04 TW: 50 Marks

Total: 50 Marks

Course Outcomes:

- 1 To use and get familiar with drawing Instruments to draw an object on sheet.
- 2 To draw Lettering and types of lines.
- 3 To write Dimensioning rules and techniques and to put proper dimensions on given drawings.
- 4 To draw orthographic projections of different objects.
- 5 To draw Isometric Projections and Views of simple and advanced problems.
- 6 To draw various types of Riveted joints.
- 7 To draw screw thread terms, I.S. conventions, forms of threads, types of threads and fasteners.
- 8 To draw simple geometrical figures using CAD package.

List of Sheets:

One sheet on each of the following topics is to be completed during practical hours and submitted as the part of continuous assessment.

Sr. No.	Title of sheet	Marks
1	Engineering lines, Lettering and Dimensioning techniques.	8
2	Orthographic Projection- rectilinear objects. Advanced problems with nonlinear and random curved objects.	8
3	Isometric Projections-Simple Isometric views and Isometric projection by the use of Isometric scale with nonlinear surfaces and advanced problems in Isometric view.	8
4	Rivets and Riveted joints.	8
5	Screw Threads and Fasteners.	8
6	Assignment on AutoCad.	10

Course Code: DEN1102 English (Lab)

Teaching Scheme

Examination Scheme

Tutorial:

1 Hrs. /Week

Credit: 1 TW : 25 PR/OR : 25

S. No.	Practical Exercises	Unit No.	Hrs
	Use 'language laboratory' for different practical tasks		
1	Make sentences using correct articles.	I	2*
2	Make sentences using correct prepositions.	I	2
3	Make sentences using correct conjunctions.	I	2
4	Make sentences using correct active and passive voice.	I	2
5	Make sentences using correct direct and indirect speech.	I	2
6	Make sentences using correct tenses.	I	2*
7	Make sentences using correct connectors.	I	2
8	Make oral presentations using correct grammar.	I	2*
9	Write short paragraphs emphasizing on syntax and sentence structure	II	2*
10	Write different types of dialogues for role plays.	III	2*
11	Write different types of dialogues for drama.	III	2
12	Describe episodes in own words using idioms and phrases.	IV	2
13	Write anecdotes of various situations.	IV	2
14	Construct sentences using various collocations.	IV	2*
15	Use synonyms and antonyms in sentences.	IV	2
16	Read aloud Newspapers with correct pronunciations and intonation	IV	2
17	Write different types of speeches using new vocabulary.	IV	2
18	Deliver short prepared speeches of 3-5 minutes.	V	2*
19	Deliver extempore short speeches of 3-5 minutes.	V	2
20	Deliver extempore long speeches of 8-10 minutes.	V	2
	Total		40

Note A suggestive list of practical LOs is given in the above table, more such practical LOs can be added to attain the COs and competency. A judicious mix of minimum 12 or more practical LOs/tutorials need to be performed, out of which, the practicals marked as '*' are compulsory.

GROUP B SEM-I

Course Code:DEN1101

English

Teaching Scheme

Examination Scheme

Lectures :

3 Hrs. /Week

Credits: 6 MSE: 30 ESE: 70 Marks

Course Outcomes:

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following *industry oriented* COs associated with the above mentioned competency:

- Formulate grammatically correct sentences.
- Summarise comprehension passages.
- Formulate different types of dialogues.
- Use relevant vocabulary to compose paragraphs to express ideas, thoughts and emotions.
- Use relevant words in writing and delivering short and long speeches.

Units	Content	Hrs.	Marks
Unit - 1 Applied Grammar	1.1. Articles: definite and indefinite 1.2. Prepositions: Types and usage 1.3. Conjunctions: coordinating and subordinating 1.4. Active and Passive voice 1.5. Subject Verb Agreement 1.6. Tenses - Present Tense (Simple, Continuous, Perfect) - Past Tense (Simple, Continuous, Perfect)- Future Tense (Simple) 1.7. Connectors : And, But, Or, Nor, Though, Although, If, Unless, Otherwise,	10	20
Unit-2 Comprehensi on Passages	2.1 Seen passages from MSBTE text book. 2.2 Unseen passages from different sources	15	30
Unit-3 Paragraph and Dialogue Writings	3.1 Paragraph writing 3.2 Types of paragraph ii. Technical iii. Descriptive iii. Narrative iv. Compare and contrast	08	17
	3.3 Dialogue writing i. Greetings ii. Development of dialogue		

	iii. Closing sentence		
Unit- 4 Vocabulary Building	4.1. Words often confused 4.2. Collocations 4.3. Prefix and suffix 4.4. Synonyms and Antonyms	08	16
Unit - 5 Speeches	5.1. Welcome speech 5.2. Farewell speech 5.3. Summarise an event 5.4. Summarise debates 5.5. Summarise panel discussions. 5.6. Compere panel discussions 5.7. Introducing a guest 5.8. Vote of thanks	07	17
Total		48	100

Note

ii. A suggestive list of practical LOs is given in the above table, more such practical LOs can be added to attain the COs and competency. A judicious mix of minimum 12 or more practical LOs/tutorials need to be performed, out of which, the practicals marked as '*' are compulsory.

SUGGESTED LEARNING RESOURCES:

Sr.no	Title of Book	Author	Publication
1	English	MSBTE	MSBTE, Mumbai, 2008
2	Effective English with CD	Kumar, E. Suresh; Sreehari, P.; Savithri, J.	Pearson Education, Noida, New Delhi, 2009 ISBN: 978-81-317-3100-0
3	English Grammar at Glance	Gnanamurali, M.	S. Chand and Co. New Delhi, 2011 ISBN:9788121929042
4	Essential English Grammar	Murphy, Raymond	Cambridge University Press, New Delhi, Third edition, 2011, ISBN: 9780-0-521-67580-9
5	Living English Structure	Allen, W.S.	Pearson Education, New Delhi, Fifth edition, 2009, ISBN:108131728498,99

SOFTWARE/LEARNING WEBSITES

- f. <https://www.britishcouncil.in/english/learn-online>
- g. <http://learnenglish.britishcouncil.org/en/content>
- h. <http://www.talkenglish.com/>
- i. languagelabsystem.com
- j. www.wordsworthelt.com

Course Code: DMA1101 Basic Mathematics**Teaching Scheme****Examination Scheme****Lectures:** 4 Hrs. /Week **Credits: 11****Tutorials:** 3 Hrs. /Week **MSE: 30 Marks** **ESE: 70 Marks****Course Outcomes:**

- 1) Apply the concepts of algebra to solve engineering related problems.
- 2) Use the types of determinant and matrices to solve basic problems in engineering.
- 3) Utilize basic concepts of trigonometry to solve elementary engineering problems.
- 4) Solve basic engineering problems under given conditions of straight lines.
- 5) Solve the problems based on measurement of regular closed figure and regular solids. Use basic concepts of statistics to solve engineering related problems.
- 6) Use numerical methods to solve engineering problems.

Unit	Contents	Hrs	Marks
1	Logarithm: Concept and laws of logarithm, examples on them.	2	5
	Partial Fractions: Definition of fraction, proper, improper fraction and partial fraction, partial fraction of proper and improper fraction, resolve proper fractions into partial fraction with denominator containing (i) non-repeated linear factors, (ii) repeated linear factors, (iii) non-repeated quadratic irreducible factors. Resolve improper fraction in to partial fraction	4	5
	Complex Numbers: Definition of complex number, cartesian, polar and exponential form of complex number, algebra of complex numbers	3	5
2	Determinant: Definition of a determinant, value of determinant of order 3×3 , solution of simultaneous equations in three unknowns by Cramer's rule	2	5
	Matrices: Definition of a matrix of order $m \times n$, types of matrices, algebraic operations on matrices, algebra of matrices with properties and examples, determinant of a square matrix, transpose of a matrix with properties, minor and cofactor of an element of a matrix, adjoint of a matrix and inverse of a matrix by adjoint method, solution of simultaneous equations	8	10

	containing two or three unknowns.		
3	Trigonometry: Definition of trigonometric ratio, trigonometric ratios of compound, allied, multiple and sub-multiple angles (without proof), factorization and de-factorization formulae (without proof), inverse trigonometric functions, principal values and examples on them.	10	20
4	Straight line: Slope of a straight line, angle between two lines, condition for parallel and perpendicular lines. Various forms of straight lines: Slope-point form, two-point form, two-intercept form, general form, perpendicular distance from a point on a line, perpendicular distance between two parallel lines.	9	10
5	Mensuration: Definition of mensuration, area of regular closed figures, area of triangle, square, parallelogram, rhombus, trapezium and circle, volume of cuboids, cone, cylinders and sphere and examples on them.	3	10
	Statistics: Definition of statistics, range, coefficient of range of discrete and grouped data, mean deviation and standard deviation from mean of grouped and ungrouped data, weighted means, variance and coefficient of variance, comparison of two sets of observation and examples on them.	6	15
6	Numerical Methods Solution of algebraic equations: a) Bisection Method, b) Regula-falsi Method, c) Newton-Raphson Method Numerical solutions of simultaneous equations: a) Gauss-elimination Method, b) Jacobi's Method, c) Gauss-Seidal Method	9	15

Tutorials:

Sr. No.	Tutorials	Unit No.	Hour
1	Solve simple problems of logarithm based on definition and laws.	I	2
2	Resolve algebraic expressions into partial fractions.	I	2
3	Solve examples on algebra of complex numbers.	I	2
4	Solve examples on determinant to find area of triangle and	II	2

	solution of simultaneous equations by Cramer's rule.		
5	Solve examples on types of matrices and find inverse of a matrix.	II	2
6	Solve examples on compound, allied, multiple and sub-multiple angles.	III	2
7	Solve examples on factorization and defactorization	III	2
8	Solve examples on inverse circular functions.	III	2
9	Solve examples on equation of straight lines using different forms.	IV	2
10	Solve examples on perpendicular distance, distance between two parallel lines and angle between two lines.	IV	2
11	Solve examples on area of triangle, rectangle and circle.	V	2
12	Solve examples on surface area and volume of sphere, cylinder and cone.	V	2
13	Solve examples on applications of surface area and volume.	V	2
14	Solve examples on range and coefficient of range.	V	2
15	Solve examples on mean deviation.	V	2
16	Solve examples on weighted arithmetic mean.	V	2
17	Solve examples on standard deviation.	V	2
18	Solve examples on coefficient of variation and comparison of two sets.	V	2
19	Solve examples on Bisection Method and Regula-falsi Method.	VI	2
20	Solve examples on Newton-Raphson Method and Gauss-elimination Method.	VI	2
21	Solve examples on Jacobi's Method and Gauss-Seidal Method.	VI	2

Text Books

G.V. Kumbhojkar	A Textbook of Engineering Mathematics,	PhadakePrakashan, Kolhapur
S.P.Deshpande	Mathematics for Polytechnic, Pune	Vidyarthee GruhaPrakashan, Pune

Reference Books

H. K. Dass	Advanced Engineering Mathematics.	S. Chand Publication, New Delhi
Dr. B. S. Grewal	Higher Engineering Mathematics.	Khanna Publication, New Delhi

Apps

Following apps are available free on the website.

Sr.No.	Mobile Apps	Developer	Website
1	MathsRK2	Dr.R.K.Jadhav	www.amazon.com
2	MathRK 3-4	Dr.R.K.Jadhav	www.amazon.com

III) Website

Sr.No.	Website	Developer
1	www.mathsrk.weebly.com	Dr.R.K.Jadhav

Course Code: DCY1101 / DCY1201

Applied Chemistry

Teaching Scheme

Examination Scheme

Lectures

4 Hrs/ Week

Credits: 08

Papers: 3 Hrs

MSE: 30 Marks

ESE: 70 Marks

Course Outcomes:

1. Know the concepts of valence electrons and valency of elements.
2. Understand the formation of various molecules.
3. Apply the knowledge of electrolysis in engineering applications.
4. Judge the selection of proper lubricants for different machines.
5. Understand various methods of water treatment
6. Understand properties and IUPAC rules for nomenclature of organic compounds.
7. Know the appropriate use nonmetallic materials in engineering and technology

Course Contents

Unit	Contents	Hrs	Marks
1	Atomic Structure and Chemical Bonding: Atomic Structure : Definition of atom, Bohr's atomic model, structure of modern atom, characteristics of fundamental particles of an atom, definition of atomic number, atomic mass number and their differences, Isotopes and Isobars: Definitions, examples and distinction, Orbits: Bohr's energy levels, sub- energy levels, s, p, d, f orbitals, Distribution of electrons in orbitals: Definition of electronic configuration, Aufbau's principle, Hund' rule, Orbital Electronic configurations (s, p, d, f) of elements having atomic number 1 to 30. Valency: Definitions of valence electrons, valency. Definition of electrovalency, positive and negative electrovalency, formation of Electrovalent compounds- $MgO, CaCl_2, MgCl_2, Na_2O$ Definition of covalency, single, double and triple covalent bonds, formation of Covalent compounds $H_2O, CO_2, N_2,$	10	18
2	Electrochemistry: Specific Objectives: Basic concepts of electrolysis: Electrolyte, types of electrolyte- strong and weak electrolyte, Ionisation and electrolytic dissociation, Arrhenius theory of electrolytic dissociation, degree of ionization, factors	10	16

	<p>affecting degree of ionization. Definitions of electrolytic cell, electrodes-cathode, anode, electrode potential-oxidation potential and reduction potential.</p> <p>Electrolysis: Mechanism of electrolysis- Electrolysis, electrochemical series for cations and anions, Mechanism of electrolysis of CuSO₄ solution by using platinum electrodes and copper electrodes, Faraday's laws of electrolysis: Faraday's first and second law, relation between electrochemical equivalent and chemical equivalent, Numericals. Applications of electrolysis- Electroplating of silver, electro refining of blister copper, pH and pOH: Definition of pH, pOH, pH Scale, Numericals.</p>		
3	<p>Lubricants: Lubricant: definition of lubricant, functions of lubricants. Classification of lubricant: Solid lubricants- characteristics and applications of graphite and molybdenum disulphide. Liquid lubricants - characteristics and applications of synthetic fluid (silicone oil), water as a lubricant (coolant). Semisolid lubricant- characteristics and applications of grease (plastic lubricant). Mechanism of Lubrication: Definition of by lubrication, mechanism of fluid film lubrication, boundary lubrication, extreme pressure lubrication, characteristics: Physical characteristics of lubricants -viscosity, viscosity index, oiliness, volatility, flash and fire point, cloud and pour point. Chemical characteristics of lubricants- acid value or neutralization number, emulsification, saponification value, Selection of Lubricants for road rollers, steam engines, sewing machine concrete mixer, I.C engine, cutting tools, gears.</p>	08	16
4	<p>Water: Impurities in natural water, Hard water and soft water, Types of hardness, Disadvantages of hard water for domestic purpose and industrial purpose such as paper Industry, sugar industry, textile industry, Dying industry, pharmaceutical industry, Purification of water for domestic use by sedimentation, coagulation, filtration and sterilization. Treatment of water for industrial purpose by cold lime soda process, hot lime soda process, Zeolite process, and ion exchange process. Sewage, physical, chemical and biological characteristic of</p>	10	18

	sewage, Sewage treatment, purpose of sewage treatment, General methods of sewage treatment.		
5	Introduction to Organic Chemistry: Definition of organic chemistry, Importance of organic chemistry, Sources of organic compounds, classification of organic compounds. Main classification Functional group and it's characteristic. Sub classification, homologous series, Properties of organic compounds, Nomenclature of organic compounds.	10	16
6	Non-metallic Engineering Materials: Polymers (Plastics, Rubber) : Plastics: Definition of plastic, polymer, polymerization, types of polymerization with examples. Types of plastic- thermos softening plastics and thermosetting plastics and their difference, properties and applications of plastics. Rubber: Types of rubber, Natural Rubber: definition, drawbacks of natural rubber, vulcanization of rubber with chemical reaction, applications of vulcanized rubber. Synthetic rubber: definition, difference between natural and synthetic rubber, examples of synthetic rubber, properties of synthetic rubber like - elasticity, tack, and abrasion resistance, their definition and related applications.	08	16

Reference Books

Jain and Jain	Engineering Chemistry	Dhanpat Rai and Sons
S. S. Dara	Engineering Chemistry	S. Chand Publication
R. Sivakumar and N. Sivakumar	Engineering Chemistry	Tata McGraw-Hill Publishing Company Limited
R. Srinivasan	Engineering Materials and Metallurgy	Tata McGraw-Hill Education Private Limited
Vedprakash Mehta	Polytechnic Chemistry	Jain brothers
S. N. Narkhede	Basic Chemistry	Nirali Prakashan

Course Code: DEE1101 / DEE1201

Basic Electrical Engineering

Teaching Scheme

Lectures

4 Hrs/ Week

Tutorials

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Examination Scheme

Credits: 8

MSE: 30 Marks ESE: 70 Marks

Course Outcomes:

1. Understand various definitions, laws, concepts involved in basic electrical engineering.
2. Study of electrical circuits and magnetic circuits and their applications in electrical engineering.
3. Study electromagnetic induction and its importance in electrical machine design and power system.
4. Learn different electrical supply schemes.
5. Learn to measure and calculate resistance, inductance and power consumed by single phase and poly phase circuit.

Course Contents

Unit	Contents	Hrs.	Marks
1	D.C circuits: Concepts of voltage, electric potential, electromotive force, potential difference. Definition of resistance, concepts of resistivity, impedance, conductivity, susceptance, and admittance. Factors affecting resistance / resistivity like temperature, temperature coefficient of resistance. D C Circuit: concept of circuit and network, circuit elements, node, path, loop, branch, mesh. Ohm's law, simple D. C. series and parallel circuits, Voltage and current division rule, Kirchhoff's laws, Maxwell's loop analysis (Node and mesh analysis). Superposition Theorem. Thevenin's Theorem, Norton's Theorem.	10	18
2	Electrostatics: Electric charge, coulomb's law, Electric flux, flux density, electric field intensity, permittivity, Concept of Breakdown Voltage and Di-electric strength, Concept of capacitor, Types of Capacitors (Paper, Mica, Film, Ceramic, Glass), Parallel plate capacitor, and Equivalent capacitance of capacitors in series: Equivalent capacitance of capacitors in parallel, Calculations of Equivalent Capacitance of Series Parallel combination. Energy Stored in Capacitor, Charging and Discharging of Capacitor, Applications of capacitors.	07	18
3	Magnetic Circuits: Magnetic polarities and magnetic lines of force, Magnetic flux,	07	14

	permeability, flux density, magnetic field intensity, concept of magnetic circuits, Terms associated with magnetic circuits like Magneto-Motive-Force (MMF), Ampere Turns (AT), Permeance, Reluctance. Comparison Between Electric and Magnetic circuits. Series Magnetic Circuit and Parallel Magnetic Circuit. Magnetic leakage, Leakage and Useful Flux & Fringing, ferromagnetic, paramagnetic and diamagnetic materials. Magnetization (B-H) curve, magnetic hysteresis and hysteresis loop, Applications of permanent and electromagnets.		
4	Electromagnetism and Electromagnetic Induction: Electromagnetism, Relation Between Magnetism and Electricity, magnetic field due to current carrying conductor, direction of magnetic field, force on current carrying conductor in magnetic field, magnetic field around a coil. Faraday's Laws of Electromagnetic Induction Induced EMF, Statically Induced E.M.F, Dynamically Induced E.M.F. Direction of induced EMF by Lenz's Law for statically induced EMF, Fleming's Right Hand Rule for dynamically induced EMF. Self Inductance and Coefficient of Self-induction, Mutual inductance and Coefficient of Mutual inductance. Inductances in series. Energy Stored in Magnetic circuit derivation. Types of inductors and their applications: Air Cored Inductors, Iron Cored Inductors, Ferrite Cored Inductors.	07	18
5	AC Fundamentals: Generation of sinusoidal AC voltage. Terms related to sinusoidal AC like wave, frequency, cycle, time period, average value and maximum value. Determination of maximum value and frequency from voltage and current equations. Average and effective (RMS) values of sinusoidal voltage and current, form factor, peak factor. Phase and phase angle, phasor difference, phasor diagram, power factor. Power calculations in single phase AC circuit, Purely resistive, inductive, and capacitive single phase AC circuits, concepts of inductive, capacitive reactance and impedance.	06	16
6	Three Phase AC Systems: Generation of three phase EMF, Phase sequence, Star and delta connections, Line and phase quantities in star and delta connected systems, Balanced and unbalanced three phase circuits, Power in three phase system, Measurement of power in three phase circuits by one wattmeter method, two wattmeter method and three wattmeter methods.	05	16

Text Books		
V. N. Mittle	Basic Electrical Engineering	Tata McGraw-Hill
B. L. Theraja A. K. Theraja	A Text Book of Electrical Technology Vol-I	S. Chand & Co.
B. L. Theraja A. K. Theraja	Basic Electrical Engg.	Ramnagar, New Delhi

Reference Books

Van Valkenburgh	Basic Electrical Engineering	Delmar Cengage Learning
Edward Hughes	Electrical Technology	Pearson Education, New Delhi
Vincent Del Toro	Electrical Engineering Fundamentals	Prentice Hall India Learning Pvt. Limited
B. R. Gupta Vandana Singhal	Electrical Science	S Chand Publications
Jhon Hiley , Keith Brown , Ian McKenzie Smith	Hughes Electric and Electronic Technology	Pearson Publications
H. Cotton	Electrical Technology	Pitman Publications

Course Code:DEE1102/ DET1202

Electrical and Electronics Engineering

Teaching Scheme

Examination Scheme

Lectures : 04 hrs /week

Credits: 8 MSE: 30 marks

Papers : 03hrs

ESE : 70 marks

Course Outcomes:

1. Understand various definitions, laws, concepts involved in basic electrical engineering.
2. Study of electrical circuits and magnetic circuits and their applications in electrical engineering.
3. Study electromagnetic induction and its importance in electrical machine design and power system.
4. Familiarize with active, passive components, signals and integrated circuits.
5. Understand the basics of semiconductor diodes, zener diodes, their applications rectifiers, regulators.
6. Understand the basics of transistors (BJT), their characteristics. Learn transistors switch and amplifier.

Course Contents

Unit	Contents	Hrs	Marks
1	D.C circuits: Concepts of voltage, electric potential, electromotive force, potential difference. Definition of resistance, concepts of resistivity, impedance, conductivity, susceptance, and admittance. Factors affecting resistance / resistivity like temperature, temperature coefficient of resistance. D C Circuit: concept of circuit and network, circuit elements, node, path, loop, branch, mesh. Ohm's law, simple D. C. series and parallel circuits, Voltage and current division rule, Kirchhoff's laws, Maxwell' loop analysis (Node and mesh analysis). Superposition Theorem. Thevenin's Theorem, Norton's Theorem.	7	18
2	Magnetic Circuits: Magnetic polarities and magnetic lines of force, Magnetic flux, permeability, flux density, magnetic field intensity, concept of magnetic circuits, Terms associated with magnetic circuits like Magneto-Motive-Force (MMF), Ampere Turns (AT), Permeance, Reluctance. Comparison Between Electric and Magnetic circuits. Magnetization (B-H) curve, magnetic hysteresis and hysteresis loop,	7	14
3	Electromagnetism and Electromagnetic Induction: Electromagnetism, Relation Between Magnetism and Electricity, magnetic field due to current carrying conductor, direction of magnetic field, force on current carrying conductor in magnetic field, magnetic field around a coil. Faraday's Laws of Electromagnetic Induction Induced EMF, Statically Induced E.M.F, Dynamically Induced E.M.F. Direction of induced EMF by	7	18

	Lenz's Law for statically induced EMF, Fleming's Right Hand Rule for dynamically induced EMF. Self-Inductance and Coefficient of Self-induction, Mutual inductance and Coefficient of Mutual inductance. Inductances in series. Energy Stored in Magnetic circuit derivation. Types of inductors and their applications: Air Cored Inductors, Iron Cored Inductors, Ferrite Cored Inductors.		
4	Active and passive electronic components: Resistor, capacitor, inductor symbols, working principals and applications, colour codes, specifications Voltage and Current Source Signal, waveform, Time and frequency domain representation, Amplitude, frequency, phase, wavelength Types of Signals: sinusoidal, triangular and square Integrated Circuits - analog and digital	06	15
5	Symbol, construction and working principle of P-N junction diode Rectifiers: Half wave, Full wave and Bridge Rectifier, working principle , circuit diagram, performance parameters PIV, ripple factor, efficiency, Need for filters: circuit diagram and working of 'L', 'C' and 'π' filter Zener diode working principle, symbol, Zener diode as voltage regulator ,Regulated power supply Construction and working principle of light emitting diode(LED)	06	15
6	Unipolar and Bipolar devices Symbol, construction and working principle of NPN transistor. Transistor as switch and amplifier. Input and Output characteristics of CE, CB and CC configurations. Regions - Cut-off, saturation and Active region. Transistor parameters- alpha, beta, input and output resistance and relation between alpha and beta	07	20

Text Books

Applied electronics	G. K. Mithal	Central Techno Publications
Electronic Components	Madhuri Joshi	Wheeler's Publication.
Principles of Electronics	V. K. Mehta	S. Chand Publications
Applied Electronics	R. S. Sedha	S. Chand Publications
Functional electronics- Basic electronics	-	TTTI

Reference Books

TITLE	AUTHOR	PUBLISHER
Electronic devices & circuits	M. Mottershed	Mc Grow-Hill
Electronics devices & circuits	Milman Halkies	Mc Grow-Hill

Course Code: DME1103

Workshop Practices (Lab)

Teaching Scheme

Lectures 1 Hrs. /Week

Practical 4 Hrs. /Week

Examination Scheme

Credits: 6

TW: 50 Marks

PR/OR: 50 Marks

Total : 100 Marks

Course Outcomes:

1. To understand basic workshop processes in carpentry, fitting and welding.
2. To study various marking, measuring, holding, striking and cutting tools and equipments.
3. To study various hand tools and spanners used in various shops.
4. To study safe methods of handling tools and spanners.
5. To understand how to make pattern in mould making.

Course Contents

Unit	Contents	Hrs.
1	Study of common workshop processes in carpentry, fitting and welding.	04
2	Identification and features of hand tools used in various shops, specifications and materials of hand tools with method of use in the processes of carpentry, fitting and welding.	03
3	Handling of Vernier caliper and micrometer.	03
4	Correct methods of handling tools and spanners.	02
5	Correct methods of using measuring Instruments.	02

Students will submit a journal which will include above theory and diagrams and get it assessed as a part continues assessment.

List of Experiments:

Sr. No.	Name of the Experiment	Hrs	Marks
1	SHOP 01 WOOD WORKING AND MOULD MAKING SHOP Assignments 1) draw sketches of different carpentry tools, wood turning lathe, label the sketches, write their uses. 2) list five different types of woods used for carpentry. State their properties. Demonstration 01. Observe operations of different carpentry tools and different wood working processes like sawing, planning, marking,	20	18

	<p>chiseling, grooving and wood turning.</p> <p>02. Practice different wood working processes.</p> <p>03. Demonstration of various types of Patterns.</p> <p>Carpentry jobs :-</p> <p>1.To Prepare one half-lap joint</p> <p>2. To Prepare one simple job on wood turning lathe.</p> <p>3. One simple wood solid pattern as per drawing.</p> <p>4. Simple Mould Making process.</p>		
2	<p>SHOP 02 WELDING SHOP</p> <p>Assignment</p> <p>01. Describe in brief the process of ARC welding, gas welding, gas cutting , state the situation where each one of them is used.</p> <p>02. List the points for selection of welding rod material, size of welding rod, different types of flame, sketch of elementary symbolic representation in welding.</p> <p>03. Safety precautions in welding, safety equipment's and their uses in welding processes.</p> <p>Demonstration</p> <p>01. Observe operation of ARC welding.</p> <p>02. Observe operation in gas welding and gas cutting</p> <p>Welding jobs</p> <p>01. To Prepare one simple job involving ARC Lap & Butt joint</p> <p>02 Prepare one job involving gas welding and cutting.</p>	20	18
3	<p>SHOP 03 FITTING AND SHEET METAL SHOP</p> <p>Assignment</p> <p>01. Draw the sketches of marking & measuring. Cutting, holding and striking tools. Write their purposes and care to be taken.</p> <p>02. Write components, parts and working principle of drilling machine and its use.</p> <p>03. Prepare list of power tools, tapping dies, raw sketches of the same and write the use.</p> <p>Demonstration</p> <p>01. Observe different power tools and drilling machine used for fitting shop</p> <p>02. Observe different operations in fitting shop like chipping, filling, right angle marking, cutting, drilling and tapping.</p> <p>Fitting job</p> <p>01 To Prepare one simple job involving practice of cutting and chipping.</p>	16	14

	02 Prepare one simple job involving practice of filling, drilling and tapping. 03 Basic Sheet Metal Model.		
Students will submit a journal which will include above Assignments and diagrams and get it assessed as a part of their practical's.			
Text Books			
Hajra Choudhary & A.K. Hajra Choudhary	Elements of workshop technology, Vol I & Vol II	Media promoters & Pvt Ltd.	
Raghuwanshi	Course in workshop technology, Vol I & Vol II	Dhanpatrai and sons.	

Course Code: DCY1102

Applied Chemistry (Lab)

Teaching Scheme

Practical 3Hrs / Week

Tutorial 1Hrs / Week

Examination Scheme

Credits: 04 PR/OR:25 Marks TW : 25 Marks

Course Outcomes:

1. Intellectual Skills:

1. Analyse given solution and to find the chemical properties of metallic and non-metallic ions.
2. Interpret the results of experiments or numerical values.
3. Understand the setup of the experiment.
4. Verify the laws and characteristics.

2. Motor Skills:

1. Handle the apparatus and various laboratory reagents carefully.
2. Accurately measure proper quantity of various chemicals.
3. Observe correct colour of precipitate, evolution of gas.
4. Connect electrical circuit as per the circuit diagram.
5. Observation readings like melting point and boiling point

List of experiments

Sr.No.	Name of the Experiment
1	Identify cation in given ionic solution. (03 Nos.)
2	Identify anion in given ionic solution. (03 Nos.)
3	Determine melting point of given solid organic substance
4	Determine boiling point of given liquid organic substance.
5	Determine the equivalent weight of metal.
6	Determine the electrochemical equivalent of copper metal.
7	Determine the chloride content in given water sample.
8	Determine hardness of water by EDTA method
9	Determine pH value of given solutions by using pH paper, universal indicator and pH meter.
10	Determine the effect of temperature on viscosity of given lubricant oil using Redwood viscometer.

Course Code: DEN1102 English (Lab)

Teaching Scheme

Examination Scheme

Tutorial:

1 Hrs. /Week

Credit: 1 TW : 25 PR/OR : 25

S. No.	Practical Exercises	Unit No.	Hrs
	Use 'language laboratory' for different practical tasks		
1	Make sentences using correct articles.	I	2*
2	Make sentences using correct prepositions.	I	2
3	Make sentences using correct conjunctions.	I	2
4	Make sentences using correct active and passive voice.	I	2
5	Make sentences using correct direct and indirect speech.	I	2
6	Make sentences using correct tenses.	I	2*
7	Make sentences using correct connectors.	I	2
8	Make oral presentations using correct grammar.	I	2*
9	Write short paragraphs emphasizing on syntax and sentence structure	II	2*
10	Write different types of dialogues for role plays.	III	2*
11	Write different types of dialogues for drama.	III	2
12	Describe episodes in own words using idioms and phrases.	IV	2
13	Write anecdotes of various situations.	IV	2
14	Construct sentences using various collocations.	IV	2*
15	Use synonyms and antonyms in sentences.	IV	2
16	Read aloud Newspapers with correct pronunciations and intonation	IV	2
17	Write different types of speeches using new vocabulary.	IV	2
18	Deliver short prepared speeches of 3-5 minutes.	V	2*
19	Deliver extempore short speeches of 3-5 minutes.	V	2
20	Deliver extempore long speeches of 8-10 minutes.	V	2
	Total		40

Note

a. A suggestive list of practical LOs is given in the above table, more such practical LOs can be added to attain the COs and competency. A judicious mix of minimum 12 or more practical LOs/tutorials need to be performed, out of which, the practicals marked as '*' are compulsory.

Course Code: DEE1103 / DEE1202

Basic Electrical Engineering (Lab)

Teaching Scheme

Examination Scheme

Practical

2 Hrs / Week

Credits: 02

PR/OR: 25 Marks

TW : 25Marks

Skills to be developed:

Intellectual Skills:

1. Identify and select electrical measuring instruments.
2. Interpret electrical circuit diagram.
3. Identify safety equipment required.
4. Decide the procedure for setting experiments.
5. Select electrical instruments of proper range.

Motor Skills:

1. Draw circuit diagram
2. Make wiring connections to connect electrical equipment and instruments.
3. Accurately measure electrical current and voltage drop.
4. Use of safety devices while working.

List of Experiments:

1. To understand the use and connections of the following electrical measuring instruments and equipment: ammeter, voltmeter, power supply, conductors, rheostat, multimeter, autotransformer, and wattmeter.
2. To verify Ohm's law.
3. To verify Kirchhoff's laws.
4. To verify superposition theorem.
5. To verify Thevenin's theorem.
6. To determine equivalent resistance of series and parallel connected resistances.
7. To plot the charging and discharging curves of a capacitor.
8. To plot B-H curve for a given magnetic material.
9. To verify the voltage and current relations in star and delta connected systems.
10. To measure the power and power factor in a three phase circuit by two wattmeter method.

Course Code: DET1204 / DEE 1104

Electrical and Electronics Engg. (Lab)

Teaching Scheme

Examination Scheme

Credits: 2

Practical: 2hrs/week

PR: 25 Marks

TW: 25 Marks

Total: 50 Marks

List of Experiments:

1.	To understand the use and connections of the following electrical measuring instruments and equipment: ammeter, voltmeter, power supply, conductors, rheostat, multimeter, autotransformer, and wattmeter.
2.	To verify Ohm's law.
3.	To verify Kirchhoff's laws.
4.	To verify superposition theorem.
5.	To verify Thevenin's theorem.
6.	To determine equivalent resistance of series and parallel connected resistances.
7.	Test the performance of PN junction and zener diode.
8.	Build/test half wave rectifier on breadboard.
9.	Build/ test full wave rectifier on breadboard using two or four diodes
10..	Test the performance of BJT operated in CE mode.
11.	Test the performance of transistor switch circuit.
12.	Test the performance of transistor amplifier circuit.

GROUP A SEM- II

Course Code: DMA1201

Applied Mathematics

Teaching Scheme

Examination Scheme

Lectures: 4 Hrs. /Week **Credits: 10**

Tutorials: 2 Hrs. /Week **MSE: 30 Marks** **ESE: 70 Marks**

Course Outcomes:

- 1) Solve examples on different types of functions and limits.
- 2) Calculate the equation of tangent and normal, maxima, minima, radius of curvature by differentiation.
- 3) Solve the given problem of integration by using suitable methods.
- 4) Solve examples on definite integral and apply the concept of definite integration to find area and volume.
- 5) Solve the differential equation of first order and first degree using suitable methods.
- 6) Find the Laplace transform of different types of functions.
- 7) Solve examples on different types of probability distribution.

Unit	Contents	Hrs	Marks
1	Functions: Concept and definition of a function, value of a function, different types of function, domain, co-domain and range of a function and examples on them.	4	5
	Limits: Concept and definition of limit, algebra of limits, method of finding limits and easy examples.	6	10
	Derivatives: Concept and definition of derivative, notation, derivative of standard functions by using the first principle, rules of differentiation such as sum, difference, product and quotient , derivative of composite function (chain rule) derivative of inverse, inverse trigonometric function using substitution, logarithmic differentiation, exponential, implicit, parametric function, derivative of one function with respect to another function, second order differentiation and examples Applications of derivative: Equations of tangent and normal, maxima and minima, radius of curvature	8	20
2	Integration: Definition of integration as anti-derivative, rules of integration, integration of standard functions, integration of function using different method, integration by parts and examples on each method.	8	15

3	Definite Integration: Concept and definition of definite integral, simple examples, properties of definite integral (without proof) and simple examples Applications of integration: a) Area under the curve, b) Area between two curves, c) Volumes of revolution	7	15
4	Differential Equations: Concept and definition of differential equation, order, degree and formation of differential equation Solution of differential equations of first order and first degree: a) Variable Separable form, b) Linear differential equation Application of differential equations and related engineering problems	9	15
5	Laplace Transform: Laplace transform of standard functions (without proof), properties of Laplace transform such as linearity, first and second shifting properties (without proof) Inverse Laplace transform using partial fraction method, linearity and first shifting property, Laplace transform of derivatives and solution of first order first degree differential equations and examples	7	10
6	Probability Distribution: Concept and types of probability distribution - a) Discrete probability distribution, b) Continuous probability distribution Binomial distribution, Poisson distribution, Normal distribution and examples on them.	7	10
	Total	56	100

Tutorials:

Sr. No.	Tutorials	Unit No.	Approx. Hour
1	Solve examples on different types of functions and limits	I	2
2	Solve examples on rules of differentiation and calculate the derivative of different type of functions.	I	2
3	Evaluate integral of standard functions.	II	2
4	Solve examples on integration by parts.	II	2
5	Solve examples on definite integration.	III	2
6	Find the area of triangle and volume of surface of	III	2

	revolution.		
7	Find the order and degree of differential equations.	IV	2
8	Solve examples on variable separable method.	IV	2
9	Solve examples on linear differential equation.	IV	2
10	Solve examples on application of differential equations.	IV	2
11	Find the Laplace transform of different type of functions.	V	2
12	Solve examples on first and second shifting theorem and find the Laplace transform of derivatives.	V	2
13	Solve examples on Binomial and Poisson distributions.	VI	2
14	Solve examples on Normal distribution.	VI	2
	Total		28

I) Text Books

G.V. Kumbhojkar	A Textbook of Engineering Mathematics,	PhadakePrakashan, Kolhapur
S.P.Deshpande	Mathematics for Polytechnic, Pune	Vidyarthee Gruha Prakashan, Pune

Reference Books

H. K. Dass	Advanced Engineering Mathematics.	S. Chand Publication, New Delhi
Dr. B. S. Grewal	Higher Engineering Mathematics.	Khanna Publication, New Delhi
Dr. R. K. Jadhav	R.K.s Most Likely Question-paper Solution	Synergy Knowledgeware Publication, Mumbai

II) Apps: Following apps are available free on the website.

Sr. No.	Mobile Apps	Developer	Website
1	MathsRK2	Dr. R. K. Jadhav	www.amazon.com
2	MathRK 3-4	Dr .R. K. Jadhav	www.amazon.com

III) Website

Sr. No.	Website	Developer
1	www.mathsrk.weebly.com	Dr. R .K. Jadhav

Course Code: DCY1101 / DCY1201

Applied Chemistry

Teaching Scheme

Lectures 4 Hrs/ Week

Examination Scheme

Credits: 08

MSE: 30 Marks

Papers: 3 Hrs

ESE: 70 Marks

Course Outcomes:

1. Know the concepts of valence electrons and valency of elements.
2. Understand the formation of various molecules.
3. Apply the knowledge of electrolysis in engineering applications.
4. Judge the selection of proper lubricants for different machines.
5. Understand various methods of water treatment
6. Understand properties and IUPAC rules for nomenclature of organic compounds.
7. Know the appropriate use nonmetallic materials in engineering and technology

Course Contents

Unit	Contents	Hrs	Marks
1	<p>Atomic Structure and Chemical Bonding:</p> <p>Atomic Structure :</p> <p>Definition of atom, Bohr's atomic model, structure of modern atom, characteristics of fundamental particles of an atom, definition of atomic number, atomic mass number and their differences, Isotopes and Isobars: Definitions, examples and distinction, Orbits: Bohr's energy levels, sub- energy levels, s, p, d, f orbitals, Distribution of electrons in orbitals: Definition of electronic configuration, Aufbau's principle, Hund' rule, Orbital Electronic configurations (s, p, d, f) of elements having atomic number 1 to 30.</p> <p>Valency:</p> <p>Definitions of valence electrons, valency.</p> <p>Definition of electrovalency, positive and negative electrovalency, formation of Electrovalent compounds-MgO, $CaCl_2$, $MgCl_2$, Na_2O</p> <p>Definition of covalency, single, double and triple covalent bonds, formation of Covalent compounds H_2O, CO_2, N_2,</p>	10	18

2	<p>Electrochemistry: Specific Objectives:</p> <p>Basic concepts of electrolysis:</p> <p>Electrolyte, types of electrolyte- strong and weak electrolyte, Ionisation and electrolytic dissociation, Arrhenius theory of electrolytic dissociation, degree of ionization, factors affecting degree of ionization. Definitions of electrolytic cell, electrodes-cathode, anode, electrode potential-oxidation potential and reduction potential.</p> <p>Electrolysis:</p> <p>Mechanism of electrolysis- Electrolysis, electrochemical series for cations and anions, Mechanism of electrolysis of CuSO₄ solution by using platinum electrodes and copper electrodes, Faraday's laws of electrolysis: Faraday's first and second law, relation between electrochemical equivalent and chemical equivalent, Numericals. Applications of electrolysis- Electroplating of silver, electro refining of blister copper, pH and pOH: Definition of pH, pOH, pH Scale, Numericals.</p>	10	16
3	<p>Lubricants:</p> <p>Lubricant: definition of lubricant, functions of lubricants. Classification of lubricant: Solid lubricants- characteristics and applications of graphite and molybdenum disulphide. Liquid lubricants - characteristics and applications of synthetic fluid (silicone oil), water as a lubricant (coolant). Semisolid lubricant- characteristics and applications of grease (plastic lubricant). Mechanism of Lubrication: Definition of by lubrication, mechanism of fluid film lubrication, boundary lubrication, extreme pressure lubrication, characteristics: Physical characteristics of lubricants -viscosity, viscosity index, oiliness, volatility, flash and fire point, cloud and pour point. Chemical characteristics of lubricants-acid value or neutralization number, emulsification, saponification value, Selection of Lubricants for road rollers, steam engines, sewing machine concrete mixer, I.C engine, cutting tools, gears.</p>	08	16
4	<p>Water:</p> <p>Impurities in natural water, Hard water and soft water, Types of hardness, Disadvantages of hard water for domestic purpose and industrial purpose such as paper Industry, sugar industry, textile industry, Dying industry, pharmaceutical industry, Purification of water for domestic use by sedimentation, coagulation, filtration and</p>	10	18

	sterilization. Treatment of water for industrial purpose by cold lime soda process, hot lime soda process, Zeolite process, and ion exchange process. Sewage, physical, chemical and biological characteristic of sewage, Sewage treatment, purpose of sewage treatment, General methods of sewage treatment.		
5	Introduction to Organic Chemistry: Definition of organic chemistry, Importance of organic chemistry, Sources of organic compounds, classification of organic compounds. Main classification Functional group and it's characteristic. Sub classification, homologous series, Properties of organic compounds, Nomenclature of organic compounds.	10	16
6	Non-metallic Engineering Materials: Polymers (Plastics, Rubber) : Plastics: Definition of plastic, polymer, polymerization, types of polymerization with examples. Types of plastic- thermos softening plastics and thermosetting plastics and their difference, properties and applications of plastics. Rubber: Types of rubber, Natural Rubber: definition, drawbacks of natural rubber, vulcanization of rubber with chemical reaction, applications of vulcanized rubber. Synthetic rubber: definition, difference between natural and synthetic rubber, examples of synthetic rubber, properties of synthetic rubber like - elasticity, tack, and abrasion resistance, their definition and related applications.	08	16

Reference Books

Jain and Jain	Engineering Chemistry	Dhanpat Rai and Sons
S. S. Dara	Engineering Chemistry	S. Chand Publication
R. Sivakumar and N. Sivakumar	Engineering Chemistry	Tata McGraw-Hill Publishing Company Limited
R. Srinivasan	Engineering Materials and Metallurgy	Tata McGraw-Hill Education Private Limited
Vedprakash mehta	Polytechnic Chemistry	Jain brothers
S. N. Narkhede	Basic Chemistry	Nirali Prakashan

Course Code: DEN1201

Language Lab

Teaching Scheme

Examination Scheme

Credits: 2

Practical: 2 hrs/week 2 Hrs./ Week PR: 25Marks TW: 25Marks Total: 50Marks

Course Outcomes:

The practical experiences and relevant soft skills associated with this course are to be implemented, so that the student demonstrates the following *industry oriented* Cos.

- Avoid communication barriers for effective business communication.
- Make the relevant use of body language to communicate.
- Use audio - visual aids to communicate effectively and efficiently.
- Develop notices, memoranda and reports in relevant formats.
- Draft different types of business letters, E-mails using correct formats.
- To develop interpersonal skills.

PRACTICALS :

Sr. No.	Practical Exercises	Hrs.
	Use 'language laboratory' for different practical tasks	
1	Enact role-play to bring out any barrier to communication.	2
2	Present Poster on Body language.	2
3	Use relevant body language during Oral Presentation.	2
4	Prepare PowerPoint presentation on a given topic.	2
5	Speak with correct voice modulation after listening to the given conversation	2
6	Draft a notice/memorandum/Email on a given situation.	2
7	Prepare a report on a student related issue.	2
8	Prepare Resume with a cover letter.	2
9	Draft an enquiry or order letter on the given topic.	2
10	Prepare presentation on importance of meeting in organization/ A successful businessman [Biographical info]	2
11	Summarize views of two businessmen from English newspapers/ Magazines and other sources	2
12	Prepare a leaflet about the admission process of polytechnic/ giving information about your institute.	2
13	SWOT analysis and presentation,	2
14	Decision making - Applying the techniques	2
15	Point of view on given situation	2

16	Interview Skills- Importance of interview skills; Resume building, Group Discussion and personal interview.	2
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A suggestive list of practical LOs is given in the above table, more such practical LOs can be added to attain the COs and competency. A judicious mix of minimum 12 or more practical LOs/tutorials need to be performed.

SUGGESTED LEARNING RESOURCES:

Sr. No.	Title of Book	Author	Publication
1	Communication Skills	MSBTE	MSBTE, Mumbai
2	Effective Communication Skills	M Ashraf Rizvi	Tata McGraw-Hill, New Delhi, 2014
3	Communication Skills	Sanjay Kumar and Pushp Lata	Oxford University Press, New Delhi, 2014
4	Business Communication	K.K.Sinha	Tata McGraw Hill, New Delhi, 2014
5	Essentials of Business Communication	Rajendra Pal , J.S.Korlahalli	Sultan Chand And Sons, New Delhi, 2014

SOFTWARE/LEARNING WEBSITES:

- a. <https://www.britishcouncil.in/english/learn-online>
- b. <http://learnenglish.britishcouncil.org/en/content>
- c. <http://www.talkenglish.com/>
- d. [language-labsystem.com](http://www.language-labsystem.com)
- e. www.wordsworthelt.com
- f. www.notesdesk.com
- g. <http://www.tutorialspoint.com>
- h. www.studylecturenotes.com
- i. [totalcommunicator.com](http://www.totalcommunicator.com)
- j. www.speaking-tips.com

Course Code: DEE1101 / DEE1201

Basic Electrical Engineering

Teaching Scheme

Lectures 4 Hrs/ Week

Tutorials -

Examination Scheme

Credits: 8

MSE: 30 Marks ESE: 70 Marks

Course Outcomes:

1. Understand various definitions, laws, concepts involved in basic electrical engineering.
2. Study of electrical circuits and magnetic circuits and their applications in electrical engineering.
3. Study electromagnetic induction and its importance in electrical machine design and power system.
4. Learn different electrical supply schemes.
5. Learn to measure and calculate resistance, inductance and power consumed by single phase and poly phase circuit.

Course Contents

Unit	Contents	Hrs.	Marks
1	D.C circuits: Concepts of voltage, electric potential, electromotive force, potential difference. Definition of resistance, concepts of resistivity, impedance, conductivity, susceptance, and admittance. Factors affecting resistance / resistivity like temperature, temperature coefficient of resistance. D C Circuit: concept of circuit and network, circuit elements, node, path, loop, branch, mesh. Ohm's law, simple D. C. series and parallel circuits, Voltage and current division rule, Kirchhoff's laws, Maxwell's loop analysis (Node and mesh analysis). Superposition Theorem. Thevenin's Theorem, Norton's Theorem.	10	18
2	Electrostatics: Electric charge, coulomb's law, Electric flux, flux density, electric field intensity, permittivity, Concept of Breakdown Voltage and Di-electric strength, Concept of capacitor, Types of Capacitors (Paper, Mica, Film, Ceramic, Glass), Parallel plate capacitor, and Equivalent capacitance of capacitors in series: Equivalent capacitance of capacitors in parallel, Calculations of Equivalent Capacitance of Series Parallel combination. Energy Stored in Capacitor, Charging and Discharging of Capacitor, Applications of capacitors.	07	18
3	Magnetic Circuits: Magnetic polarities and magnetic lines of force, Magnetic flux, permeability, flux density, magnetic field intensity, concept of	07	14

	<p>magnetic circuits, Terms associated with magnetic circuits like Magneto-Motive-Force (MMF), Ampere Turns (AT), Permeance, Reluctance. Comparison Between Electric and Magnetic circuits. Series Magnetic Circuit and Parallel Magnetic Circuit. Magnetic leakage, Leakage and Useful Flux & Fringing, ferromagnetic, paramagnetic and diamagnetic materials. Magnetization (B-H) curve, magnetic hysteresis and hysteresis loop, Applications of permanent and electromagnets.</p>		
4	<p>Electromagnetism and Electromagnetic Induction: Electromagnetism, Relation Between Magnetism and Electricity, magnetic field due to current carrying conductor, direction of magnetic field, force on current carrying conductor in magnetic field, magnetic field around a coil. Faraday's Laws of Electromagnetic Induction Induced EMF, Statically Induced E.M.F, Dynamically Induced E.M.F. Direction of induced EMF by Lenz's Law for statically induced EMF, Fleming's Right Hand Rule for dynamically induced EMF. Self Inductance and Coefficient of Self-induction, Mutual inductance and Coefficient of Mutual inductance. Inductances in series. Energy Stored in Magnetic circuit derivation. Types of inductors and their applications: Air Cored Inductors, Iron Cored Inductors, Ferrite Cored Inductors.</p>	07	18
5	<p>AC Fundamentals: Generation of sinusoidal AC voltage. Terms related to sinusoidal AC like wave, frequency, cycle, time period, average value and maximum value. Determination of maximum value and frequency from voltage and current equations. Average and effective (RMS) values of sinusoidal voltage and current, form factor, peak factor. Phase and phase angle, phasor difference, phasor diagram, power factor. Power calculations in single phase AC circuit, Purely resistive, inductive, and capacitive single phase AC circuits, concepts of inductive, capacitive reactance and impedance.</p>	06	16
6	<p>Three Phase AC Systems: Generation of three phase EMF, Phase sequence, Star and delta connections, Line and phase quantities in star and delta connected systems, Balanced and unbalanced three phase circuits, Power in three phase system, Measurement of power in three phase circuits by one wattmeter method, two wattmeter method and three wattmeter methods.</p>	05	16

Text Books			
V. N. Mittle	Basic Electrical Engineering	Tata McGraw-Hill	
B. L. Theraja A. K. Theraja	A Text Book of Electrical Technology Vol-I	S. Chand & Co.	
B. L. Theraja A. K. Theraja	Basic Electrical Engg.	Ramnagar, New Delhi	

Reference Books

Van Valkenburgh	Basic Electrical Engineering	Delmar Cengage Learning
Edward Hughes	Electrical Technology	Pearson Education, New Delhi
Vincent Del Toro	Electrical Engineering Fundamentals	Prentice Hall India Learning Pvt. Limited
B. R. Gupta Vandana Singhal	Electrical Science	S Chand Publications
Jhon Hiley , Keith Brown , Ian McKenzie Smith	Hughes Electric and Electronic Technology	Pearson Publications
H. Cotton	Electrical Technology	Pitman Publications

Course Code:DEE1102/ DET1202

Electrical and Electronics Engineering

Teaching Scheme

Examination Scheme

Lectures : 04 hrs /week

Credits: 8 MSE: 30 marks

Papers : 03hrs

ESE : 70 marks

Course Outcomes:

1. Understand various definitions, laws, concepts involved in basic electrical engineering.
2. Study of electrical circuits and magnetic circuits and their applications in electrical engineering.
3. Study electromagnetic induction and its importance in electrical machine design and power system.
4. Familiarize with active, passive components, signals and integrated circuits.
5. Understand the basics of semiconductor diodes, zener diodes, their applications rectifiers, regulators.
6. Understand the basics of transistors (BJT), their characteristics. Learn transistors switch and amplifier.

Course Contents

Unit	Contents	Hrs	Marks
1	D.C circuits: Concepts of voltage, electric potential, electromotive force, potential difference. Definition of resistance, concepts of resistivity, impedance, conductivity, susceptance, and admittance. Factors affecting resistance / resistivity like temperature, temperature coefficient of resistance. D C Circuit: concept of circuit and network, circuit elements, node, path, loop, branch, mesh. Ohm's law, simple D. C. series and parallel circuits, Voltage and current division rule, Kirchhoff's laws, Maxwell's loop analysis (Node and mesh analysis). Superposition Theorem. Thevenin's Theorem, Norton's Theorem.	7	18
2	Magnetic Circuits: Magnetic polarities and magnetic lines of force, Magnetic flux, permeability, flux density, magnetic field intensity, concept of magnetic circuits, Terms associated with magnetic circuits like Magneto-Motive-Force (MMF), Ampere Turns (AT), Permeance, Reluctance. Comparison Between Electric and Magnetic circuits. Magnetization (B-H) curve, magnetic hysteresis and hysteresis loop,	7	14

3	Electromagnetism and Electromagnetic Induction: Electromagnetism, Relation Between Magnetism and Electricity, magnetic field due to current carrying conductor, direction of magnetic field, force on current carrying conductor in magnetic field, magnetic field around a coil. Faraday's Laws of Electromagnetic Induction Induced EMF, Statically Induced E.M.F, Dynamically Induced E.M.F. Direction of induced EMF by Lenz's Law for statically induced EMF, Fleming's Right Hand Rule for dynamically induced EMF. Self-Inductance and Coefficient of Self-induction, Mutual inductance and Coefficient of Mutual inductance. Inductances in series. Energy Stored in Magnetic circuit derivation. Types of inductors and their applications: Air Cored Inductors, Iron Cored Inductors, Ferrite Cored Inductors.	7	18
4	Active and passive electronic components: Resistor, capacitor, inductor symbols, working principals and applications, colour codes, specifications Voltage and Current Source Signal, waveform, Time and frequency domain representation, Amplitude, frequency, phase, wavelength Types of Signals: sinusoidal, triangular and square Integrated Circuits - analog and digital	06	15
5	Symbol, construction and working principle of P-N junction diode Rectifiers: Half wave, Full wave and Bridge Rectifier, working principle , circuit diagram, performance parameters PIV, ripple factor, efficiency, Need for filters: circuit diagram and working of 'L', 'C' and 'π' filter Zener diode working principle, symbol, Zener diode as voltage regulator Regulated power supply Construction and working principle of light emitting diode(LED)	06	15
6	Unipolar and Bipolar devices Symbol, construction and working principle of NPN transistor. Transistor as switch and amplifier. Input and Output characteristics of CE, CB and CC configurations. Regions - Cut-off, saturation and Active region. Transistor parameters- alpha, beta, input and output resistance and relation between alpha and beta	07	20
Text Books			
Applied electronics		G. K. Mithal	Central Techno Publications

Electronic Components	Madhuri Joshi	Wheeles Publication.
Principles of Electronics	V. K. Mehta	S. Chand Publications
Applied Electronics	R. S. Sedha	S. Chand Publications
Functional electronics- Basic electronics	-	TTTI
Reference Books		
TITLE	AUTHOR	PUBLISHER
Electronic devices & circuits	M. Mottershed	Mc Grow-Hill
Electronics devices & circuits	Milman Halkies	Mc Grow-Hill

Course Code:DET1201

Elements of Electronics

Teaching Scheme

Examination Scheme

Lectures : 03hrs/week

Credit: 06

MSE:30 ESE:70

Papers Hrs : 03

Course Outcomes:

1. Understand the basics of semiconductor diodes.
2. Learn rectifiers and filters.
3. Understand the basics of transistors (BJT), field effect transistors (FETs) and their characteristics. Learn transistors amplifiers.
4. Familiarize the concept of zener diode and its applications as regulators. Understand the transistorized and IC based regulators.
5. Understand the types of feedback in circuits and study various oscillators.
6. Demonstrate knowledge of binary number theory, Boolean algebra and binary codes, Gates and Flip-flops.

Course Contents

Unit	Contents	Hrs	Marks
1	Semiconductor Diode: Construction, symbol, working principle, specification, applications, forward and reverse biasing and V-I characteristic of following semiconductor diodes: PN junction diode, Zener diode. Special diodes : LED, Photodiode, LASER diode and Power diode.	07	15
2	Rectifiers and Filters : Types of Rectifiers: Half Wave, Full Wave Rectifier (bridge and center tapped): circuit operation I/O . Waveforms for voltage and current . Parameters of rectifier: Average DC value of current and voltage ripple factor ripple frequency PIV of diode TUF and efficiency of rectifier. Types of Filters: Shunt capacitor, Series inductor, LC and π filter.	07	15
3	Transistor: Different types of transistors: PNP,NPN. Transistor configurations: CB, CE, CC. Transistor CE configuration: circuit diagram, input and output characteristics. Different points of characteristics (Cut-off, Active and Saturation), input resistance, output resistance, current gain. BJT biasing: DC load line, operating point, voltage divider bias Single Stage and multi stage CE amplifier: Circuit diagram, Function of each component, Frequency response and bandwidth. Transistor as a switch. Construction of FET (N-channel and P- channel), symbol, working principle and characteristics. Circuit	07	20

	diagram for drain and transfer characteristics, operating regions of characteristics.		
4	Regulators and power supply : Load and line regulation .Basic Zener diode voltage regulator. Transistorized series and shunt regulator - circuit diagram and working. Regulator IC's: IC's 78XX, 79XX ,IC 723 as fixed, variable and Dual Regulated DC power supply. Construction and operation of DC Regulated power supply.	06	15
5	Oscillators Types of feedback: Positive feedback, Negative feedback. Barkhausen's criterion .Oscillator: Circuit Diagram and working of LC, RC and Crystal oscillator. Hartley oscillator, Colpitt's oscillator, Wein Bridge and Phase shift oscillator.	06	15
6	Digital Electronics: Number System: binary, octal decimal and hexadecimal number system. Boolean algebra: Demorgan's Theorem. Logic gates: Logic symbol, logical expression and truth table of AND, OR, NOT EX-OR and EX-NOR gates. Universal gates: NAND and NOR. Flip flop: Symbol, truth table and working of S-R, J-K, M-S J-K, T and D Flip flop.	07	20

Text Books

Applied electronics	G. K. Mithal	Central Techno Publications
Principles of Electronics	V. K. Mehta	S. Chand Publications
Applied Electronics	R. S. Sedha	S. Chand Publications
Functional electronics- Basic electronics	-	TTTI
Digital Electronics	R.P. Jain	Tata McGraw Hill

Reference Books

TITLE	AUTHOR	PUBLISHER
Electronic devices & circuits	M. Mottershed	Mc Grow-Hill
Electronics devices & circuits	Milman Halkies	Mc Grow-Hill
Digital Principal and applications	Malvino and Leach	Mc Grow-Hill
Digital Computer Fundamentals	Thomas Bartee	Tata McGraw Hill
-	TTL, COMS - Data Handbooks	-

Course Code:DCE1202

Programming in C

Teaching Scheme

Examination Scheme

Lectures : 3 hrs/week

Credit: 06

MSE: 30 marks

ESE: 70 Marks

Course Outcomes:

- 1 Write simple 'C' programs using arithmetic expressions.
- 2 Develop 'C' programs using control structure.
- 3 Develop 'C' programs using arrays and structures
- 4 Develop/Use functions in C programs for modular programming approach.
- 5 Develop 'C' programs using pointers.
- 6 Develop a C program to perform file operations

Course Contents			
Unit No	Contents	Hrs.	Marks
1	Basics of C Programming. Introduction to C: History of 'C', General Structure of a 'C' program: Header files, 'main' function. Data Concepts: Character set, tokens, keywords, Identifiers, Variables, Constant, data types, C operators, Arithmetic operators, Arithmetic expression, declaring variables, and data type conversion. Basic Input output: Input and Output statements, using printf() and scanf(), character input/output statements, Input/output formatting, Use of comments.	5	15
2	Control Structures. Decision making and branching: Relational and logical operators, if statement, if else statement, nested if-else, if-else ladder, The switch statement Looping: While loop, Do... While loop, For loop, Go to statement, Use of break and continue statements	7	15
3	Array and Structures. Characteristics of an array, One dimension and two dimension arrays, Array declaration and Initialization, Array of characters, Operation on array, Character and String input/output, Introduction and Features of Structures, Declaration and	7	20

	Initialization of Structures, typedef, Enumerated Data Type, using structures in C Program		
4	Functions. Concept and need of functions, Library functions: Math functions, String handling functions, other miscellaneous functions. Writing User defined functions, scope of variables. Parameter passing: call by value, call by reference. Recursive functions	5	20
5	Pointers. Concepts of pointers: declaring, initializing, accessing. Pointer arithmetic, Handling arrays using pointers, Handling functions using pointers, Handling structures using pointers.	6	15
6	Introduction to files. Introduction, Defining and opening a file, closing a file, input/output operations on a file, error handling during I/O operations, random access to files, command line arguments.	6	15
Text Books			
E. Balagurusamy	ANSI C	TMH publications	
Yashwant Kanetkar	Let us C	BPB Publications	
Reference Books			
Brian, W. Kerninghan, Ritchie Denis	The C programming Language	PHI Publications	

Course Code: DME1203

Workshop Practices (Lab)

Teaching Scheme

Examination Scheme

Lectures 1 Hrs. /Week

Credits: 6

Practical 4 Hrs. /Week

TW: 50 Marks

Total : 50 Marks

Course Outcomes:

1. To understand basic workshop processes in carpentry, fitting and welding.
2. To study various marking, measuring, holding, striking and cutting tools and equipments.
3. To study various hand tools and spanners used in various shops.
4. To study safe methods of handling tools and spanners.
5. To understand how to make pattern in mould making.

Course Contents

Unit	Contents	Hrs.
1	Study of common workshop processes in carpentry, fitting and welding.(any two)	04
2	Identification and features of hand tools used in various shops, specifications and materials of hand tools with method of use in the processes of carpentry, fitting and welding.(Any Two)	03
3	Handling of Vernier caliper and micrometer.	03
4	Correct methods of handling tools and spanners.	02
5	Correct methods of using measuring Instruments.	02
Students will submit a journal which will include above theory and diagrams and get it assessed as a part continues assessment.		

List of Experiments:

Sr.No.	Name of the Experiment	Hrs	Marks
1	SHOP 01 WOOD WORKING AND MOULD MAKING SHOP Assignments 1) Draw sketches of different carpentry tools, wood turning lathe, label the sketches, write their uses. 2) list five different types of woods used for carpentry. State their		

	<p>properties.</p> <p>Demonstration</p> <p>03) Observe operations of different carpentry tools and different wood working processes like sawing, planning, marking, chiseling, grooving and wood turning.</p> <p>04) Practice different wood working processes.</p> <p>05) Demonstration of various types of Patterns.</p> <p>Carpentry jobs :-</p> <p>1. To Prepare one half-lap joint</p> <p>2. To Prepare one simple job on wood turning lathe.</p> <p>3. One simple wood solid pattern as per drawing.</p> <p>4. Simple Mould Making process.</p>	20	18
2	<p>SHOP 02 WELDING SHOP</p> <p>Assignment</p> <p>01) Describe in brief the process of ARC welding, gas welding, gas cutting, state the situation where each one of them is used.</p> <p>02) List the points for selection of welding rod material, size of welding rod, different types of flame, sketch of elementary symbolic representation in welding.</p> <p>03) Safety precautions in welding, safety equipments and their uses in welding processes.</p> <p>Demonstration</p> <p>04 Observe operation of ARC welding.</p> <p>05 Observe operation in gas welding and gas cutting</p> <p>Welding jobs</p> <p>01. To Prepare one simple job involving ARC Lap & Butt joint</p> <p>02 Prepare one job involving gas welding and cutting.</p>	20	18
3	<p>SHOP 03 FITTING AND SHEET METAL SHOP</p> <p>Assignment</p> <p>01) Draw the sketches of marking & measuring. Cutting, holding and striking tools. Write their purposes and care to be taken.</p> <p>02) Write components, parts and working principle of drilling machine and its use.</p> <p>03) Prepare list of power tools, tapping dies, raw sketches of the same and write the use.</p> <p>Demonstration</p> <p>01 Observe different power tools and drilling machine used for fitting shop</p> <p>02 Observe different operations in fitting shop like chipping, filling, right angle marking, cutting, drilling and tapping.</p>	16	14

	<p>Fitting job</p> <p>01 To Prepare one simple job involving practice of cutting and chipping.</p> <p>02 Prepare one simple job involving practice of filling, drilling and tapping.</p> <p>03 Basic Sheet Metal Model.</p>		
<p>Students will submit a journal which will include above Assignments and diagrams and get it assessed as a part of their practical's.</p>			
<p>Text Books</p>			
<p>Hajra Choudhary & A.K. Hajra Choudhary</p>	<p>Elements of workshop technology, Vol I & Vol II</p>	<p>Media promoters & Pvt Ltd.</p>	
<p>Raghuwanshi</p>	<p>Course in workshop technology, Vol I & Vol II</p>	<p>Dhanpatrai and sons.</p>	

Course Code: DCY1202

Applied Chemistry (Lab)

Teaching Scheme

Practical 2 Hrs / Week

Examination Scheme

Credits: 02 PR/OR: 25 Marks TW : 25 Marks

Course Outcomes:

1. Intellectual Skills:

1. Analyse given solution and to find the chemical properties of metallic and non-metallic ions.
2. Interpret the results of experiments or numerical values.
3. Understand the set up of the experiment.
4. Verify the laws and characteristics.

2. Motor Skills:

1. Handle the apparatus and various laboratory reagents carefully.
2. Accurately measure proper quantity of various chemicals.
3. Observe correct colour of precipitate, evolution of gas.
4. Connect electrical circuit as per the circuit diagram.
5. Observation readings like melting point and boiling point

List of Experiments:

Sr.No.	Name of the Experiment
1	Identify cation in given ionic solution. (03 Nos.)
2	Identify anion in given ionic solution. (03 Nos.)
3	Determine melting point of given solid organic substance
4	Determine boiling point of given liquid organic substance.
5	Determine the equivalent weight of metal.
6	Determine the electrochemical equivalent of copper metal.
7	Determine the chloride content in given water sample.
8	Determine hardness of water by EDTA method
9	Determine pH value of given solutions by using pH paper, universal indicator and pH meter..
10	Determine the effect of temperature on viscosity of given lubricant oil using Redwood viscometer.

Course Code: DEE1103 / DEE1202

Basic Electrical Engineering (Lab)

Teaching Scheme

Examination Scheme

Practical 2 Hrs / Week **Credits: 02** **PR/OR: 25 Marks** **TW : 25Marks**

Skills to be developed:

Intellectual Skills:

1. Identify and select electrical measuring instruments.
2. Interpret electrical circuit diagram.
3. Identify safety equipment required.
4. Decide the procedure for setting experiments.
5. Select electrical instruments of proper range.

Motor Skills:

1. Draw circuit diagram
2. Make wiring connections to connect electrical equipment and instruments.
3. Accurately measure electrical current and voltage drop.
4. Use of safety devices while working.

List of Experiments:

1. To understand the use and connections of the following electrical measuring instruments and equipment: ammeter, voltmeter, power supply, conductors, rheostat, multimeter, autotransformer, and wattmeter.
2. To verify Ohm's law.
3. To verify Kirchhoff's laws.
4. To verify superposition theorem.
5. To verify Thevenin's theorem.
6. To determine equivalent resistance of series and parallel connected resistances.
7. To plot the charging and discharging curves of a capacitor.
8. To plot B-H curve for a given magnetic material.
9. To verify the voltage and current relations in star and delta connected systems.
10. To measure the power and power factor in a three phase circuit by two wattmeter method.

Course Code: DET1204 / DEE 1104

Electrical and Electronics Engg. (Lab)

Teaching Scheme

Examination Scheme

Credits: 2

Practical: 2hrs/week PR: 25 Marks

TW: 25 Marks

Total: 50 Marks

List of Experiments:

1.	To understand the use and connections of the following electrical measuring instruments and equipment: ammeter, voltmeter, power supply, conductors, rheostat, multimeter, autotransformer, and wattmeter.
2.	To verify Ohm's law.
3.	To verify Kirchhoff's laws.
4.	To verify superposition theorem.
5.	To verify Thevenin's theorem.
6.	To determine equivalent resistance of series and parallel connected resistances.
7.	Test the performance of PN junction and zener diode.
8.	Build/test half wave rectifier on breadboard.
9.	Build/ test full wave rectifier on breadboard using two or four diodes
10..	Test the performance of BJT operated in CE mode.
11.	Test the performance of transistor switch circuit.
12.	Test the performance of transistor amplifier circuit.

Course Code: DET1203

Elements of Electronics (Lab)

Teaching Scheme

Examination Scheme

Credits: 2

Practical: 2hrs/Week

PR: 25Marks

TW: 25Marks

Total: 50 Marks

List of Experiments:

1.	Determine the value of given resistor using digital multimeter to confirm with colour code. Connect resistors in series and parallel combination on bread board to measure its value using digital multimeter.
2.	Connect capacitors in series and parallel combination on bread board to measure its value using digital multimeter.
3.	Identify various active electronic components in the given circuit Measure value of given capacitor and inductor using LCR-Q tester Identify three terminals of a transistor using digital multimeter.
4.	Test the performance of PN junction and zener diode.
5.	Build/test half wave rectifier on breadboard.
6.	Build/ test full wave rectifier on breadboard using two or four diodes
7.	Use filters for getting minimum ripple using two diodes rectifier.
8.	Test the performance of BJT operated in CE mode.
9.	Test the performance of transistor switch circuit.
10.	Test the performance of transistor amplifier circuit.

Course Code:DCE1203

Programming in C (Lab)

Teaching Scheme

Examination Scheme

Practicals : 02

Credit: 2

PR: 25 Marks

TW: 25 Marks

hrs/week

Course Outcomes:

- 1 Edit/Compile/Execute simple 'C' programs using arithmetic expressions.
- 2 Edit/Compile/Execute 'C' programs using control structure.
- 3 Edit/Compile/Execute 'C' programs using arrays and structures.
- 4 Edit/Compile/Execute /Use functions in C programs for modular programming approach.
- 5 Edit/Compile/Execute 'C' programs using pointers.
- 6 Edit/Compile/Execute a C program to perform file operations

Course Contents

	Suggested List of Experiments:
1	Write/compile/execute following programs in C language.
2	Develop a program using Constants, Variables, arithmetic expression.
3	Develop a program using increment/decrement operators, exhibiting data type conversion.
4	Write simple program to convert temperature in Fahrenheit degrees to Centigrade degrees.
5	Write simple program to calculate the area and perimeter of the rectangle, and the area & circumference of the circle.
6	Decision Making and branching using if, if-else structure Write program to: <ol style="list-style-type: none">a. Determine whether a given year is a leap year or not.b. Determine whether a string is palindrome.c. Find the greatest of the three numbers using conditional operators Find if a given character is vowel.
7	Using switch statement: Write programs to: <ol style="list-style-type: none">a. Print day of week by taking number from 1 to 7b. Print a student's grade by accepting percent marks. Write programs to check whether the triangle is isosceles, equilateral, scalene or right angled triangle.

8	<p>Looping:</p> <p>Write a program to: a. Find sum of digits of a given number. b. Generate multiplication table up to 10 for numbers 1 to 5.</p> <p>Write a program to:</p> <p>a. Find Fibonacci series for given number. b. Write a program to produce the following output:</p> <pre> 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 </pre>
9	<p>Array: Develop a Program to:</p> <p>a. Sort list of 10 numbers</p> <p>Perform addition of 3x3 matrix.</p>
10	<p>Structure: Develop a Program to:</p> <p>a. Create a structure called library to hold details of a book viz. accession number, title of the book, author name, price of the book, and flag indicating whether book is issued or not. Fetch some sample data and display the same.</p> <p>b. Develop and execute C Program to Add Two Distances given in kilometer-meter using structures.</p>
11	<p>Library Functions: Develop Program to demonstrate:</p> <p>a. Use of all String handling functions. b. Use of few Mathematical functions.</p> <p>Use of few other miscellaneous functions.</p>
12	<p>User Defined Functions: Develop a Program to:</p> <p>a. Create a function to find GCD of given number. Call this function in a program.</p> <p>Find Factorial of given number using recursion.</p>
13	<p>Pointers: Develop a Program to Print values of variables and their addresses.</p>
14	<p>Develop a Program to find sum of all elements stored in given array using pointers.</p>
15	<p>Write a program to create and store information in a text file.</p>
16	<p>Write a program to read an existing text file.</p>
<p>Required Equipment Name with Broad Specification: 1 Computer system with basic configuration with 'C' language compiler</p>	

GROUP B SEM- II

Course Code: DMA1201

Applied Mathematics

Teaching Scheme

Examination Scheme

Lectures: 4 Hrs. /Week **Credits: 10**

Tutorials: 2 Hrs. /Week **MSE: 30 Marks** **ESE: 70 Marks**

Course Outcomes:

- 1) Solve examples on different types of functions and limits.
- 2) Calculate the equation of tangent and normal, maxima, minima, radius of curvature by differentiation.
- 3) Solve the given problem of integration by using suitable methods.
- 4) Solve examples on definite integral and apply the concept of definite integration to find area and volume.
- 5) Solve the differential equation of first order and first degree using suitable methods.
- 6) Find the Laplace transform of different types of functions.
- 7) Solve examples on different types of probability distribution.

Unit	Contents	Hrs	Marks
1	Functions: Concept and definition of a function, value of a function, different types of function, domain, co-domain and range of a function and examples on them.	4	5
	Limits: Concept and definition of limit, algebra of limits, method of finding limits and easy examples.	6	10
	Derivatives: Concept and definition of derivative, notation, derivative of standard functions by using the first principle, rules of differentiation such as sum, difference, product and quotient, derivative of composite function (chain rule) derivative of inverse, inverse trigonometric function using substitution, logarithmic differentiation, exponential, implicit, parametric function, derivative of one function with respect to another function, second order differentiation and examples Applications of derivative: Equations of tangent and normal, maxima and minima, radius of curvature	8	20
2	Integration: Definition of integration as anti-derivative, rules of integration, integration of standard functions, integration of function using different method, integration by parts and examples on each method.	8	15

3	Definite Integration: Concept and definition of definite integral, simple examples, properties of definite integral (without proof) and simple examples Applications of integration: a) Area under the curve, b) Area between two curves, c) Volumes of revolution	7	15
4	Differential Equations: Concept and definition of differential equation, order, degree and formation of differential equation Solution of differential equations of first order and first degree: a) Variable Separable form, b) Linear differential equation Application of differential equations and related engineering problems	9	15
5	Laplace Transform: Laplace transform of standard functions (without proof), properties of Laplace transform such as linearity, first and second shifting properties (without proof) Inverse Laplace transform using partial fraction method, linearity and first shifting property, Laplace transform of derivatives and solution of first order first degree differential equations and examples	7	10
6	Probability Distribution: Concept and types of probability distribution - a) Discrete probability distribution, b) Continuous probability distribution Binomial distribution, Poisson distribution, Normal distribution and examples on them.	7	10
Total		56	100

Tutorials:

Sr. No.	Tutorials	Unit No.	Approx. Hour
1	Solve examples on different types of functions and limits	I	2
2	Solve examples on rules of differentiation and calculate the derivative of different type of functions.	I	2
3	Evaluate integral of standard functions.	II	2
4	Solve examples on integration by parts.	II	2
5	Solve examples on definite integration.	III	2
6	Find the area of triangle and volume of surface of revolution.	III	2

7	Find the order and degree of differential equations.	IV	2
8	Solve examples on variable separable method.	IV	2
9	Solve examples on linear differential equation.	IV	2
10	Solve examples on application of differential equations.	IV	2
11	Find the Laplace transform of different type of functions.	V	2
12	Solve examples on first and second shifting theorem and find the Laplace transform of derivatives.	V	2
13	Solve examples on Binomial and Poisson distributions.	VI	2
14	Solve examples on Normal distribution.	VI	2
	Total		28

I) Text Books

G.V. Kumbhojkar	A Textbook of Engineering Mathematics,	PhadakePrakashan, Kolhapur
S.P.Deshpande	Mathematics for Polytechnic, Pune	Vidyarthee Gruha Prakashan, Pune

Reference Books

H. K. Dass	Advanced Engineering Mathematics.	S. Chand Publication, New Delhi
Dr. B. S. Grewal	Higher Engineering Mathematics.	Khanna Publication, New Delhi
Dr. R. K. Jadhav	R.K.s Most Likely Question-paper Solution	Synergy Knowledgeware Publication, Mumbai

II) Apps: Following apps are available free on the website.

Sr. No.	Mobile Apps	Developer	Website
1	MathsRK2	Dr. R. K. Jadhav	www.amazon.com
2	MathRK 3-4	Dr .R. K. Jadhav	www.amazon.com

III) Website

Sr. No.	Website	Developer
1	www.mathsrk.weebly.com	Dr. R .K. Jadhav

Applied Physics**Teaching Scheme**

Lectures 04 hrs/weeks

Examination Scheme

Credits: 8

Papers Hrs : 03

MSE: 30 Marks

ESE: 70 Marks

Course Outcomes: Students will able to:

1. Understand laws and principles of electrical circuits.
2. Classify solids on the basis of Band theory.
3. Understand principle of LASER and its applications in engineering field.
4. Understand applications of viscosity in engineering field.
5. Understand method of selection of material for intended purpose.
6. Apply knowledge of good and bad conductors of heat in various engineering concepts.

Course Contents

Unit	Contents	Hrs.	Marks
1	<p>General Physics</p> <p>1.1) Properties of solids:</p> <ul style="list-style-type: none"> • Elasticity: Definitions of deforming force, restoring force, elasticity, plasticity, Factors affecting elasticity. • Stress: Tensile, Compressive, Volumetric and Shear stress. • Strains: Tensile, Volumetric and Shear strain. Elastic limit, Hook's law. • Elastic co-efficient: Young's modulus, bulk modulus, modulus of rigidity and relation between them. • Stress-strain diagram, behaviour of wire under continuously increasing load, yield point, ultimate stress, breaking stress, factor of safety, compressibility, Poisson's ratio. <p>1.2) Properties of liquids</p> <p>Fluid friction:</p> <ul style="list-style-type: none"> • Viscous force, definition of viscosity, velocity gradient, Newton's law of viscosity, coefficient of viscosity and its SI unit. • Streamline and turbulent flow with examples, critical velocity, Reynolds's number and its significance. • Up thrust force, terminal velocity, stroke's law and derivation of coefficient of viscosity by Stroke's method, effect of temperature and adulteration on viscosity of liquid. <p>Surface Tension:</p> <ul style="list-style-type: none"> • Cohesive and adhesive force, Laplace's molecular theory of 	12	20

	<p>surface tension, Surface Tension: definition and unit, effect of temperature on surface tension. Angle of contact, Capillarity and examples of capillary action, derivation of expression for surface tension by capillary rise method, applications of surface tension.</p>		
2	<p>Thermal properties of matter:</p> <p>2.1) Modes of transformation of heat:</p> <ul style="list-style-type: none"> • Difference between heat and temperature, definition of calorie, Absolute zero, units of temperature: °C, °F, °K, with their conversion. • Conduction, law of thermal conductivity, coefficient of thermal conductivity, good conductors of heat & insulators with suitable examples, applications of conduction. Convection, applications of convection. Radiation, applications of radiation <p>2.2) Gas laws: Boyle's law, Charles's law, Gay lussac;s law (statement and mathematical equation only)Perfect gas equation ($PV=RT$) (No derivation), specific heat of a substance, SI unit, specific heat of gas at constant volume (C_v), specific heat of gas at constant pressure (C_p), ratio of specific heat, Mayer's relation between C_p and C_v, isothermal process, adiabatic process, difference between isothermal process and adiabatic process.</p>	9	16
3	<p>Optics</p> <p>3.1 Refraction of light:</p> <ul style="list-style-type: none"> • Refraction of monochromatic light, Snell's law, derivation of prism formula, total internal reflection, critical angle. • Elementary ideas of Scattering, interference, diffraction, birefringence phenomenon. • Optical fibre: principle, structure of optical fibre, propagation of light wave through optical fibre, derivation of numerical aperture and acceptance angle. <p>3.2 Laser:</p> <ul style="list-style-type: none"> • Laser, properties of laser, spontaneous and stimulated emission, population inversion, optical pumping. <p>He-Ne Laser: principle, construction and working, engineering applications of Laser.</p>	8	16
4	<p>Wave motion</p> <p>4.1 Wave motion:</p> <ul style="list-style-type: none"> • Definition of wave, wave motion, wave velocity, wave 	8	16

	<p>period, wave frequency, wave length, vibratory motion, periodic motion, amplitude of a vibrating particle, derivation of $v = n\lambda$.</p> <ul style="list-style-type: none"> • Simple harmonic motion (SHM), examples of SHM, characteristics of SHM. • Types of progressive waves: transverse and longitudinal waves with examples. <p>4.2 Resonance: Stationary wave, formation of stationary wave, examples Of stationary waves, characteristics of stationary waves, free and Forced vibrations with examples. Resonance: definition of resonance, examples of resonance, formula To calculate velocity of sound by resonance method.</p>		
5	<p>Basic Electric circuits & Electromagnetism</p> <p>5.1 Simple D.C. electric circuits:</p> <ul style="list-style-type: none"> • Electric current: definition, symbol and unit, Ohm's law: statement, mathematical expression, resistivity: definition, unit, conductivity: definition, unit. <p>5.2 Whetstone's network and potentiometer:</p> <ul style="list-style-type: none"> • Wheatstone's network, working principle, balancing condition, principle of potentiometer, potential gradient. <p>5.3 Electromagnetism:</p> <ul style="list-style-type: none"> • Magnetism, Magnetic effect of electric current, Ampere's thumb rule, Biot-Savart's law, statement, force experienced by a current carrying straight conductor kept in a magnetic field. Fleming's left hand rule, couple acting on a rectangular coil kept in a magnetic field. • Principle of galvanometer, construction & working of galvanometer, conversion of galvanometer into ammeter and voltmeter. 	10	16
6	<p>Semiconductor Physics & modern Physics</p> <p>6.1 Semiconductor Physics</p> <ul style="list-style-type: none"> • Classification of solids on the basis of band theory: forbidden energy gap, conductor, insulator, and semiconductor. • Classification of semiconductors, P-N junction diode, forward characteristics of P-N junction diode, reverse characteristics of P-N junction diode, photodiode, its symbol, principle and applications. 	9	16

	<p>6.2 Photo electricity:</p> <ul style="list-style-type: none"> • Photon (quantum), Plank’s hypothesis, energy of photon, properties of photons. • Magneto-optic effect. • Photo electric effect: circuit diagram, process of photoelectric emission, definitions:- threshold frequency, threshold wavelength, stopping potential, characteristics of photoelectric effect. • Work function, Einstein’s photoelectric equation, photo resistor (LDR):- symbol, principle, applications, photoelectric cell:- principle. <p>6.3 X-rays:</p> <ul style="list-style-type: none"> • Origin of X-rays, production of X-rays using Coolidge’s X-ray tube, minimum wavelength of X-ray, properties of X-rays, applications of X-rays: engineering, medical and scientific. 		
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Text Books

	Physics std.XI & XII	HSC Board /CBSE Board
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Reference Books

B .L. Theraja	Engineering Physics	S. Chand Publishers
V. Rajendran	Engineering Physics	Tata McGraw-Hill
P. G. Hewitt	Conceptual Physics	New Age international
D. K. Bhattacharya & A. Bhaskaran	Engineering Physics	Oxford University Press

Course Code: DME1101 / DME 1201

Engineering Drawing

Teaching Scheme

Examination Scheme

Lectures: 3hrs/week

Credits: 6 Papers : 04 hrs

MSE: 30 Marks ESE: 70 Marks

Course Outcomes:

1. To understand the concepts of Engineering Drawing used to develop, express the ideas, and convey the instructions which are used to carry out jobs in the engineering field.
2. To get familiar with drawing Instruments, use them to draw an object on sheet, Lettering and types of lines.
3. To know the dimensioning rules and techniques.
4. To study orthographic projections of different objects.
5. To have an idea of Visualizing three dimensional objects and draw Isometric Projections and to find dimensions for various types of Riveted joints.
6. To find dimensions for various types of Riveted joints.
7. To Know screw thread terms, I.S. conventions, forms of threads, types of threads and fasteners.
8. To understand how to use CAD package, its advantages, capabilities and features.

Course Content:

Unit	Contents	Hrs	Marks
1	Introduction to Engineering lines, Lettering and Dimensioning. Introduction to Engineering Drawing, Use of drawing instruments, lettering and types of lines as per B.S.I., Introduction and types of dimensions, dimensioning terms & notations, general rules of dimensioning.	06	15
2	Orthographic Projections: Introduction to orthographic projections, Orthographic projections using First angle and Third angle method of projection and its symbols.	08	20
3	Isometric Projections: Introduction to Isometric Projection. Isometric axes, lines and planes. Use of Isometric scale for rectilinear objects. Advanced problems with nonlinear and random curved objects in Isometric view and Isometric projection.	07	15
4	Riveted Joints: Forms of rivet heads, Failure of riveted joints, Dimensions of riveted joints, Design of single & double riveted Lap Joint and Single riveted single strap & double strap Butt joint.	06	15

5	Screw Threads and Fasteners: Screw thread terminology, forms of threads, conventional representation of threads as per I.S.I., Left hand threads and Right hand threads, Multi start square threads. Drawing of Bolts, Nuts, Studs, Washers and set-screws of different types	08	20
6	Introduction to AutoCad: Introduction to Computer Aided Drafting and its advantages. AutoCAD, its capabilities and main features. Drawing of Various entities like point, line, rectangle, circle, ellipse, arc and polygon. Introduction to 3D modeling.	07	15

Reference Books

N. D. Bhatt	Elementary Engineering Drawing.	Charotar Publishing House
Mali & Chaudgari	Engineering Drawing	Vrinda Publications
P. H. Jain	Engineering Graphics	Soham Publications
AutoCad software	Educational Edition	-----
T. Jeyapoovan	Engineering Drawing And Graphics using AutoCad.	Vikas Publications.

Course Code:DET1201

Elements of Electronics

Teaching Scheme

Examination Scheme

Lectures : 03hrs/week Credit: 06

MSE:30 ESE:70 Papers Hrs : 03

Course Outcomes:

1. Understand the basics of semiconductor diodes.
2. Learn rectifiers and filters.
3. Understand the basics of transistors (BJT), field effect transistors (FETs) and their characteristics. Learn transistors amplifiers.
4. Familiarize the concept of zener diode and its applications as regulators. Understand the transistorized and IC based regulators.
5. Understand the types of feedback in circuits and study various oscillators.
6. Demonstrate knowledge of binary number theory, Boolean algebra and binary codes, Gates and Flip-flops.

Course Contents

Unit No	Contents	Hrs.	Marks
1	Semiconductor Diode: Construction, symbol, working principle, specification, applications, forward and reverse biasing and V-I characteristic of following semiconductor diodes: PN junction diode, Zener diode. Special diodes : LED, Photodiode, LASER diode and Power diode.	07	15
2	Rectifiers and Filters : Types of Rectifiers: Half Wave, Full Wave Rectifier (bridge and center tapped): circuit operation I/O . Waveforms for voltage and current . Parameters of rectifier: Average DC value of current and voltage ripple factor ripple frequency PIV of diode TUF and efficiency of rectifier. Types of Filters: Shunt capacitor, Series inductor, LC and π filter.	07	15
3	Transistor: Different types of transistors: PNP,NPN. Transistor configurations: CB, CE, CC. Transistor CE configuration: circuit diagram, input and output characteristics. Different points of characteristics (Cut-off, Active and Saturation), input resistance, output resistance, current gain. BJT biasing: DC load line, operating point, voltage divider bias Single Stage and multi stage CE amplifier: Circuit diagram, Function of each component, Frequency response and bandwidth. Transistor as a switch. Construction of FET (N-channel and P- channel), symbol, working principle and characteristics. Circuit diagram for drain and transfer characteristics, operating regions of characteristics.	07	20

4	Regulators and power supply : Load and line regulation .Basic Zener diode voltage regulator. Transistorized series and shunt regulator - circuit diagram and working. Regulator IC's: IC's 78XX, 79XX ,IC 723 as fixed, variable and Dual Regulated DC power supply. Construction and operation of DC Regulated power supply.	06	15
5	Oscillators Types of feedback: Positive feedback, Negative feedback. Barkhausen's criterion .Oscillator: Circuit Diagram and working of LC, RC and Crystal oscillator. Hartley oscillator, Colpitt's oscillator, Wein Bridge and Phase shift oscillator.	06	15
6	Digital Electronics: Number System: binary, octal decimal and hexadecimal number system. Boolean algebra: Demorgan's Theorem. Logic gates: Logic symbol, logical expression and truth table of AND, OR, NOT EX-OR and EX-NOR gates. Universal gates: NAND and NOR. Flip flop: Symbol, truth table and working of S-R, J-K, M-S J-K, T and D Flip flop.	07	20

Text Books

Applied electronics	G. K. Mithal	Central Techno Publications
Principles of Electronics	V. K. Mehta	S. Chand Publications
Applied Electronics	R. S. Sedha	S. Chand Publications
Functional electronics- Basic electronics	-	TTTI
Digital Electronics	R.P. Jain	Tata McGraw Hill

Reference Books

TITLE	AUTHOR	PUBLISHER
Electronic devices & circuits	M. Mottershed	Mc Grow-Hill
Electronics devices & circuits	Milman Halkies	Mc Grow-Hill
Digital Principal and applications	Malvino and Leach	Mc Grow-Hill
Digital Computer Fundamentals	Thomas Bartee	Tata McGraw Hill
-	TTL, COMS - Data Handbooks	-

Course Code: DCY1203 Chemistry of Engineering Materials

Teaching and Examination Scheme: Credits: 06

Teaching Scheme			Examination Scheme		
TH	TU	PR	PAPER HRS	TH (MES)	TH(ESE)
03	--	--	03	30 Marks	70 Marks

Course Objectives:

The student will be able to

- Identify the material structure.
- Select the relevant industrial materials for different applications.
- Identify the type of corrosion in industrial environments.
- Select the relevant ferrous metals for the different applications.

Theory Content:

Unit	Major Learning Outcomes	Topics and Sub-topics	Hours
Unit - I Structure of Material and Insulations	1a. Describe the crystal structure of the given material 1b. Describe the properties of the biomaterial. 1c. Describe the properties of the given insulations. 1d. Identify relevant organic and inorganic insulations for the given system with justification..	Crystal Structure: Types of structure Atomic structure, Nano structure, Micro structure: Macro structure. Chemical Bonding. Fundamental laws of crystal structure, Bragg's Law. 1.1 Materials in research: Biomaterials, Nano materials, Electronic, optical and Magnetic Materials 1.2 Insulating Materials: Heat/Thermal insulations, Sound Insulations, Electrical Insulations. 1.3 Heat/Thermal Insulations: General aspects, requirements, classifications, Organic insulation,(e.g. wool, cotton wool, saw dust, corkboard) and Inorganic insulation (e.g. Slag wool, Glass wool, Charcoal, Asbestos Gypsum powder)	08
Unit-II Properties of engineering materials	2a. Describe chemical reactivity of the given material 2b. Describe the density and porosity of the given material.	2.1 Chemical properties: Composition, Chemical reactivity with air, water and acid. 2.2 Physical properties: Dimension,	12

	<p>2c. Describe thermal of the given material.</p> <p>2d. Calculate resistivity and conductivity of the given material.</p> <p>2e. Describe the importance of tensile strength for the given material</p>	<p>color, Appearance, density, porosity.</p> <p>2.3 Thermal properties: Melting point, specific heat, Heat Capacity, thermal expansion, thermal conductivity, thermal stability, thermal shock resistance, heat resistance.</p> <p>2.4 Electrical Properties: Resistivity and conductivity, Dielectric constant, Dielectric strength, thermo electricity</p> <p>2.5 Mechanical Properties: Tensile strength, Yield strength, Impact Strength, compressive strength, Hardness, Malleability, Ductility, Brittleness, Fatigue, Creep, Elasticity, Plasticity, Toughness</p>	
Unit-III Industrial Materials	<p>3a. Describe properties of the metallic substance</p> <p>3b. Differentiate ceramic substances based on the given properties.</p> <p>3c. Describe the properties of given thermosetting and thermoplastic polymers.</p> <p>3d. Select the polymerization process for the given material with justification.</p>	<p>3.1 Metals and Nonmetals: Classification, Properties and uses</p> <p>3.2 Ceramics: Classification, Clay, Silica, Feldspar, Properties of ceramics: Mechanical, Electrical, Chemical, Thermal. Important Engineering Ceramics, Silicon Carbide, Aluminum Oxide, Engineering application ceramics</p> <p>3.3 Polymeric Materials: Thermoplastic and Thermosetting polymers, Polymerization reaction: Addition, Condensation, Co-polymerization</p>	12
Unit-IV Chemical and corrosive environment	<p>4a. Describe the mechanism of corrosion in the given medium</p> <p>4b. Identify the different factors affecting rate of corrosion for the given type of material with justification..</p> <p>4c. Differentiate the mechanis of corrosion in the given acidic and alkaline environment.</p> <p>4d. Identify the material of construction for the give</p>	<p>4.1 Corrosion: Mechanism, Factors affecting the corrosion</p> <p>4.2 Corrosion by water, steam and soil</p> <p>4.3 Corrosion in acidic and alkaline Environments</p> <p>4.4 Control and prevention of corrosion: Factors determining choice of materials</p> <p>4.5 MOC: Process Equipments, handling chemicals (storage vessel transportation) like Acid, Chlorine (Dry and Wet)</p>	12

	chemical process with justification.		
Unit -V Ferrous Metals and alloys	5a. Identify the properties of the given ferrous alloy with justification. 5b. Describe the effect of chemical element on the given ferrous material. 5c. Describe the chemical composition of the given alloy steel 5d. Identify the special alloy steel for the given application with justification	5.1 Types of Irons: Pig iron, cast iron, wrought iron 5.2 Effects of chemical elements on Iron: Chromium, copper, magnesium, manganese, Nickel, silicon, phosphorus 5.3 Steel: Classification of steel Based on carbon content, based on deoxidation practice 5.4 Alloy Steels: Purpose of alloying, Preparation of alloys, Classification Of alloy, chemical composition, purpose, structural class 5.5 Special alloy steels: Heat resisting steel Stainless Steel	12
			56

List of Reference Books:

Sr. No.	Title of Book	Author	Publication
01	Material Science and Metallurgy	Khanna O.P.	Dhanpat Rai publications Ltd.; New Metallurgy Delhi, 2014; ISBN-10: 9383182458
02	Material science and metallurgy	Daniel C. Yesudian	SCITECH publications(India) Pvt. Ltd.; Chennai ; 2010; ISBN 10: 8188429449
03	Engineering Chemistry	Dr. Dara S. S. Dr. Umare S.S.	S. CHAND and Company Ltd.; New Delhi; 2011; ISBN: 9788121997652
04	Material Science	Narang B. S.	CBS Publishers and Distributors; Delhi1991; ISBN: 16825076329
05	Material Science and Processes	Chaoudhury Hajra S.K.	Indian Book Distributing Company; Mumbai; 1985; ISBN: 9780906216002
06	Engineering Materials	Rangawal S. C.	Charotar Publishing House; Anand; 2016; ISBN: 978-93-85039-17-1

Course Code: DEN1201

Language Lab

Teaching Scheme

Examination Scheme

Credits: 2

Practical: 2 hrs/week 2 Hrs./ Week PR: 25Marks TW: 25Marks Total: 50Marks

Course Outcomes:

The practical experiences and relevant soft skills associated with this course are to be implemented, so that the student demonstrates the following *industry oriented* Cos.

- g. Avoid communication barriers for effective business communication.
- h. Make the relevant use of body language to communicate.
- i. Use audio - visual aids to communicate effectively and efficiently.
- j. Develop notices, memoranda and reports in relevant formats.
- k. Draft different types of business letters, E-mails using correct formats.
- l. To develop interpersonal skills.

PRACTICALS :

Sr. No.	Practical Exercises	Hrs.
	Use 'language laboratory' for different practical tasks	
1	Enact role-play to bring out any barrier to communication.	2
2	Present Poster on Body language.	2
3	Use relevant body language during Oral Presentation.	2
4	Prepare PowerPoint presentation on a given topic.	2
5	Speak with correct voice modulation after listening to the given conversation	2
6	Draft a notice/memorandum/Email on a given situation.	2
7	Prepare a report on a student related issue.	2
8	Prepare Resume with a cover letter.	2
9	Draft an enquiry or order letter on the given topic.	2
10	Prepare presentation on importance of meeting in organization/ A successful businessman [Biographical info]	2
11	Summarize views of two businessmen from English newspapers/ Magazines and other sources	2
12	Prepare a leaflet about the admission process of polytechnic/ giving information about your institute.	2
13	SWOT analysis and presentation,	2
14	Decision making - Applying the techniques	2
15	Point of view on given situation	2
16	Interview Skills- Importance of interview skills; Resume building, Group Discussion and personal interview.	2
		Total: 24

A suggestive list of practical LOs is given in the above table, more such practical LOs can be added to attain the COs and competency. A judicious mix of minimum 12 or more practical LOs/tutorials need to be performed.

SUGGESTED LEARNING RESOURCES:

Sr.No	Title of Book	Author	Publication
1	Communication Skills	MSBTE	MSBTE, Mumbai
2	Effective Communication Skills	M Ashraf Rizvi	Tata McGraw-Hill, New Delhi, 2014
3	Communication Skills	Sanjay Kumar and Pushp Lata	Oxford University Press, New Delhi, 2014
4	Business Communication	K.K.Sinha	Tata McGraw Hill, New Delhi, 2014
5	Essentials of Business Communication	Rajendra Pal , J.S.Korlahalli	Sultan Chand And Sons, New Delhi, 2014

SOFTWARE/LEARNING WEBSITES:

- i. <https://www.britishcouncil.in/english/learn-online>
- ii. <http://learnenglish.britishcouncil.org/en/content>
- iii. <http://www.talkenglish.com/>
- iv. [languagelabsystem.com](http://www.languagelabsystem.com)
- v. www.wordsworthelt.com
- vi. www.notesdesk.com
- vii. <http://www.tutorialspoint.com>
- viii. www.studylecturenotes.com
- ix. [totalcommunicator.com](http://www.totalcommunicator.com)
- x. www.speaking-tips.com

Course Code: DCE1101/DCE1201

Fundamentals of ICT (LAB)

Teaching Scheme

Examination Scheme

Theory : 2 Hrs./Week

Credits: 04

Practical : 2 Hrs./Week

PR/ OR: 25 Marks TW: 25 Marks

Course Outcomes:: On successful completion of this course, the student will be able to

1. Use computer system and identify its peripherals.
2. Prepare business documents using word processing tools.
3. Interpret data and represent it graphically using spreadsheets.
4. Prepare professional presentations.
5. Draw flowcharts and develop algorithms.
6. Use web browsers to access internet services.

Course Contents

Unit	Contents	Hrs	Marks
1	Basics of Computer: Functionalities of a computer, definition, advantages, applications, Generations of computer, Types of computer Components: Input, output units, CPU, Input devices, output devices, storage devices, memory and its types. Definition of computer hardware and software, Data and information, Operating system(definition, objectives and characteristics)	4	5
2	Word Processing: Basic Operations, Creating and Editing documents, Formatting documents, Enhancing documents, Applying Page Setup, Working with various objects like shapes, SmartArt, Pictures and Tables, Inserting Header and Footers, Linking and embedding documents, Previewing and Printing documents, Advanced Word Processing , Creating and Editing PDF documents, Comparing two versions of a document Proofreading of a document, Using track changes, Including Digital Signature into the document, Inserting ActiveX controls, Using Table of Contents, Using Mail Merge, Protecting a document, Sharing document online	4	10
3	Spreadsheets: Creating and editing workbook, Organizing and formatting worksheets, Data analysis and management, Using formulas and functions, Previewing and printing worksheets, Advanced Spreadsheet, Managing multiple worksheets,	4	10

	Producing and designing charts , Creating Pivot tables and pivot charts, Importing and exporting data between spreadsheets and other applications, Using advanced functions, Applying conditional formatting, Using data validation, Using sort and filter.		
4	Presentation Tools: Creating and Editing Presentations, Designing and Enhancing Presentation, Delivering Presentation, Advanced Presentation Graphics, Creating videos of presentations, Saving presentation in various formats, Importing and exporting presentations Using templates, Working with slide master, Creating Socially Useful and Productive Works.	4	10
5	Flowcharts and algorithm development: Define flowchart and algorithm. Flowchart Symbols. Problem definition. Drawing of flowchart and Algorithm development to solve a given problem.	4	5
6	Basics of Internet: <i>World Wide Web:</i> Introduction, Internet, Intranet, Cloud, Web Sites, web pages, URL, web servers, basic settings of web browsers- history, extension, default page, default, search engine, creating and retrieving, bookmarks, use search engines effectively for searching the content. <i>Web Services:</i> e-Mail, Chat, Video Conferencing, e-learning, e-shopping, e- Reservation, e-Groups, Social Networking.	4	10

List of Experiments:

1.	Draw the functional diagram of a computer.
2.	Identify the different computer peripherals.
3.	Create a word document and enhance the same using various formatting features.
4.	Create a word document and insert objects like tables, pictures, SmartArts etc.
5.	Create a spreadsheet and use various formulae and functions.
6.	Create a spreadsheet and perform data analysis to produce various types of Charts.
7.	Create a presentation using various multimedia techniques.
8.	Create a presentation and insert objects like tables, pictures, charts, etc.
9.	Draw a flowchart to solve a given problem.
10.	Write an algorithm to solve a given problem.
11	Configure web browsers.
12	Use web services for online shopping, online reservation, etc.

At least ten experiments should be performed attaining all the course outcomes.

Text Books:

Author	Title	Publisher
V. Rajaraman	Fundamentals of Computers	PHI publications
Peter Weverka	Microsoft Office 2016 All in One Dummies	Wiley publications

Reference Books:

Author	Title	Publisher
Alvaro, Felix	Linux: Easy Linux for Beginners	CreatevSpace Independent Publishing Platform- 2016

SOFTWARE/LEARNING WEBSITES

- a. <https://www.microsoft.com/en-in/learning/office-training.aspx>
- b. <http://www.tutorialsforopenoffice.org/>
- c. https://s3-ap-southeast-1.amazonaws.com/r4ltue295xy0d/Special_Edition_Using_StarOffice_6_0.pdf
- d. <https://www.libreoffice.org>

Course Code:DPH1202

Applied Physics (lab)

Teaching Scheme

Examination Scheme Credit : 02

Practical 2Hrs. /Week

PR/ OR: 25 Marks : TW : 25 Marks Total:50 Marks

Course Outcomes:

1 Intellectual skills:-

- Select proper measuring instruments.
- Verify the principles, laws, using given instruments under different conditions.
- Read interpret the graph.
- Interpret the results from observations and calculations.

2 Motor skills:-

- Handle the instruments.
- Measuring physical quantities accurately.
- Observe the phenomenon and to list the observations in a tabular form.

List of experiments : Minimum eight experiments

1. Determine Young's modulus of elasticity of metal wire by using Searle's apparatus.
2. Measure the dimensions of given objects using vernier caliper & micrometer screw gauge.
3. Determine coefficient of viscosity of given liquid using Stoke's method.
4. Determine surface tension of liquid by capillary rise method using travelling microscope.
5. Determine the coefficient of thermal conductivity of copper by Searle's method.
6. Determine specific resistance by voltmeter ammeter method.
7. Verify law of resistances in series by using meter bridge.
8. Verify principle of potentiometer.
9. Plot characteristics of P-N junction diode.
10. Determine Joule's constant (J) by electrical method.
11. Determine temperature coefficient of resistance of metal (conductor) using platinum resistance thermometer.
12. Determine wavelength of He-Ne gas laser.

Course Code:DME1102 / DME1202

Engineering Drawing (Lab)

Teaching Scheme

Examination Scheme

Practical: 4 hrs/week

Credits: 04 TW: 50 Marks

Total: 50 Marks

Course Outcomes:

- 1 To use and get familiar with drawing Instruments to draw an object on sheet.
- 2 To draw Lettering and types of lines.
- 3 To write Dimensioning rules and techniques and to put proper dimensions on given drawings.
- 4 To draw orthographic projections of different objects.
- 5 To draw Isometric Projections and Views of simple and advanced problems.
- 6 To draw various types of Riveted joints.
- 7 To draw screw thread terms, I.S. conventions, forms of threads, types of threads and fasteners.
- 8 To draw simple geometrical figures using CAD package.

List of Sheets:

One sheet on each of the following topics is to be completed during practical hours and submitted as the part of continuous assessment.

Sr. No.	Title of sheet	Marks
1	Engineering lines, Lettering and Dimensioning techniques.	8
2	Orthographic Projection- rectilinear objects. Advanced problems with nonlinear and random curved objects.	8
3	Isometric Projections-Simple Isometric views and Isometric projection by the use of Isometric scale with nonlinear surfaces and advanced problems in Isometric view.	8
4	Rivets and Riveted joints.	8
5	Screw Threads and Fasteners.	8
6	Assignment on AutoCad.	10

Course Code: DET1202

Elements of Electronics (Lab)

Teaching Scheme

Examination Scheme

Credits: 2

Practical: 2hrs/Week

PR: 25Marks

TW: 25Marks

Total: 50 Marks

List of Experiments:

1.	Determine the value of given resistor using digital multimeter to confirm with colour code. Connect resistors in series and parallel combination on bread board to measure its value using digital multimeter.
2.	Connect capacitors in series and parallel combination on bread board to measure its value using digital multimeter.
3.	Identify various active electronic components in the given circuit Measure value of given capacitor and inductor using LCR-Q tester Identify three terminals of a transistor using digital multimeter.
4.	Test the performance of PN junction and zener diode.
5.	Build/test half wave rectifier on breadboard.
6.	Build/ test full wave rectifier on breadboard using two or four diodes
7.	Use filters for getting minimum ripple using two diodes rectifier.
8.	Test the performance of BJT operated in CE mode.
9.	Test the performance of transistor switch circuit.
10.	Test the performance of transistor amplifier circuit.

Course Code: DCY1204

Chemistry of Engineering Materials (Lab)

Teaching and Examination Scheme: Credits: 02

Teaching Scheme			Examination Scheme		
TH	TU	PR	PR/OR	TW	TOTAL
--	--	02	25 Marks	25 Marks	50

Course Objectives:

The student will be able to

- Identify the material structure.
- Test physical, chemical, mechanical properties of the materials.
- Select the relevant industrial materials for different applications.

List of Experiments:

Sr.No.	Name of the Experiment
1	Identify the material from given crystal structure.
2	Determine the thermal and electrical conductivity of given metal.
3	Determine the melting point of given material.
4	Determine the Malleability, Ductility of given material.
5	Prepare the thermoplastic material.
6	Prepare the thermosetting material.
7	Determine the rate of corrosion in acidic medium.
8	Determine the rate of corrosion in alkaline medium.
9	Determine electrode potential of metal and compare its rate of corrosion.
10	Determine the composition of given alloy steel.
11	Determine copper content in Cu-alloy material.
12	Determine manganese in steel.

Rules and Regulations

1. Attendance

Attendance in all classes (lectures/tutorials, laboratories, workshops etc.) will be mandatory. A student may be debarred from appearing at an examination on grounds of unsatisfactory attendance. Rules regarding attendance are given in Appendix –III.

2.0 Curriculum:

Every Department will have a prescribed course structure, which in general terms known as curriculum of study. It will prescribe different subjects to be studied in each semester. The curriculum of study will be updated by Institute Board of Studies as and when need arises and the same shall be approved by the Academic Council and Executive Council of the University.

3.0 Semesters:

The Institute will follow a credit based semester system. There will be two semesters in a year. The semester that begins in July will be known as autumn semester (or odd semester) and the semester that begins in January will be known as spring semester (or even semester).

4.0 Subject Credit System:

In general a certain quantum of work measured in terms of credits will be laid down as the requirement for a particular diploma. The student will acquire credits by passing courses every semester, the amount of credit associated with a course being dependent upon the number of hours of instruction per week in that subject. A course may consist of lecture, tutorial and practical/term work/drawing hours. One hour of lecture/tutorial/practical will be equivalent to one credits. For example, a subject having 3 lectures, 1 tutorial and 2 practical contact hours in a week will bear six credits ($3 \times 1 + 1 \times 1 + 2 \times 1 = 06$). Credits will also be assigned to seminar and project.

Total credits are 60 per year. Candidate must clear minimum 45 credits to be eligible for the admission to the next year and he must clear all the 60 credits of first year and minimum 45 credits of second year to be eligible for admission to third year.

5.0 Examination

Students performance in a course will be assessed through various modes listed below:

5.1 There will be one mid semester examination (MSE) of ninety minutes duration to be conducted as per the schedule fixed in the Academic Calendar and during such examination period, there will be no classes conducted. Each MSE will be conducted for 30 marks. End semester examination (ESE) will be conducted for 70 marks. The syllabus of each course will be divided in to approx. six units. Normally, the MSE will be conducted based on the syllabus specified in first three units (Unit Nos. 1,2 and 3) and ESE will be conducted based on all the syllabus giving 70% weightage to unit 4,5 and 6. However, there may be some flexibility in

deciding exact syllabus for MSE and ESE. The individual subject teacher may decide and declare the exact syllabus for the MSE based on his lesson plan. The end semester examination will cover the full syllabus of the course. The end semester examination will be compulsory for all students for securing a pass grade (DE and above). The marks obtained in examination will be displayed on the notice board within five days from the date of completion of examinations. After the end semester examination the grades will be displayed on the notice boards within eight days from the date of completion of such examinations.

5.2 Appearing in the end-semester examination in the theory/ practical course will be compulsory for a student for securing a minimum pass grade (“DE” or above).

5.3 All the examinations will be conducted at University Level as per Academic Calendar.

5.4 A student will be allowed to appear in the end semester examination only if he/she has:

- a) Attendance record to the satisfaction of the teacher in the theory and laboratory classes
- b) Paid all University and Hostel dues of the semester
- c) Not been debarred from appearing in the examination as a result of disciplinary proceedings

5.5 MSE, ESE, assignments, viva-voce, laboratory assignments etc. will be the constituent components of continuous assessment process and a student must fulfill all these requirements as prescribed by the teacher/coordination committee of the subject. If due to any compelling reason (such as his/her illness, calamity in the family etc.) a student fails to meet any of the requirements within/on the scheduled date and time, the teacher/coordination committee in consultation with the concerned Head of the Department may take such steps (including conduction of compensatory tests/examinations) as are deemed fit.

5.6 The Remedial-examinations of both the odd and even semesters will be conducted as per the schedule notified in the academic calendar, in order to provide an additional opportunity to the students who failed (obtained an FF grade) in one or more subjects

6.0 Assessment

6.1 There will be continuous assessment of a “students” performance throughout the semester and grades will be awarded by the course teacher/ coordination committee formed for this purpose (constitution of Coordination Committee given in Appendix – IV).

6.2 Each theory course in a semester is evaluated for 100 marks with the following weightages.
Sub-component Weightage Mid Semester Examination 30% End-semester Examination 70%

6.3 The assessment in a laboratory course will be based on turn-to turn supervision of the student’s work, their performance in viva-voce and quality of their work as prescribed through laboratory journals and a test that contains an experiment or a viva-voce. It is obligatory to maintain laboratory journal as prescribed by the course coordinator. Each laboratory course may be evaluated as follows:

Laboratory Report	05 Marks
Turn to turn Laboratory Work	20 Marks
Practical Exam/Viva	25 Marks

Total 50 Marks

The numeric marks obtained in each course will be converted to letter grades.

6.4 Final examination for laboratory classes will normally be held a week before the final theory examinations. The grades obtained in the practical subjects will be displayed on the notice boards within three days from the date of completion of such examinations.

6.5 Every student has to separately pass in each subject heads. Candidate should secure minimum 40 % marks in each subject head. In case of theory subject, there will be mid semester and end semester theory examination. Candidate should secure minimum 40 marks in MSE and ESE taken together and he must attend ESE. e.g. If candidate secure minimum 30 marks in MSE and 10 marks in ESE, he is pass. If candidate secure 40 marks in ESE and zero marks in MSE, then he is pass.

6.6 In case of TW/PR/OR Head candidate must secure minimum of 40% marks to pass that head. i.e 20 out of 50, and 10 out of 25. This mark will be then converted to the lowest passing grade.

6.7 The final grades awarded to the students in a course must be submitted by the teacher/Chairman, coordination committee within ten days from the date of holding the examination to the concerned Head of the Department for onward submission to the Controller of Examinations.

6.8 Any change of grade of a student in a course consequent upon detection of any genuine error of omission and/or commission on part of the concerned teacher or examination section, must be approved by the Departmental Committee and must be forwarded by the teacher/chairman, coordination committee, through the Head of the concerned Department to the Controller of Examinations within 10 (Ten) days from the commencement of the next semester.

6.9 For the benefit and as a process of learning by students, the answer books after evaluation of mid semester examination and end-semester examinations, etc. would be shown to the students within a weeks" time from the last date of conduct of tests/examinations. The schedule may be announced by the concerned Heads of the Departments.

6.10 A student of the Diploma program must complete the prescribed course work of the entire Diploma within a maximum period of 6 years. In special cases the Vice-Chancellor may on the recommendation of the Department and the DPEC further extend the total time limit for

completion of all the requirements up to 7 years for the Diploma program of 3 year duration. The students who do not fulfill the above requirements will be terminated from the programme.

7.0 Grading System

7.1 For every course a student is assigned a grade based on his/her overall performance in that course over the semester. Different grades and the equivalent corresponding grade points are given below.

% of Marks obtained	Letter Grade	Grade Point
> 95	EX	10.0
91-95	AA	9.5
86-90	AB	9.0
81-85	AC	8.5
76-80	BB	8.0
71-75	BC	7.5
66-70	BD	7.0
61-65	CC	6.5
56-60	CD	6.0
51-55	CE	5.5
46-50	DD	5.0
41-45	DE	4.5
= 40	EE	4.0
< 40	FF (Fail)	0.0
PP	(non-credit courses)	0.0

NP	(non-credit courses)	0.0

In addition there shall be two transitional grading symbols that can be used by the examiners to indicate the special position of a student in a course. II –for “Incomplete assessment” XX for Debarred for Examination. The guidelines for the award of letter grades are given in Appendix– V

7.2 Any student who satisfactorily completes courses like Industrial Training, plant visits, etc. will be awarded „PP“ grade. Satisfactory completion of such courses is mandatory failing which the student will be awarded „NP“ grade. Then the student is required to repeat such course till he gets „PP“ grade in such courses. The award of the degree is subject to obtaining a „PP“ grade in all such courses, prescribed in the curriculum.

7.3 Students failing to maintain prescribed attendance in a course with no genuine reasons will be

awarded XX grade for that subject and this grade will be awarded in advance of the end semester examination with prior warnings. These students will not be eligible for end semester examination. Those who get XX grade will have to repeat that course.

7.4 Only students with a satisfactory and complete in-semester record, but who miss the end semester exam due to personal illness or accident will be given II grade. The applications of such students for remedial-exam must be supported by proper medical certificate duly approved by the sub-committee of DPEC. In the event of death or serious illness of parent or guardian, the application should be supported by adequate evidence of the same. Any student who fails to appear for re-exam in the prescribed manner will be deemed to have failed in that course and will be awarded „FF“ grade.

7.5 The Semester Grade Point Average will be computed for each semester. The SGPA will be calculated as follows:

$$SGPA = \frac{\sum_{i=1}^n Ci * Gi}{\sum_{i=1}^n Ci}$$

Where Ci = Credit for the course, Gi = the Grade Point obtained for the course and the summation is over all the courses taken in that semester and n is the number of courses registered for the semester.

7.6 At the end of each year a yearly Grade Point Average (GPA) is calculated.

7.7 The yearly GPA would give the cumulative performance of the student from the first and second semester for First year, from third and fourth semester for Second Year and from fifth and sixth semester for Third Year.

$$\text{Yearly GPA} = \frac{\sum_{k=m}^n Sk * Ck}{\sum_{k=m}^n Ck}$$

Where, „m“ is the odd (winter) semester and „n“ is even semester (spring) of respective year (1 and 2 for First Year, 3 and 4 for Second Year and 5 and 6 for Third Year) under consideration. Ck is the total number of credits registered during a particular semester. Sk is the SGPA of that semester.

7.8 The yearly GPA, SGPA and the grades obtained in all the courses in a semester will be communicated to every student at the end of every semester.

7.9 Both SGPA and yearly GPA will be rounded off to the second place of decimal and recorded as such. Whenever these grade point averages are to be used for the purpose of determining the inter-se merit ranking of a group of students, only the rounded off values will be used.

7.10 When a student gets the grade “II” for incomplete assessment for any subject(s) during a semester, the SGPA of that semester and the yearly GPA at the end of that semester will not be calculated till the student complete that course. After the “II” grade(s) has (have) been converted to appropriate grades, the SGPA and yearly GPA will finally be recalculated after taking into account these grades.

7.11 When a student gets the grade “FF” for any course during a semester, the SGPA of that semester and the yearly GPA at the end of that semester will not be calculated till the student complete that course. After the “FF” grade(s) has (have) been converted to appropriate grades, the SGPA and yearly GPA will finally be recalculated after taking into account these grades.

7.12 Rules regarding the conduct of remedial-examination and award of grade with remedial examination are given in Appendix – VI.

7.13 A student securing in Final year a yearly GPA of 4.00 and above but below 5.00 during 5th and 6th semesters of Diploma will be awarded “Pass Class”. A student securing yearly GPA of 5.00 and above but below 6.00 during 5th and 6th semesters of Diploma will be awarded “Second Division”. A student securing average GPA of 6.00 and above but below 7.00 during 5th and 6th semesters of Diploma will be awarded “First Class” and a student securing GPA of above 7.00 during 5th and 6th semesters of Diploma will be awarded “First Class with Distinction”. No class will be awarded at any stage without completing all the requirements for the award of Diploma.

APPENDIX – I

RULES REGARDING CONDUCT AND DISCIPLINE

Following rules shall be in force to govern the conduct and discipline of all students.

1. Students shall show due respect to the teachers of the University/ Institute, the Rector of the Hostel, the Sports Officers of the Gymkhana and the Officers of the National Cadet Corps and NSS; proper courtesy and consideration should be extended to the employees of the University and the Hostels. They shall also pay due attention and courtesy to visitors.

2. Students are required to develop a friendly relationship with fellow students. In particular they are expected to show kindness and consideration to the new students admitted to the University/ Institute every year. Law bans ragging in any form to anybody – acts of ragging will be considered as gross indiscipline and will be severely dealt with. The act of ragging is a crime by law.

3. The following acts of omission and / or commission shall constitute gross violation of the code of conduct and are liable to invoke disciplinary measures:

- Any kind of involvement in the Act Ragging.
- Furnishing false statement of any kind in the form of application for admission or for award of scholarship etc.
- Displaying lack of courtesy and decorum: resorting to indecent behavior anywhere within or outside the campus.
- Willfully damaging or stealthily removing any property/belonging of the University/ Institute / Hostel or fellow students.
- Possession, consumption or distribution of alcoholic drinks or any kind of hallucinogenic drugs.
- Adoption of unfair means in the examinations.
- Organizing or participating in any group activity in company with others in or outside the campus without prior permission of Principal-IoPE.
- Mutilation or Unauthorized possession of library books.
- Resorting to noisy and unseemly behavior, disturbing studies of fellow students.
- Not intimating his/her absence to the Rector of the Hostel before availing any leave.

Commensurate with the gravity of the offence the punishment may be reprimand, fine, expulsion from the Hall, debarment from an examination, rustication for a specified period or even outright expulsion from the University/ Institute.

4. For an offence committed in a Hostel, in the Department or a classroom and elsewhere, the Chief Warden or the Head of the Department, and the Principal-IoPE respectively shall have the authority to reprimand or impose fine or take any other suitable measures. All cases involving punishment other than reprimand shall be reported to the Chairman of the Standing Disciplinary Committee.

5. All major acts of indiscipline, which may have serious repercussion on the general body of students and /or which may warrant a uniform and more formalized nature of investigation, shall be handled by the Standing Disciplinary Committee for Diploma Programme appointed by the Vice-Chancellor.

The Standing Disciplinary Committee consists of the following ex-officio and other members:

- Principal-IoPE – Chairman
- Chief Rector
- Rector of the Hostel of which the student concerned is a resident.
- One member of faculty nominated by the Vice-Chancellor, by rotation for two years.
- One of the student representatives to be nominated by the Principal-IoPE for one year.

In addition, the Chairman may invite any other person(s) to be associated with the proceedings of a particular case, if his/her participation is considered necessary in disposing of the matter. Recommendation of the Committee, which will include the suggested punishment in cases of guilt proven, will be forwarded to the Vice-Chancellor for necessary action.

6. Cases of adoption of unfair means in an examination shall be dealt with by the Committee on Examination Malpractice consisting of the following members:

- a. One senior faculty member nominated by the Vice-chancellor will be the Chairman
- b. Three Heads of the Department nominated by the Vice-chancellor –Member
- c. Principal – IoPE - Member
- d. Three members of faculty nominated by the UG Programme & Evaluation Committee for a term of two years – Member
- e. One Legal Expert (if required for a particular case) – member (by Invitation)
- f. Controller of Examinations - Member- Secretary

The committee shall recommend appropriate measures in each case to the Vice- Chancellor for awarding the punishment.

APPENDIX – II

RULES RELATING TO RESIDENCE REQUIREMENTS

The residence requirements of students will be governed by the following rules:

1. The students staying in the hostels will be deemed to be the boarders of the mess.
2. No married accommodation shall be provided to any student.
3. No student shall come into or give up the assigned accommodation in any Hostel without prior permission of the Rector.

4. A student shall reside in a room allotted to him/her and may shift to any other room only under the direction/permission of the Rector.
5. Students shall be required to make their rooms available whenever required for inspection, repairs, and maintenance or disinfecting and shall vacate the rooms when leaving for the vacation/holidays.
6. Students shall be responsible for the proper care of the furniture; fans and other fittings in the rooms allotted to them and shall generally assist the Rector in ensuring proper care and security of those provided in the Halls of common use of all students.
7. Students will be responsible for the safe keeping of their own property. In the event of loss of any personal property of a student due to theft, fire or any other cause the University shall accept no responsibility and shall not be liable for payment of any accept no responsibility and shall not be liable for payment of any compensation.
8. Engaging personal attendants, keeping pets and use of appliances like electric heater, refrigerator etc., by a student in the Hostel is prohibited.
9. All students must abide by the rules and regulations of the Hostel as may be framed from time to time.
10. Students should not take any undue risk, which may cause heavy loss to somebody's life or his/her own life. They are warranted from uncalled for acts like picnic programmes to the nearby beaches or any other holiday spots without the permission of Rector concerned. They are strongly warned not to go for swimming in beaches or open water tanks. University will not be responsible for the loss of life due to such prevented acts.
11. Motorcycle driving in the campus with more than one pillion is prohibited. Faculty members are empowered to impose fine to the students who are found violating this prohibition.

APPENDIX – III

RULES REGARDING ATTENDANCE

The attendance of the students in theory classes and laboratory sessions will be governed by the following rules.

1. Attendance in all classes (lectures, tutorials, laboratories, workshops and other publicized activities etc. is compulsory. A student may be debarred from appearing at an examination on the ground of unsatisfactory attendance.
2. The teacher concerned may condone absence from classes for a very short period due to unavoidable reasons provided he/she is satisfied with the explanation.
3. If the period of absence is for a short duration (of not more than two weeks) application for leave shall have to be submitted to the Head of the Department concerned stating fully the reasons for the leave requested for along with supporting document (s). The Head of the Department will grant such leave.

4. Absence for a period not exceeding two weeks in a semester due to sickness or any other unavoidable reason for which prior application could not be made may be condoned by the Head of the Department provided he is satisfied with the explanation.

5. If the period of absence is likely to exceed two weeks, a prior application for grant of leave will have to be submitted through the Head of the Department to the Principal-IoPE with the supporting documents. The decision to grant or condone such leave shall be taken by the Principal-IoPE after considering the recommendation of the Head of the Department, if the attendance is above 75%.

However, if the attendance is less than 75% but above 60% due to prolonged illness or a calamity in the family, condonation may be granted by Principal-IoPE. In any case if the attendance is less than 60% he/she will not be permitted to appear for the semester examination for that subject and he/she has to re-register for that course when offered.

6. It will be the responsibility of the student to get his absence from classes condoned by the appropriate authority.

7. A student must intimate his/her absence to the Warden of the Hostel in which he/she is residing, before availing of any leave. Failing to do so will be construed as breach of discipline and will be dealt with as per provisions.

APPENDIX – IV

COORDINATION COMMITTEES FOR DIPLOMA STUDENTS

Composition:

One coordination Committee would be constituted for each subject taught by more than one teacher of one or more Departments/Centers. Each committee would consist of all the teachers who are involved with the teaching of the subject during the semester. One of its members would be nominated by the Head of the Department under whose name the subject is being offered, to act as its Chairman.

Tenure: One semester, in which the subject is being offered.

Functions:

(i) To lay down the course plan for the subject.

(ii) To coordinate instructions and progress of teaching in the subject and to ensure that the full syllabus is covered.

(iii) To review periodically the performance of students who have registered in the subject.

(iv) To forward the results of the examinations and the final grades obtained by each student taking the subject to the concerned Head of the Department.

(v) To moderate the question papers on the subject and ensure that the syllabus is well covered by the question papers.

Frequency of Meetings: Each co-ordination Committee shall meet at least three times during the semester.

APPENDIX – V

GUIDELINES FOR AWARD OF LETTER GRADES

1. In general there shall be no rigid marks-to-grade linkage. Difficulty levels of the examinations, test, viva-voce and other factors that contributed to the final marks are to be considered by the teacher/co-ordination committee of a subject while converting marks into letter grades.
 2. The grades FF and EX are to be considered as benchmark grades.
 3. The cut-off marks below which a student would be assigned an “FF” grade will be 40 % for the theory and 40% for the laboratory.
 4. The exceptionally brilliant performance will be assigned an “EX” grade even the best student of any class needs to be good enough to be awarded the “EX” grade.
 5. In case where a student appears in the remedial-examination, the conversion from marks to grade would be done applying the same norm as was framed for the original class.
 6. Co-ordination Committee would moderate the results of the different sections of a class if wide disparity in performance across sections were observed.
 7. All the requirements for the laboratory component are to be satisfied by a student within deadline set-up by the teacher/co-ordination committee before the start of the end-semester examination, if a student due to a genuine reason like illness of himself/herself or calamity in the family cannot complete a particular subcomponent the teacher/co-ordination committee may allocate him/her additional time. In this case an II-grade if needed may temporarily be allocated to the student in the subject. However, the requirement in any case has to be fulfilled within 15days after the end of the end-semester examination and the grade finalized.
 8. There is no provision for remedial-examination in the laboratory, if a student cannot clear the laboratory of a particular subject, he/she will be assigned the grade “FF” in that subject and has to re-register in the subject, if permitted in the immediately following semester in which it is offered.
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APPENDIX - VI

RULES REGARDING REMEDIAL-EXAMINATIONS

In order to provide an additional chance to students who fail in one or more theoretical subjects in a semester, there will be a remedial-examination equivalent to the end-semester examination. The following are the conditions under which the remedial-examination will be arranged.

1. Students who, after having registered for a subject have obtained grade “FF” in the proceeding autumn and spring semester will be eligible to appear in the reexamination. Intending students must submit their applications counter signed by the teachers of the subject(s) or the Head of the Department concerned along with the necessary fees to the Controller of Examinations by the date as announced by a notification.
2. The remedial-examination shall be held on such dates as laid down in the academic calendar for the year or as notified separately.
3. On appearing at the remedial-examination in a subject a student will be entitled to the award of one grade lower than the actual grade scored unless exempted as per the clause 9.4 of the regulations due to illness, accident or calamity.
4. However the performance grade “EE” will remain unaltered as elucidated in the table below:

Actual grade obtained	Grade to be awarded
EX	AA
AA	AB
AB	AC
AC	BB
BB	BC
BC	BD
BD	CC
CC	CD
CD	CE
CE	DD
DD	DE
DE	EE
EE	EE
FF	FR

The final grades awarded to the students must be sent to the Controller of Examinations within 3 days from the date the re-examination was held.

APPENDIX – VII
RULES FOR CHANGE OF BRANCH

1. Student admitted to a particular branch of the Diploma course will normally continue studying in that branch till completion.
2. However, in special cases the Institute may permit a student to change from one branch of studies to another after the first two semesters. Such changes will be permitted, strictly in accordance with the provisions laid down hereafter.
3. Only those students will be eligible for consideration for a change of branch after the second (spring) semester, who have completed all the credits prescribed in the first two semesters of their studies, in their first attempt, without having had to pass any requirement in the remedial examination and obtained an average GPA during 1st and 2nd semesters of Diploma not lower than 7.50.
4. Application for a change of branch must be made by intending eligible students in the form prescribed for this purpose. The Principal-IoPE will call for application sometime in the month of July of each academic year and the completed forms must be submitted to him by the last date specified in his notification.
5. Students may enlist up to five choices of branch, in order of preference to which they wish to change over. It will not be permissible to alter the choices after the application has been submitted.
6. Change of branch shall be made strictly on the basis of inter se merit of the applicants. For this purpose an average GPA obtained during 1st and 2nd semesters of Diploma shall be considered. Ties will be broken by the SSC merit of the applicants.
7. The applicants may be allowed a change of branch, strictly in order of inter se merit, subject to the limitation that the actual number of students in the third (autumn) semester, in the branch to which the transfer is to be made does not exceed 100% of the sanctioned yearly intake for that branch.
8. All changes of branch made in accordance with the above rules will be effective from the third (autumn) Semester of the applicants concerned. No changes of branch shall be permitted hereafter. All changes of branch will be final and binding on the applicants. No student will be permitted under any circumstances to refuse the change of branch offered.