UPL University of Sustainable Technology

(Established Under State Private University Act, 2009)

Shroff S.R. Rotary Institute of Chemical Technology

First Year Curriculum for Diploma Courses in Engineering & Technology

A. Programs offered at Diploma Levels –

1. Chemical Engineering 2. Computer Engineering 3. Mechanical Engineering
4. Electrical Engineering 5. Environment Engineering 6. Information Technology

B. Structure of curriculum

Mandatory Induction Program

Induction program (mandatory)	Two-week duration
Induction program for students to be offered right at the start of the first Year.	• Physical activity • Creative Arts • Universal Human Values • Literary • Lectures by Eminent People • Visits to local Areas • Familiarization to Dept./Branch & Innovations

Semester-I/II (Computer Engg., Mechanical Engg., Electrical Engg.)

Sr. No.	Category of Course	Code No.	Course Title	Hours per week			Total contact hrs/ week	Total Credits	E	M	I	V	Total Marks
				L	T	P							
1	Basic Science	MH1101	Mathematics-I	3	2	0	5	5	70	30	50	0	150
2	Basic Science	MH1104	Basic Physics	3	0	2	5	4	70	30	20	30	150
3	Engineering Science	MH1107	Basics of Electrical Engineering	2	0	2	4	3	70	30	20	30	150
4	Humanities & Social Science	MH1110	English	2	0	2	4	3	70	30	20	30	150
5	Engineering Science	MH1109	Engineering Graphics	1	0	6	7	4	70	30	20	30	150
6	Audit Course	1MH1111	Environmental Studies & Sustainability	1	0	0	1	0	50	0	0	0	50
	Total			**12**	**2**	**12**	**26**	**19**	**400**	**150**	**130**	**120**	**800**

Block No:402, At&PO: Vataria, Ankleshwar-Valia Road, Ta. Valia, Dist: Bharuch, Gujarat (India)

Phone No: +91 9712177799, Mo: 9727745875/76

Semester-II/I (Chemical Engg., Environment Engg., Information Technology)

Sr. No.	Category of Course	Code No.	Course Title	Hours per week			Total contact hrs/ week	Total Credits	E	M	I	V	Total
				L	T	P							
1	Basic Science	MH1103	Mathematics-II	3	2	0	5	5	70	30	50	0	150
2	Basic Science	MH1102/ CO1101	Basic Chemistry / Programming in C#	3	0	2	5	4	70	30	20	30	150
3	Engineering Science	MH1108	Basics of Mechanical Engineering	2	0	2	4	3	70	30	20	30	150
4	Engineering Science	MH1105	Basics of Civil Engineering	2	0	2	4	3	70	30	20	30	150
5	Engineering Science	MH1106	Basics of Computer Engineering	2	0	2	4	3	70	30	20	30	150
6	Engineering Science	MH1112	Engineering Workshop Practice	0	0	6	6	3	0	0	60	40	100
Total				**12**	**2**	**14**	**28**	**21**	**350**	**150**	**190**	**160**	**850**

 # Programming in C (CO1101) will be included in 2nd semester Computer Engineering & Information Technology instead of Basic Chemistry, w.e.f. A.Y. 2023-24.

C. Course code and definition:

Course code	Definitions
L	Lecture
T	Tutorial
P	Practical
E	Theory External Examination Marks
M	Theory Internal Examination Marks
I	Practical Internal Examination Marks
V	Practical External Examination Marks

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Shroff S.R. Rotary Institute of Chemical Technology

Diploma of Engineering
Subject Code: MH1101
Subject Name: Mathematics-I

Semester: - I

Type of course: Engineering Science

Prerequisite: Knowledge of Basic Mathematics

Rationale: The subject is classified under Basic Sciences and students are intended to know about the basic concepts and principles of Mathematics as a tool to analyze the Engineering problems. Mathematics has the potential to understand the Core Technological studies

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	2	0	5	70	30	0	50	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Logarithm:** Concept, Rules and related Examples.	**3**
2	**Determinants and Matrices:** Idea of Determinant and Matrix, Types of matrices, Addition and Subtraction, Product, Inverse up to 3X3 matrix, Solution of Simultaneous Equations (up to three variables).	**8**
3	**Mensuration:** Area of Triangle, Square, Rectangle, Trapezium, Parallelogram, Rhombus, Circle, Surface & Volume of Cuboids, Cone, Cylinder and Sphere.	**7**
	SECTION-B	
4	**Vectors:** Basic concept of Vector and Scalar, Addition & subtraction, Product of Vectors, Geometric meaning of Scalar and Vector Product, Angle between two vectors, Applications of Dot (scalar) and Cross-(vector) Product, Work Done and Moment of Force.	**8**
5	**Trigonometry:** Units of Angles (degree and radian) , Allied & Compound Angles, Multiple –Submultiples angles, Graph of Sine and	**6**

Diploma of Engineering
Subject Code: MH1101
Subject Name: Mathematics-I

	Cosine, Periodic function, Sum and factor formulae	
6	**Inverse Trigonometry:** Introduction, Range and domain, Relation between inverse Trigonometry, Basic formulae	**4**

Text Books:

1. G C Patel, Basic Mathematics, Atul Prakashan

Reference Books:

1. Anthony croft and others, Engineering Mathematics (third edition), Pearson Education
2. W R Neelkanth, Applied Mathematics-I, Sapna Publication
3. S P Deshpande, Polytechnic Mathematics, Pune Vidyarthi Gruh Prakashan

List of Tutorial's:

1. Tutorial-1 (Logarithm)
2. Tutorial-2 (Determinants and Matrices)
3. Tutorial-3 (Determinants and Matrices)
4. Tutorial-4 (Determinants and Matrices)
5. Tutorial-5 (Mensuration)
6. Tutorial-6 (Mensuration)
7. Tutorial-7 (Vectors)
8. Tutorial-8 (Vectors)
9. Tutorial-9 (Trigonometry)
10. Tutorial-10 (Inverse Trigonometry)

Course Outcomes:

Students will be able to:

Sr. No.	CO statement

Diploma of Engineering
Subject Code: MH1101
Subject Name: Mathematics-I

CO-1	**Define** logarithmic function, Matrix, Determinant, vector and trigonometry function.
CO-2	**Solve** simple problems using concepts of Logarithms
CO-3	**Calculate** simultaneous equations using concepts of Determinants and Matrices
CO-4	**Determine** simple problems using concepts of Trigonometry
CO-5	**Formulate** simple problems using concepts of Vectors
CO-6	**Measure** the surface area and volume of different shapes and bodies.

List of Open Source Software/learning website:

- https://nptel.ac.in
- www.sosmath.com

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Shroff S.R. Rotary Institute of Chemical Technology

Diploma Engineering
Subject Code: MH1104
Subject Name: Basic Physics

Semester: - I/II

Type of course: Basic Science

Prerequisite: 10th Standard Science & Mathematics

Rationale: As Physics is considered as basic science, its principles, laws, hypothesis, concepts, ideas are playing important role in reinforcing the knowledge of technology. Deep thought is given while selecting topics in physics. They are different for various branches of engineering. This will provide sound background for self-development in future to cope up with new innovations. Topics are relevant to particular program and students will be motivated to learn and can enjoy the course of Physics as if it is one of the subjects of their own stream.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Course Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Unit – I SI Units & Measurements:** Need of measurement and unit in engineering and science, definition of unit, requirements of standard unit, systems of units-CGS, MKS and SI, fundamental and derived quantities and their units, Least count and range of instrument, least count of vernier caliper, micrometer screw gauge, Definition of accuracy, precision and error, estimation of errors - absolute error, relative error and percentage error, rules and identification of Significant figures.	6
2	**Unit-2 Electrostatics:-** Concept of charge, Coulomb's inverse square law, Electric field, potential and potential difference, Electric current, Ohm's law,	12

Diploma Engineering
Subject Code: MH1104
Subject Name: Basic Physics

	laws of series and parallel combination of resistance, D.C. circuits(Network, Branch, Active and Passive Electronic components, Loop and Junction, Symbols of Electronics components), Kirchhoff's law(KVL & KCL).	
3	**Unit-3 Basic Laws of magnetic materials:** Magnetic field and its units, magnetic intensity, magnetic lines of force, magnetic flux and their units, Dia, Para, Ferro magnetic materials, Electromagnetic Induction, Lenz's law and its Applications, Alternating current and its waveform.	**6**
SECTION-B		
4	**Unit-4 Heat and Temperature:** Heat and temperature, Modes of Heat transfer (Conduction, Convection and Radiation), Temperature measurement scales (Kelvin, Celsius and Fahrenheit and inter conversion between them), Types of thermometers (Mercury thermometer, Bimetallic thermometer, Platinum resistance thermometer), Thermal conductivity, Applications of Thermal Conductivity.	**6**
5	**Unit-5 Force and Motion:** Recapitulation of equations of motion, Newton's 1st law of motion, Force, basic forces in motion, gravitational force, electrostatic force, electromagnetic force, nuclear force, Inertia, types of inertia (inertia of rest, inertia of motion, inertia of direction), Momentum, Newton's 2nd law of motion, measurement of force using second law, simple problems on F = ma and equations of motion, Impulse of force, Impulse as the product of force and time, impulse as the difference of momentum, examples of impulse, simple problems on impulse, Newtons III rd law of motion and its examples. Law of conservation of momentum, Statement, simple problems.	**8**
6	**Unit-6 Properties of Waves and Light:** Definition of wave, amplitude, Time period, frequency, and wavelength, relation between velocity, frequency and wavelength, longitudinal and transverse wave, principle of superposition of waves, definition of stationary wave , node and antinode, definition of resonance with examples, Properties of Light, Electromagnetic spectrum, Reflection, refraction, Snell's law, diffraction, polarization, dispersion of light, interference of light, constructive and destructive interference (Only definitions),Refractive index, LASER, Properties of LASER, Application of LASER.	**6**

Diploma Engineering
Subject Code: MH1104
Subject Name: Basic Physics

Text Books:

1. A Textbook of Engineering Physics-I by Dr. Pankaj kumar, Khanna Publications.
2. Applied Physics, S S Patel, Atul Publication.

Reference Books:

1. Concepts in Physics Vol. I and Vol. II, H C Verma, Bharti Bhawan Ltd. New Delhi, 2019
2. Applied Physics, Vol. I and Vol. II, TTTI Publications, Tata McGraw Hill, Delhi, 2019
3. Engineering Physics For Diploma, Bhuyan, Ranjan Kumar, PHI Learning pvt. ltd 2020
4. Text Book of Physics for Class XI (Part-I, Part-II), N.C.E.R.T., Delhi, 2019
5. Text Book of Physics for Class XII (Part-I, Part-II) , N.C.E.R.T., Delhi, 2019
6. Dilip Gaikwad, Shailaja Padmakar, Swati Rane and Vaishali Morankar, Basic Physics, S. Chand.

List of Practical: (Min. 10 Practicals should be performed)

1. To Measure linear dimensions by vernier caliper and calculate volume.
2. To Measure linear dimensions by Micrometer screw.
3. To calculate resistance using Ohm's law.
4. To calculate resistance using Colour code method.
5. To verify law of Resistance in series and parallel.
6. To determine errors in electrical measurements.
7. To Measure A.C. Power using resistive load.
8. To study p-n junction in forward bias.
9. Determine acceleration due to gravity 'g' by using simple pendulum.
10. To determine Force constant with the help of periodic time of oscillations of spring.
11. Use different types of thermometers to measure temperature of a hot bath and convert it into different scales.
12. To measure and convert MKS physical quantity to CGS Physical Quantity and vice versa.

Diploma Engineering
Subject Code: MH1104
Subject Name: Basic Physics

Course Outcomes:

Students will be able to:

Sr. No.	CO statement
CO-1	**Select** proper measuring instrument on the basis of range, least count & precision required for measurement.
CO-2	**Analyze** properties of material & their use for the selection of material mostly applicable for engineering users.
CO-3	**Identify** good & bad conductors of heat and proper temperature scale for temperature measurement.
CO-4	Identify, analyze**, discriminate** and interpret logical sequence of field problems with the study of physics.
CO-5	**Analyze** variation of sound intensity with respect to distance.
CO-6	**Follow** the principles used in the physical properties, its measurement and selections.

List of Open Source Software/learning website:

- www.physicsclassroom.com
- www.physics.org
- www.fearofphysics.com
- www.sciencejoywagon.com/physicszone
- www.science.howstuffworks.com

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Shroff S.R. Rotary Institute of Chemical Technology

Diploma Engineering
Subject Code: MH1107
Subject Name: Basics of Electrical Engineering

Semester: - I/II

Type of course: Engineering Science

Prerequisite: 10th Standard Science & Mathematics

Rationale: A diploma holder may be involved in various jobs ranging from preventive maintenance of electrical installation to fault location. In addition, he/she may be working in testing laboratories where he/she uses measuring instruments. To carry out these and similar jobs effectively, knowledge of basic concepts, principles and their applications is very essential. This course will enable the students to understand the basic concepts and principles of DC and AC fundamental, ac circuits, batteries, electromagnetic induction, electrostatics, semiconductor devices etc.

Course Objectives: To introduce the concept of Electrical energy, with the knowledge of electrical Current, voltage, power, energy and electrical circuits, DC circuits, electrostatics, Faraday's laws and Basic Electronic Circuits.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE (E)	PA (M)	ESE (V)	PA (I)	
2	0	2	3	70	30	30	20	150

Course Content:

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Basic Terminology and their concepts :** Current, EMF, potential difference (Voltage), resistance, resistivity their units, Relationship between electrical, mechanical and thermal SI units of work, power and energy, Electrical Safety and precautions, Electrical power, energy and their units (SI).	4
2	**Fundamental of D.C. Circuit :** Ohm's Law and its limitations, Series connections, Parallel connections and Series-Parallel combinations of Resistors and problems, Start-Delta	6

	connections of Resistors and simple problems, Kirchhoff's voltage law & Kirchhoff's current law and simple problems.	
3	**Electrostatics :** Working principle of capacitor, types of capacitor, Series and parallel combination of capacitors and simple problems, Charging and discharging of capacitors.	**4**
SECTION-B		
4	**Electromagnetics :** Concept of magnetic flux, flux density, magnetic field intensity ,permeability and their units, B-H curve and magnetic hysteresis , concept of reluctance and mmf and simple problems, Rise and decay of current in inductors, Analogy between electric and magnetic circuits.	**4**
5	**Electromagnetic Induction :** Faraday's laws of electromagnetic induction. Lenz's law, Self and Mutual induced E.M.F., Energy stored in magnetic circuit, Force on a current carrying conductor placed in a magnetic field.	**4**
6	**Fundamentals of A.C. Circuits :** Instantaneous value, maximum (peak) value, cycle, frequency, alternate current and voltage, Difference between AC and DC, Equation of an alternating voltage and current and wave shape varying sinusoidal, Average and RMS value of alternating voltage and current. Importance of RMS value and Simple problems, Concept of phase, phase difference and phasor representation of alternating voltage and current, Single phase A.C. through pure resistance, inductance, capacitance, R-L, R-C, R- L-C Series & Parallel circuit and simple problems, Resonance (Series and parallel) circuit Active -Reactive and Apparent power & Power Factor, Generation of 3-phase voltage, Phase Sequence , Interconnection of three phase Star – Delta Voltage ,Current & Power relationship in balanced 3-Phase Circuits, Measurement of power in 3-phase circuit and Effect of power factor on Wattmeter readings.	**14**

Diploma Engineering
Subject Code: MH1107
Subject Name: Basics of Electrical Engineering

Text Books:

1. Basic Electrical and Electronics Engineering By B. L. Theraja Vol.-1 - S. Chand Publications.
2. Fundamentals of Electronics by Anokh singh, Khanna Publications.

Reference Books:

1. Principles of Electronics by V K Mehta & Rohit Mehta - S. Chand Publications
2. Basic Electrical Engineering by J B Gupta; SK Kataria and Sons, New Delhi.
3. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.

List of Practical: (Min. 10 Practicals should be performed)

1. Draw different types of Circuit symbols.
2. To Verify 4 & 5 Band Resistor using Color Code method with Multimeter.
3. To measure various AC signals in Digital storage Oscilloscope (DSO) using Function Generator.
4. Experimental verifications of the Kirchhoff's laws.
5. Experimental Verification of voltage and current relations in Star and delta connected Systems.
6. Experimental Verification of laws of capacitors in series and parallel.
7. Determine Frequency, Time Period, Peak value, RMS Value, Peak Factor & Form Factor of Sinusoidal AC waveform by using DSO.
8. To plot Volt-Ampere Characteristics of Silicon P-N Junction Diode.
9. To determine the electrical power of a single-phase AC series R-C circuit and compute The value of Capacitance by vector method.
10. To determine the electrical power of a single-phase R-L A.C. series circuit and Compute the value of Inductance by vector method.
11. Measurement of electrical power in a 3-phase A.C. circuit by two wattmeter method.

12 To measure three phase power by using two wattmeter method.

13. Determine the permeability of magnetic material by plotting its B-H curve.

14. To prepare a report on safety precautions while working on electric installations and necessity of Earthing.

15. Measurement of Earth resistance of electrical equipment.

Course Outcomes:

Students will be able to:

Sr. No.	CO statement
CO-1	**Describe** the sources of energy, applications, different electrical parameters and symbols.
CO-2	**Determine** Ohm's law, Resistance combinations, Start-Delta network and to Solve problems.
CO-3	**Generalized** the Electrical Work, Power and Energy and understand Joule's law. Solve problems.
CO-4	Earthing. Electrostatics and Electromagnetic laws and Solve related problems.
CO-5	**Explain** Single phase and Three Phase AC circuits and Solve related problems.
CO-6	**Develop** Basic Electronic circuits and their applications.

List of Open Source Software/learning website:

- Vlabs.iitb.ac.in
- NPTEL tutorials
- www.coursera.org

UPL University of Sustainable Technology
Shroff S.R. Rotary Institute of Chemical Technology

Diploma of Engineering

Subject Code: MH1110

Subject: English

Semester-I/II

Type of course: Language and Communication

Prerequisite: Zeal to learn the Language

Rationale: The rationale of the curriculum is to help students refresh their knowledge of English language. It also targets the understanding of grammar, focusing in comprehension, and reading, speaking and writing skills.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
2	0	2	3	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Parts of Speech:** Recognition and review of Nouns, Pronouns, Verbs, Adverbs, Adjectives, Prepositions. Conjunctions & Interjections, Knowledge of Subject, Object and Compliment of the Verb, Verbals – Infinitive, Gerund and Preposition	5
2	**Prepositions of time and place :**Contextual teaching of prepositions of time - on, in , at, since, for, ago, before, to, past, to, from, till/until, by Prepositions of place: in, at, on, by, next to, beside, near, between, behind, in front of, under, below, over, above, across, though, to, into, towards, onto, from	4
3	**Phrases andClauses :**Basic definitions of clauses andphrases Focus on Relative Pronouns Use in sentences as relative clauses	3
	SECTION-B	
4	**Sentence types and Transformation of sentences :**Assertive sentences, Exclamatory sentences, Interrogative sentences, Negative sentences, Compound sentences, Complex sentences, Simple sentences, Degrees of Comparison	4

5	**Word formations Affixes:** Prefixes and Suffixes**,** Change of one part of speech to the other: from Verbs to Nouns, Nouns to Verbs, Adjectives to Nouns, Nouns to Adjectives, Verbs to adverbs, Adverbs to Verbs	**4**
6	**Paragraph Writing** & **Punctuation:** Descriptive Paragraph on related topic, Use of the comma, full stop, Semi-colon, colon, apostrophe, exclamation mark, question mark and quotation marks	**4**

Text Book:

1. Communication Skills by Pushplatha & Sanjay Kumar, OUP

Reference Books:

1. Essential English Grammar with Answers by Raymond Murphy (Cambridge University Press)
2. English Grammar by Annie Brinda (Cambridge University Press)

List of Practical/ tutorials:

1. Introducing oneself
2. Introduction about family
3. Discussion about the weather
4. Seeking Permission to do something
5. Description about hobbies
6. Seeking Information at Railway Station/ Airport
7. Taking Appointments from superiors and industry personnel
8. Conversation with the Cashier- College/ bank
9. Discussing holiday plans
10. Asking about products in a shopping mall

Course Outcomes:

After completion of this course students will able to

Sr. No.	CO statement
CO-1	**Present** basic sentences in English.
CO-2	**Construct** grammatically correct sentences in English
CO-3	**Use** grammatically correct English sentences in everyday situations.
CO-4	**Connect** with varied English vocabulary in everyday situations confidently
CO-5	**Relate** themselves orally using simple English.
CO-6	**Assess** reading and validate lifelong learning in English

List of Open Source Software/learning website:

- http://www.free-english-study.com/
- http://www.english-online.org.uk/course.htm
- https://www.grammar-quizzes.com/noun-forms.html

UPL University of Sustainable Technology

Shroff S.R. Rotary Institute of Chemical Technology

Diploma of Engineering
Subject Code: MH1109
Subject Name: Engineering Graphics

Semester: - I/II

Type of course: Engineering Science course

Prerequisite: Zeal to learn the subject

Rationale: Engineering Drawing is an effective language of engineers. It is the foundation block which strengthens the engineering & technological structure. Moreover, it is the transmitting link between ideas and realization.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
1	0	6	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Introduction to Engineering Graphics:** Drawing instruments and accessories, BIS – SP 46. Use of plane scales, Diagonal Scales and Representative Fraction	**6**
2	**Engineering Curves:** Classification and application of Engineering Curves, Construction of Conics, Cycloidal Curves, Involutes and Spirals along with normal and tangent to each curve	**18**
3	**Projections of Points and Lines:** Introduction to principal planes of projections, True length and inclination with the reference planes. **Projections of Solids, Section of Solids and Development of Surfaces:** Classification of solids. Projections of solids (Cylinder, Cone, Pyramid and Prism) Development of surfaces	**18**
	SECTION-B	
4	**Orthographic projections:** Introduction to Orthographic projections, Conversion of pictorial view into Orthographic Views (First Angle	**18**

	Projection Method Only), Dimensioning technique as per SP-46	
5	**Isometric Projections and Isometric View or Drawing**: Isometric Scale, Conversion of orthographic views into isometric projection, isometric view or drawing of simple objects.	**18**
6	**Computer Aided Drawing:** Introduction to AutoCAD, Basic commands for 2D drawing like: Line, Circle, Polyline, Rectangle, Hatch, Fillet, Chamfer, Trim, Extend, Offset, Dim style, etc..	**6**

Text Books:

1. **A Text Book of Engineering Graphics** by P.J.Shah S.Chand & Company Ltd., New Delhi
2. **A Text book of Engineering Drawing** by R.K.Dhawan, S.Chand & Company Ltd., New Delhi

Reference Books:

1. Elementary Engineering Drawing by N.D.Bhatt Charotar Publishing House, Anand
2. Engineering Drawing by Jolhe D A, Tata McGraw Hill Edu. New Delhi,
3. Engineering Graphics by Arunodayaya Kumar, Tech-Max Publication, Mumbai
4. Mechanical Engineering Drawing by N S Salunke, Tech-Max Publication, Mumbai

List of Practical/ tutorials:

1. Practice sheet (which includes dimensioning methods, different types of line, construction of different polygon, divide the line and angle in parts, use of stencil)
2. Plain scale and diagonal scale
3. Loci of Points
4. Engineering curve
5. Projection of Line
6. Projection of Plane
7. Orthographic Projection
8. Isometric Projection

Diploma of Engineering
Subject Code: MH1109
Subject Name: Engineering Graphics

9. Draw basic 2D entities like: Circles, Arcs, circular using AutoCAD (Printout should be a part of progressive assessment).
10. Draw basic 2D entities like: Rectangle, Rhombus, Polygon using AutoCAD (Print out should be a part of progressive assessment).

Course Outcomes:

Sr. No.	CO statement
CO-1	**Know** and understand the conventions and the methods of engineering drawing.
CO-2	**Interpret** engineering drawings using fundamental technical mathematics.
CO-3	**Construct** basic and intermediate geometry and comprehend the theory of projection
CO-4	**Improve** their visualization skills so that they can apply these skills in developing new products.
CO-5	**Develop** their technical communication skill in the form of communicative drawings.
CO-6	**Visualization** and use of basic commands of 2D designing software.

List of Open Source Software/learning website:

1. NPTEL tutorials
2. https://www.youtube.com/watch?v=TJ4jGyD-WCw
3. https://www.youtube.com/watch?v=dmt6_n7Sgcg

UPL University of Sustainable Technology

Shroff S.R. Rotary Institute of Chemical Technology

Diploma of Engineering

Subject Code: 1MH1111

Subject Name: Environmental Studies & Sustainability

Semester: - I/II

Type of course: Audit Course

Prerequisite: Enthusiasm about conservation of natural resources and sustainable development for sustaining the life on the mother earth.

Rationale: The principal motive of this subject is to make students aware about environment and related aspects.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
1	0	0	0	50	0	0	0	50

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	Definition, Scope and Importance, Need of public awareness-Environment, Effect of human activities on Environment-Agriculture, Housing & Industries, Ecosystem, Food chain, Biodiversity	**2**
2	Natural Resources, Water borne diseases, Minerals related problems in water.	**2**
3	Energy: Conventional and non-conventional sources, Biomass and Biogas, Alternative source of Energy- Hydrogen	**2**
	SECTION-B	
4	Environmental pollution, effects and Control: Water, Air, Noise, Land & Thermal, Environmental Management: Solid Waste, Plastic Waste & e-waste.	**2**
5	Current Environmental Issues and Importance: Public Growth, Climate change and Global warming, Acid Rain, Ozone layer depletion,	**2**
6	Environmental treaties, Agreements & Protocols-National & International Basics of Environmental Audit, Sustainable Development, Environment Protection: Role of Government, Legal Aspects, Initiatives by NGOs,	**2**

	National organization.	

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
30	**30**	**20**	**20**	**0**	**0**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Text Books:

1. Text book of Environmental Science & Technology- m. Anji Reddy- BS Publication
2. Basics of Environmental Studies by U K Khare, 2011 Published by Tata McGraw Hill

Reference Books:

1. Environmental Studies by Benny Joseph, TMH publishers
2. Environmental Studies by R. Rajagopalan, Oxford University Press
3. Environmental Studies- R. Rajagopalan-Oxford Publication

Course Outcomes:

Students will be able to:

Sr. No.	CO statement
CO-1	**Define** the principles and scope of Environmental Science
CO-2	**Identify** the types of pollution in society along with their sources and effects
CO-3	**Demonstrate** the generation and management of various wastes
CO-4	**Relate** the national & international environmental issues and treaties.

Diploma of Engineering
Subject Code: 1MH1111
Subject Name: Environmental Studies & Sustainability

CO-5	**Explain** the concept Sustainable development and Environment management
CO-6	**Appraise** the role of government and non-government organization

List of Open Source Software/learning website:

- NPTEL tutorials
- www.coursera.org

UPL University of Sustainable Technology

Shroff S.R. Rotary Institute of Chemical Technology

Diploma of Engineering
Subject Code: MH1103
Subject Name: Mathematics-II

Semester: - II

Type of course: Engineering Science

Prerequisite: Knowledge of Basic Mathematics

Rationale: The course is classified under Advance Mathematics and students are intended to understand the advance concepts and principles of Mathematics such as calculus, complex numbers, and differential equations. This knowledge is required to understand and solve engineering problems.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	2	0	5	70	30	0	50	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Complex Number:** Concept**,** Modules and Amplitude form, Root of Complex Number**,** De Moivre's Theorem and it's application in simple engineering problems.	**4**
2	**Function & Limit:** Concept and Examples of functions, Concept of Limit, Standard Formulae, Related Examples	**6**
3	**Differentiation & it's Applications:** Definition, Rules of Sum, Product, Quotient of Functions, Chain Rule, Derivative of Implicit functions and Parametric functions, Logarithmic Differentiation, Successive Differentiation up to second order, Application: Velocity, Acceleration, Maxima & Minima. (Simple problems)	**8**
	SECTION-B	
4	**Integration:** Concept, Integral of Standard Functions, Working Rules of Integration, Integration by Parts, Integration by Substitution Method, Definite Integral and its properties	**7**

Diploma of Engineering
Subject Code: MH1103
Subject Name: Mathematics-II

5	**Application of Integration:** Application: Area and Volume. (Simple problems)	**4**
6	**Differential Equations (First Order First Degree):** Definition, Order and Degree of Differential Equation, Formation of Differential Equation, Solution of Differential Equation of First Degree and First Order by Variable Separable, Homogeneous and Integrating Factor methods.	**7**

Text Books:

1. G C Patel, Advanced Mathematics, Atul Prakashan

2. Sachin Gajjar, Advanced Mathematics, Mahajan Publishing House

Reference Books:

1. Anthony croft and others, Engineering Mathematics (third edition), Pearson Education 2012
2. Pandya N R, Pandya N R, Advanced Mathematics for Polytechnic, Macmillan Publishers India Ltd.,2012
3. S P Deshpande, Polytechnic Mathematics, Pune Vidyarthi Gruh Prakashan
4. Prakash D S, Polytechnic Mathematics, S Chand,1985

List of Tutorials:

1. Tutorial-1 (Complex Number)
2. Tutorial-2 (Function & Limit)
3. Tutorial-3 (Function & Limit)
4. Tutorial-4 (Differentiation & it's Applications)
5. Tutorial-5 (Differentiation & it's Applications)
6. Tutorial-6 (Differentiation & it's Applications)
7. Tutorial-7 (Integration)
8. Tutorial-8 (Application of Integration)
9. Tutorial-9 (Differential Equations)

Diploma of Engineering
Subject Code: MH1103
Subject Name: Mathematics-II

10. Tutorial-10 (Differential Equations)

Course Outcomes:

Students will be able to:

Sr. No.	CO statement
CO-1	**Define** Complex numbers and limit.
CO-2	**Identify** the roots of complex number using De Moivre's theorem.
CO-3	**Solve** the problem of function using the concept of Limit
CO-4	**Calculate** velocity, acceleration and maxima & minima
CO-5	**Integrate** to find Area and Volume
CO-6	**Evaluate** solution of differential equations using Variable Separable, Homogeneous and Integrating Factor methods.

List of Open Source Software/learning website:

- https://nptel.ac.in
- www.sosmath.com

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Shroff S.R. Rotary Institute of Chemical Technology

Diploma of Engineering
Subject Code: MH1102
Subject Name: Basic Chemistry

Semester: - I/II

Type of course: Basic Science

Prerequisite: Zeal to learn the subject

Rationale: Chemistry is considered as Basic Science subject

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Chemical Bandings and Solutions**: Ionic bonds, co-valent bonds, co-ordinate co-valent bonds, H bonds, Types of solutions, different methods of expressing strength of solutions, viz. molarity. molality, normality, formality, preparation of standard solutions	**4**
2	**Metal, Alloy & Corrosion of metals & its prevention**: Physical Properties of Metal, Alloy & need of alloying of metal, Definition of corrosion, Types of corrosion, Dry corrosion: Oxidation corrosion mechanism corrosion-mechanism, Nature of oxide film, Wet corrosion-mechanism, Galvanic Corrosion, Concentration cell corrosion, Pitting corrosion, Waterline corrosion, Methods of prevention of corrosion- Cathodic protection method, Coating, Inhibitor	**6**
3	**Water Technology**: Hard water and soft water, Types of hardness of water Examples to calculate the hardness Effect of hard water in Boiler operation, Scale and sludge formation and it's Prevention, Caustic embrittlement and it's prevention, Softening of Water, Soda-Lime process, Permutit process, Ion Exchange process, Reverse Osmosis process, Break-point chlorination, Treatment of domestic and industrial	**7**

Diploma of Engineering
Subject Code: MH1102
Subject Name: Basic Chemistry

	waste water	
	SECTION-B	
4	**Basic Concepts of Organic Chemistry**: Introduction: Organic chemistry, Difference between organic and Inorganic compound, Types of Organic Compound, Saturated & Unsaturated hydrocarbon, IUPAC nomenclature of aliphatic compounds	**6**
5	**Lubricants**: Introduction and definition of lubricants and lubrication, function of lubricants, Types of lubrication: Fluid film lubrication, Boundary lubrication, Classification of lubricants: Solid lubricants, Semi-solid lubricants, Liquid lubricants, Viscosity & viscosity index, Flash point and fire point, Pour point and cloud point, Chemical Properties of lubricants: Saponification value, Neutralization number, Emulsification number	**6**
6	**Polymer & Rubber**: Introduction and Definition of Polymer and Monomer, Classification of Polymer, Types polymerization Reaction, Addition Polymerization, Condensation Polymerization, Synthesis, properties and application of Polyethylene, Polypropylene, Polyvinyl chloride, Polystyrene, Phenol formaldehyde, Acrylonitrile, Define the term:- Elastomers, Types of Rubber: Natural Rubber & Synthetic Rubber, Natural rubber and its properties, Vulcanization of rubber, Synthetic rubber, Synthesis, properties and uses of Buna-S Rubber, Buna-N Rubber, Neoprene Rubber	**7**

Text Books:

1. J. Rajaram, A Text Book ofApplied Chemistry, Tata McGraw Hill Co. New Delhi
2. V. P Mehta, A Text Book of Polytechnic Chemistry, Jain Brothers

Reference Books:

3. Jain & Jain , Engineering Chemistry, Dhanpat Rai and Sons
4. S S Dara, Engineering Chemistry, S.Chand Publication

List of Practicals:

1. Basic terms used in Chemistry lab (Theoretical)
2. Determine the strength of given acidic solution using standard solution of base
3. Determine the percentage of Fe in given steel alloy sample
4. Study of corrosion of metals in medium of different pH

Diploma of Engineering
Subject Code: MH1102
Subject Name: Basic Chemistry

5. Determine pH-Values of given samples of Solution by using Litmus paper, pH Paper and pH-meter
6. Determine the hardness of given water sample by EDTA method
7. Determine the alkanity of given water sample
8. Assign IUPAC names to first five members of Alkane and Alkene series (Theoretical)
9. Determine the saponification value of a lubricating oil
10. Determine Flash & Fire point of given lubricating oil
11. To Determine molecular weight of a polymer using Ostwald viscometer
12. Preparation of (any one) polystyrene, urea formaldehyde, phenol formaldehyde
13. Vlab/Demo: Water analysis-Determination of Physical parameters
14. Vlab/Demo: Water analysis-Determination of Chemical parameters

Course Outcomes:
Students will be able to:

Sr. No.	CO statement
CO-1	**Define** the fundamentals of Chemical bonding & Preparation of solutions
CO-2	**Explain** types of corrosion & how to control corrosion of metal
CO-3	**Apply** knowledge of water technology to resolve the issues of drinking water
CO-4	**Classify** organic compounds and nomenclature of compounds
CO-5	**Evaluate** the properties of lubricating oils.
CO-6	**Combine** different monomers to get good quality of polymer & Rubber

List of Open Source Software/learning website:

- Vlabs.iitb.ac.in
- NPTEL Videos
- https://vlab.amrita.edu/

UPL University of Sustainable Technology

Shroff S.R. Rotary Institute of Chemical Technology

Diploma of Engineering
Subject Code: MH1108
Subject Name: Basics of Mechanical Engineering

Semester: - I / II

Type of course: Engineering Science Course

Prerequisite: Zeal to learn the subject

Rationale: To provide a comprehensive knowledge of fundamental concept of mechanical engineering and to understanding working of simple mechanical devices for the students of Engineering.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
2	0	2	3	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Introduction:** Prime movers and its types, Concept of Force, Pressure, Energy, Work, Power, System, Heat, Temperature, Specific heat capacity, Change of state, Path, Process, Cycle, Internal energy, Enthalpy, Statements of Zeroth law, First Law of Thermodynamics and Second Law of Thermodynamics	**02**
2	**Properties of Pure Substances:** Boyle's law, Charles's law, Gay-Lussac's law, Avogadro's law, Combined gas law, Gas constant, Relation between Cp and Cv, Various non-flow processes like constant volume process, constant pressure process, Isothermal process, Adiabatic process, Polytropic process, Steam formation, Types of steam, Enthalpy, Specific volume, Internal energy and dryness fraction of steam, use of steam tables, steam calorimeters	**06**
3	**Steam Boilers:** Introduction, Classification, Cochran, Lancashire and Babcock and Wilcox boiler, Functioning of different mountings and accessories	**04**
	SECTION-B	

4	**Heat Engines:** Heat engine cycle and Heat engine, working substances, Classification of heat engines, Description and thermal efficiency of Carnot; Rankine; Otto cycle and Diesel cycles **Internal Combustion Engines:** Introduction, Classification, Engine details, four-stroke/ two-stroke cycle Petrol/Diesel engines, Indicated power, Brake Power, Efficiencies	**05**
5	**Pumps:** Types and operation of Reciprocating, Rotary and Centrifugal pumps, Priming **Air Compressors:** Types and operation of Reciprocating and Rotary air compressors, significance of Multistage **Refrigeration & Air Conditioning:** Refrigerant, Vapor compression refrigeration system, Vapor absorption refrigeration system, Window and split air conditioners	**05**
6	**Engineering Materials:** Types, properties and applications of Ferrous & Nonferrous metals, Timber, Abrasive material, silica, ceramics, glass, graphite, diamond, plastic and polymer	**02**

Textbooks:

1. A text book of Basics of Mechanical Engineering By R.B. Varia, Atul Prakashan.

Reference Books:

1. Elements of Mechanical Engineering by N M Bhatt and J R Mehta, Mahajan Publishing House
2. Basic Mechanical Engineering by Pravin Kumar, Pearson Education
3. Fundamental of Mechanical Engineering by G.S. Sawhney, PHI Publication New Delhi
4. Elements of Mechanical Engineering by Sadhu Singh, S. Chand Publication
5. Introduction to Engineering Materials by B.K. Agrawal, McGraw Hill Publication, New Delhi

List of Practical:

1. Study of working principles of Cochran boiler and Babcock & Wilcox boiler
2. To understand construction and working of different boiler mountings.
3. To understand construction and working of different boiler accessories.
4. To study working of different Calorimeter.
5. To understand construction features of two and four stroke Petrol engines.
6. To understand construction features of two and four stroke Diesel engines.
7. To determine brake thermal efficiency of an I. C. Engine.

8. To understand construction and working of various Air Compressors.
9. To understand construction and working of Pumps.
10. To demonstrate vapour compression refrigeration cycle of Window air conditioner and Split air conditioner.

Course Outcomes:

Students will be able to:

Sr. No.	CO statement
CO-1	**Describe** the basic terminology of Mechanical engineering.
CO-2	**Make** calculations for commonly used working fluids i.e. ideal gases and steam
CO-3	**Analyze** various heat engine cycles and understand construction and working of IC engines.
CO-4	**Compile** working and applications of steam boilers and various accessories and mountings of boilers.
CO-5	Discuss **working and applications** of pumps, compressors & refrigeration and air conditioning systems.
CO-6	**Compare** properties of various engineering materials with their applications.

List of Open Source Software/learning website:

- Vlabs.iitb.ac.in
- http://nptel.ac.in
- www.coursera.org

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Shroff S.R. Rotary Institute of Chemical Technology

Diploma of Engineering
Subject Code: MH1105
Subject Name: Basic of Civil Engineering

Semester: - I/II

Type of course: Engineering Science

Prerequisite: Basic Knowledge of Higher Secondary Mathematics and Science

Rationale: This subject envisages making the student know the fundamentals of Civil Engineering. This course mainly encompasses the major and general areas of civil engineering, knowledge of which may be required by mechanical and electrical engineers/technicians

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
2	0	2	3	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**CIVIL ENGINEERING SURVEYING –I :**Surveying & leveling (its importance and types), Necessity for leveling, Principals of surveying, Instrument/ tools used for survey and level, Various methods of finding the field survey measurements Chain Survey.	4
2	**CIVIL ENGINEERING SURVEYING –II:** Compass Survey, Preparations of contour sheets/ plan using survey data, Procedure of leveling.	4
3	**CIVIL ENGINEERING DRAWING:** Types of building drawings, Abbreviation, conventions & symbols in civil drawing**,** Building byelaws for planning of residential building and industrial building Planning of simple residential and industrial building.	4
	SECTION-B	
4	**CONSTRUCTION MATERIALS:** Common construction materials such as cement, Brick, Stone, Timber, Steel and Concrete, Properties of each materials & their acceptable standards**,** Quality parameters of	4

Diploma of Engineering
Subject Code: MH1105
Subject Name: Basic of Civil Engineering

	materials.	
5	**Water Resources Engineering :** Basic definition, Hydrological cycle, water conservation and its use**,** rain water harvesting, Water shed Management	**4**
6	**Transportation Engineering:** Introduction, Role of transportation, Mode of transportation, Types of pavement, Basic Knowledge of Traffic engineering.	**4**

Text Books:

1. R. P. Rethaliya, "Basic civil engineering"
2. R. P. Rethaliya, " Elements of Civil Engineering"

Reference Books:

1. T.P.Kanitkar, " Text book on Surveying & leveling "
2. B.C.Punmia, " Text hook on Surveying & leveling "
3. Shah Kalel & Patkil, "Civil Engineering Drawing"
4. S.C. Rangwala, "Engineering Material", S. Chand Publishing
5. L.R Kadiyali, „"Traffic and highway engineering""

List of Practicals:

1. Practice for linear measurements through ranging, chaining, taping offsetting, recording field book etc.
2. Practice for working on prismatic compass for taking measurements and angles.
3. Practice for working dumpy Levels, for taking measurements and, recording length.
4. Prepare surveying drawings using surveyed data (Study Practical)
5. Prepare plan, elevation and section of residential building. (Study Practical)
6. Test construction material cement for field test.
7. Test construction material cement in laboratory.
8. Test construction material brick for field test
9. Test construction materials brick in laboratory

Diploma of Engineering
Subject Code: MH1105
Subject Name: Basic of Civil Engineering

10. Market survey of construction materials

Course Outcomes:

Students will be able to:

Sr. No.	CO statement
CO-1	**Describe** fundamentals of surveying
CO-2	**Understand** various construction symbols and drawings
CO-3	**Use** various civil engineering materials for different purpose
CO-4	**Illustrate** drawing symbols in field data
CO-5	**Evaluate** different methods of water conservation
CO-6	**Create** and recognize different solution for problems related to pavement and traffic.

List of Open Source Software/learning website:

- Autocad for drawings
- https://npyel.ac.in

UPL University of Sustainable Technology

Shroff S.R. Rotary Institute of Chemical Technology

Diploma of Engineering
Subject Code: MH1106
Subject Name: Basics of Computer Engineering

Semester: - I/II

Type of course: Engineering Science

Prerequisite: Knowledge of Computer

Rationale: This subject is intended to make students comfortable with computing environment – Learning basic computer skills, software tools, Understanding of hardware, Cyber Security awareness.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
2	0	2	3	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Basics of Computer System:** Concept of Hardware and Software, Computer block diagram, Input Output unit, CPU, Control Unit, Arithmetic logic Unit (ALU), Memory Unit, Monitor, Printers: Dot matrix, Laser, Inkjet, Plotters, Scanner	4
2	**Software:** System software and Application Software, Operating system concepts, purpose and functions, Installation of Linux and Windows, Operations of Windows OS, Control Panel, My Computer, My Network Places	4
3	**Information Processing Using Open Office:** Open office Writer Calc, Impress, Draw, Base, Math	4
	SECTION-B	
4	**Computer and Communication:** Need of Data Transmission, Data Transmission Media, Baud rate and Bandwidth, Digital and Analog Transmission, Serial and Parallel Data Transfer, Protocols, MODEM, Networking of Computers, Bridges, Routers, Switch, Gate way,	5

	Topologies: Bus, Star, Ring, Hybrid, Introduction to Ports : RS232, IEEE 488, PS2, USB, UTP	
5	**Introduction to Internet**: www, Web Site, URL, e-mail, e-Commerce, Web browsing, Web page, Introduction to Hypertext & HTML, Introduction to http & ftp Protocol	**4**
6	**Information Concepts and Security:** Definition of Data, Information, Need of Information, Concepts of Data Security, Privacy, Protection, Computer Virus and their types, Scanning & Removing Virus	**3**

Text Book:

1. Fundamentals Of Computers, 2nd Edition, by Reema Thareja, Oxford University Press

Reference Books:

1. Computer Fundamentals & Distributors , Seventh edition, by V K Jain, Standard Publications
2. PC Software for Windows made simple, by R. K Taxali, TMH
3. Introduction to Networking, by Barrey Nance, PHI
4. Web Based Application Development, by Ivan Beyross, TMH using HTML, DHTML, Javascript Pearl/ CGI

List of Practicals:

Sr. No	Title of Experiment
1	Installation of Windows XP
2	Installation of Linux
3	Practice of Computer Booting Process in XP
4	Demonstration of Windows Environment
5	Practice of using My Computer, Windows Explorer, My Network Places
6	Practice of using Control Panel

7	Searching Web Page/ Site using Search Engine
8	Creating e-mail Account, Sending and Receiving e-mails with attachment & Signature
9	Exercise Based on Open Office : Document Preparation, Work Book Preparation, Creating Slides
10	Creating Simple Web Page using HTML.

Course Outcomes:

Student will be able to:

Sr. No.	CO statement
CO-1	**Identify** the needs of hardware and software required for a computation task.
CO-2	**Understands** the working of important application software and their use to perform any engineering activity
CO-3	**Use** the software for information processing
CO-4	**Describe** Network & Communications tools
CO-5	**Design** the simple webpage.
CO-6	**Explain** typical provisions of cyber law that govern the proper usage of Internet and computing resources.

List of Open Source Software/learning website:

- Open Office
- Antivirus
- Window 8.1

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Shroff S.R. Rotary Institute of Chemical Technology

Diploma Engineering
Subject Code: MH1112
Subject Name: Engineering Workshop Practice

Semester: - I/I

Type of course: Engineering Science Course

Prerequisite: Zeal to learn the subject
Rationale: Workshop practice is the backbone of the real industrial environment which helps to develop and enhance relevant technical hand skills required by the technician working in the various engineering industries and workshops. Irrespective of branch, the use of workshop practices in day to day industrial as well domestic life helps to dissolve the problems.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
0	0	6	3	0	0	40	60	100

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Carpentry Shop:** i) Demonstration of different wood working tools / machines. ii) Demonstration of different wood working processes, like plaining, marking, chiseling, grooving, turning of wood etc. iii) One simple job involving any one joint like mortise and Tenon dovetail, bridle, half lap etc.	**10**
2	**Fitting Shop:** i) Demonstration of different fitting tools and drilling machines and power tools ii) Demonstration of different operations like chipping, filing, drilling, Lapping, sawing, cutting etc. iii) One simple fitting job involving practice of chipping, filing, drilling, tapping, cutting etc.	**10**
3	**Welding Shop:** i) Demonstration of different welding tools / machines. ii) Demonstration on Arc Welding, Gas Welding, MIG, MAG welding, gas cutting and rebuilding of broken parts with welding. iii) One simple job involving butt and lap joint	**04**

Diploma Engineering
Subject Code: MH1112
Subject Name: Engineering Workshop Practice

SECTION-B		
4	**Tin Smithy Shop:**i) Tin smith tools like – hammers, stakes, scissors etc., ii) sheet metal operations such as shearing, bending, joining, iii) safety precautions, iv) demonstration of various operations.	**10**
5	**Smithy Shop:** i)Smithy tool like - hammer, tongs, Anvil, flattener etc., ii)Smithy operations such as upsetting, drawing down, bending, setting down, for welding, cutting, punching and fullering etc., iii) Safety precautions, iv) Demonstration of various smithy operations	**04**
6	**Machine Shop:**i) Various machining operations such as facing, centering and turning, drilling, gear cutting, ii) demonstration of different machine tools like Lathe machine, Milling machine, Shaper and drilling machine iii) General idea of cutting tools of the machines. iv) demonstration of machining operations	**08**

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
NA	**NA**	**NA**	**NA**	**NA**	**NA**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Text Books:

1. **Elements of Workshop Technology** –Vol.I & II – Hazara and Choudhay by Media promoters & Publisher private limited.
2. **A Course in Workshop Technology** _Vol I & II- B.S. Raghuwanshi, Dhanpat Rai and Co., New Delhi.

Reference Books:

1. **Comprehensive Workshop Technology** (Manufacturing Processes). S.K. Garg by Laxmi Publications.
2. **Workshop familiarization.**- E.Wilkinson by Pitman engineering craft series.
3. **Mechanical workshop practice**.- K.C. John by PHI publications
4. **Basic Workshop Practice Manual** - T Jeyapoovan; Vikas Publishing House (P) Ltd.,New Delhi

5. **Manufacturing Technology**, Vol. I and Vol. II, Rao P.N, by Tata McGraw Hill publications House

List of Practical/ tutorials:

1. Introduction to Mechanical Workshop
2. Exercise on Carpentry shop
3. Exercise on Fitting shop
4. Exercise on Tin smithy shop
5. Demonstration of Welding joints like Lap joint, Lap Tee joint, Edge joint, Butt joint and Corner joint.
6. Demonstration on Smithy shop and various smithy operations
7. Demonstration of Lathe Machine Tools and its components and accessories
8. Demonstration of Various machining operations performed on Lathe machine
9. Demonstration of Milling machine tool and Drilling Machine and their basic components
10. Demonstration of Various machining operations performed on Milling machine and Drilling Machine.

Course Outcomes:

After completion of this course students will able to

Sr. No.	CO statement
CO-1	Understand the safety measures required to be taken while working with machines in workshop.
CO-2	Design and model different prototypes in the carpentry trade such as Cross lap joint, Dove tail joint
CO-3	Design and model various basic prototypes in the trade of fitting such as Straight fit, V- fit
CO-4	Recognize various basic prototypes in the trade of Tin smithy such as rectangular tray, and open Cylinder.
CO-5	Identify various Welding joints such as Lap joint, Lap Tee joint, Edge joint, Butt joint and Corner joint.
CO-6	Comprehend of various machine tools and process carried out in workshop.

List of Open Source Software/learning website:

- http://nptel.iitm.ac.in/courses.php

Shroff S.R. Rotary Institute of Chemical Technology

Diploma in Engineering
Subject Code: CO1101
Subject Name: Programming in C

Semester: - II

Type of course: Engineering Core

Prerequisite: Basic knowledge of Computer.

Rationale: C is an entry-level programming language, and, in many ways, the foundation of advanced programming languages.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	2	4	70	30	30	20	150

Content:

Sr. No.	Content	Total Hrs.
	SECTION-A	
1	**Fundamentals of C** Features of C language, structure of C Program, comments, header files, data types, constants and variables, operators, expressions, evaluation of expressions, type conversion, precedence and associativity, I/O functions**.**	**6**
2	**Control structure in C** Simple statements, Decision making statements, Looping statements, Nesting of control structures, break and continue, goto statement	**7**
3	**Array & String** Concepts of array, one and two dimensional arrays, declaration and initialization of arrays, string, string storage, Built-in string functions	**7**
	SECTION-B	

Diploma in Engineering
Subject Code: CO1101
Subject Name: Programming in C

4	**Functions** Concepts of user defined functions, prototypes, definition of function, parameters, parameter passing, calling a function, recursive function	**7**
5	**Pointers** Basics of pointers, pointer to pointer, pointer and array, pointer to array, function returning pointer **Structure** Basics of structure, structure members, accessing structure members, nested structures, array of structures, structure and functions, structures and pointers	**7**
6	**Dynamic memory allocation** Introduction to Dynamic memory allocation, malloc(), calloc(), realloc(), free() **File management** Introduction to file management, modes and its functions	**5**

Text Book:

1. Programming in ANCI C, Seventh edition, by Balagarusamy E, Tata McGrawHill Publishing Company Limited

Reference Book:

1. Programming with C, Second edition, by Gottfried, Tata McGraw-Hill Publishing Company Limited.
2. Let us C, Fifth edition, by Kanetkar Y. P., BPB Publication

Practical List:

1. Write a program to compute Fahrenheit from centigrade (f=1.8*c +32).
2. Write a program to read three numbers from keyboard and find out maximum out of these three. (nested if else)
3. Write a c program to find given no is prime or not.

Diploma in Engineering
Subject Code: CO1101
Subject Name: Programming in C

4. Write a program to print following patterns
   * 1
   * * 1 2
   * * * 1 2 3
5. Write a C program to read and store the roll no and marks of 20 students using array.
6. Write a program to reverse string.
7. Write a C program to swap the two values using call by value and call by reference.
8. Write a program to find factorial of a number & Fibonacci series using recursion.
9. Define a structure type struct personal that would contain person name, date of joining and salary using this structure to read this information of 5 people and print the same on screen.
10. Write a program to write a string in file.

Course Outcomes:
Student will be able to:

Sr. No.	CO statement
CO-1	**Demonstrate** the concept of variables, data types & operators.
CO-2	**Use** concept of branching & looping to design efficient C programs.
CO-3	**Develop** an application using the concepts of array and string.
CO-4	**Apply** code reusability with functions.
CO-5	**Implement** Structure using C.
CO-6	**Understand** the basics of file handling mechanisms.