

Batch 2010

II SEMESTER, B.Tech.-Civil				
Sr.No.	Course Code	Subject	L-T- P	Credits
1	ME 102	Engineering Thermodynamics	3-1-0	4
2	ME 103	Basic Manufacturing Technology	2-0-1	3
3	EC 104	Basics of Electrical and Electronics Engineering	3-1-1	5
4	MA 103	Advanced Engineering Mathematics – I	3-1-0	4
5	CH 102	Inorganic and Organic Chemistry	3-0-1	4
6	PH 104	Engineering Physics	3-0-1	4
7	HU 102	English and Professional Communications – II	2-1-0	3
<i>Total Contact Hrs= 19 hrs. Lectures+4 Hrs. Tutorial+8 hrs. Lab=31Hrs</i>			TOTAL	27

SIR PADAMPAT SINGHANIA UNIVERSITY, UDAIPUR

COURSE CONTENTS

First year (II Semester) Batch: 2009-2013

L T P C

2 0 1 3

Course Code: ME 103

Course Name: Basic Manufacturing Technology

Objective:

This course is designed to impart knowledge of the basic manufacturing processes used in producing finished products out of ferrous and non-ferrous metals. Advanced and modern manufacturing processes including non-conventional manufacturing processes and the usage of computer controlled machinery in manufacturing are also covered. Student will also learn how to operate and handle various types of machine tools, foundry, fitting and measuring instruments.

Introduction to Materials and Manufacturing:

Introduction to engineering materials such as metals and alloys and their applications. Concept of manufacturing. Measurement and quality in manufacturing

4

Theory of metal cutting:

Different metal cutting operations and calculation of various cutting parameters.

2

Machining Processes and Machine Tools:

Classification of machining processes and machine tools; Construction and working of lathe, Drilling machine, Shaper, Slotter and Planer, Boring Machine, Milling Machine, Grinding Machine and different finishing operations.

8

Property Manipulation of Materials:

Heat treatment of materials. Cold and hot working of material for property manipulation.

4

Casting Processes:

Elements of Sand Mould, Method of preparation of Sand Mould, Introduction of casting defects.

Metal Forming Processes:

Various metal forming processes and their applications

2

Sheet Metal Working Operations:

Classification of press working operations, Construction of Power Presses, Press working terminology, Types of dies and their operations.

3

Fabrication Processes:

Classification of welding operations, Types of joints and welding positions. Brief description of arc, Resistance and gas welding techniques. Brazing and Soldering.

4

Non Conventional Manufacturing Processes:

Basic working concepts of EDM, USM, CHM, ECM, and LBM.

3

Modern Trends in Manufacturing:

Automation, Concept of CAD, CAM and CIM; Concept of Micro manufacturing and nano-technology

2

Feasibility Study in Manufacturing:

Economics of manufacturing.

1

Power Transmission in Machine Tools:

Power transmission in machine tools including compound gear train, Epicyclical gear train

1

Referenecees Books:

- 1) Elements of Manufacturing Proceses by B.S. Nagendra Parashar, R.K Mittal, PHI
- 2) Principal of manufacturing Material and Processes by J.S. Campbell, TMH
- 3) Workshop Technology part I, II and III by WAJ Chapman, Butterworth Heinmann, 2001, 1995, 1998 respectively.
- 4) Manufacturing Technology I & II by Bawa H.S., Mc Graw Hill Publication

Laboratory Work:

Relevant shop floor exercises involving practice in sand casting, machining, welding, sheet metal fabrication techniques, fitting work, Demonstration and job on shaper, lathe and milling machine, Demostration on CNC lathe machine and Job work.

SIR PADAMPAT SINGHANIA UNIVERSITY, UDAIPUR

COURSE CONTENTS

First year (II Semester) **Batch: 2009-2013**

L T P C

3 1 1 5

Course Code: EC 104

Course Name: Basic Electrical and Electronics Engineering

Objective:

This course is designed to familiarize students with some of the fundamental concepts of electrical and electronics engineering such as the working principles of DC and AC (single-phase and three-phase) networks, which are useful in handling and troubleshooting equipments and machinery used in the laboratories and industries.

Course Outline:

BASICS OF CIRCUIT ANALYSIS: DC and AC excitation, Source conversion, Kirchoff's laws, Series and parallel circuits, Mesh current and node voltage method of analysis, Thevenin's and Norton's theorems, Superposition theorem, Compensation theorem, Reciprocity theorem, Maximum power transfer theorem.

MAGNETIC CIRCUITS AND INDUCTION:

Magnetic circuit, magnetic effect of electric current, Faraday's Law of Electromagnetic Induction, B-H relationship, Magnetization characteristics of magnetic Materials, electromagnetic induction and force: self and mutual inductances, energy stored in magnetic field, Transformer-Construction and Operation of Single Phase Transformer, EMF Equation, Voltage & Current relationship and Phasor Diagram of Ideal Transformer, hysteresis and eddy current losses, efficiency of transformer and regulation, OC and SC tests, efficiency calculation

SINGLE PHASE AND THREE PHASE A.C. CIRCUITS: Generation of Single Phase AC Voltage, EMF Equation, Average, RMS and Effective Values. R, L, C

Series circuits, Parallel and Series-Parallel Circuits, Power and Power Factor, Generation of Three-Phase, AC Voltage, Delta and Star-Connection, Line & Phase Quantities,

SEMICONDUCTOR THEORY & PN JUNCTION DIODES:

Construction of PN junction diodes- VI characteristics- diode resistances-transition & diffusion capacitances-effect of temperature on diode characteristics- model of diode - diode specifications-Clipping & Clamping Circuits- Voltage multipliers Using diodes.

BIPOLAR JUNCTION AND FIELD EFFECT TRANSISTOR:

Construction of transistor -principle of transistor action – current components -input & output characteristics of a transistor in CE,CB,CC configurations. Construction & characteristics of JFET -parameters of JFET -MOSFET – Depletion & Enhancement modes-FET in CS, CD Configurations

SPECIAL SEMICONDUCTOR DEVICES: Construction,Characteristics and applications of Zener diode, Varactor diodes.Construction & characteristics of Photodiodes- Photoconductive cell & Photovoltaic cell construction & working of LED & LCD, photo-transistors, solar-cell.

Basic Electrical & Electronics Engineering Lab

1. Verification of Kirchoff's Laws
2. Calibration of Dynamometer Type Power Factor Meter.
3. Calibration of PMMC Ammeter and Voltmeter
4. PN Junction Diode Characteristics A) Forward Bias B) Reverse Bias
5. Zener Diode Characteristics
6. Transistor CE Characteristics (Input and Output)
7. Rectifier With out Filters (Full Wave & Half Wave)
8. UJT Characteristics
9. FET Characteristics
10. Study of CRO
11. CE Amplifier
12. Class a Amplifier
13. RC Phase Shift Oscillator
14. Study of Logic Gates Using ICS.

References:

1. Millman & Halkias,"electronic devices & circuits",tata mcgraw hill,1995.
2. David.a.bell, "electronic devices & circuits ",phi,1998.
3. Robert boylestad, "electronic devices & circuit theory",sixth edition,phi,1998.
4. Albert d.helfrick, william d.cooper, "modern electronic instrumentation and measurement techniques" - phi - 1995.
5. A text book of electrical technology, b.l. thereja. - vol.i
6. Circuit theory, a. Chakraborty

SIR PADAMPAT SINGHANIA UNIVERSITY, UDAIPUR

COURSE CONTENTS

First year (II Semester) **Batch: 2009-2013**

L T P C

3 1 0 4

Course Code: MA-103

Course Name: Engineering Mathematics-I

Objective: *Students will develop an understanding of the fundamental concepts of the calculus, differential equations and linear algebra and connect them with real world problems from other disciplines. Students would also develop mathematical reasoning and problem-solving abilities.*

Vector Calculus: Scalar and Vector fields; Gradient, divergence, curl, Laplacian; Directional Derivative; Differentiation and Integration of Vector functions; Line integrals, Surface integrals. Applications of Green's theorem, Divergence theorem, Stokes' theorem.

Laplace Transform: Existence of Laplace Transform; Laplace Transform of elementary functions; First and second shifting properties; Change of scale property; Laplace Transform of derivatives. Laplace Transform of periodic functions; Laplace Transform of $(t^n f(t))$, Laplace Transform of $(f(t)/t)$; Laplace Transform of special functions; Convolution theorem. Inverse Laplace transform; Application of Laplace transforms in solving ordinary differential equations.

Fourier series: Euler's formula; Problems on general Fourier Series; Conditions for Fourier Expansion; Fourier Expansions of Discontinuous Functions; Even and Odd functions; Change of interval; Half range series; Typical Waveforms (Square, Saw-toothed, Triangular, Half Wave rectifier, Full Wave rectifier); Parseval's Identity; Harmonic analysis.

Fourier Transforms: Fourier Transform and its properties; Fourier sine and cosine transforms, Fourier integral formula ; Inverse Fourier Transform; Fourier transform of derivatives; Convolution; Application of Fourier Transform in solving partial differential equations — Laplace's Equation (2D only), Heat Conduction Equation (1D only) and Wave Equation (1D only).

Z- transforms: Properties of Z -transform, Initial Value theorem, Final Value Theorem; Inverse Z- transform, Z- transform of some important sequences; Solution of Difference Equations using Z- transform.

Differential Equations: Second order ordinary differential equations with variable coefficients: Homogeneous and Exact equations; Solution by change of independent variable; Method of Variation of Parameters. Series solution of second order ordinary differential equations with variable coefficients. Partial Differential Equations of First Order; Lagrange's equation, Standard forms; Charpit's Method.

References:

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|---------------------|--|
| 1 Kreszig E | Advanced Engineering Mathematics. |
| 2 Grewal B S | Higher Engineering Mathematics |
| 3 Dass H K | Advanced Engineering Mathematics. |

SIR PADAMPAT SINGHANIA UNIVERSITY, UDAIPUR

COURSE CONTENTS

First year (II Semester) **Batch: 2009-2013**

L T P C

3 0 1 4

Course Code: CH-102

Course Name: Inorganic & Organic Chemistry

***Aim:** This course is designed to provide an in-depth study of construction materials such as cement, glass and polymers. Innovations in material technology and their applications in construction are also discussed.*

Lubricants & Lubrication

Introduction and functions of lubricants, Mechanism of lubrication, classification of lubricants. Properties and testing of lubricating oils, viscosity and viscosity index, determination of viscosity by Red wood viscometer, Flash and fire point, cloud and pour point. Emulsification, saponification number, iodine value.

Corrosion and its control

Introduction and theories of corrosion, Mechanism of dry or chemical corrosion and Wet or electrochemical corrosion. Galvanic corrosion, Concentration cell corrosion, Pitting corrosion. Factors affecting corrosion and control of corrosion.

Composite materials

Introduction, classification of composite materials, constituents of composites, short fibre reinforced composites, particle-reinforced composites, Particulate composites, structural composites, advantages of composites and application of composites.

Fuels

Solid fuels- proximate and ultimate analysis of coal and its significance. Gross and net calorific value, determination of calorific value by Bomb calorimeter. Metallurgical coke and its manufacture by Beehive and byproduct coke oven process.

Liquid fuels- Advantages, refining and reforming of gasoline, Knocking, antiknocking and octane number, cracking.

Gaseous fuel- Advantages, manufacture of coal gas and oil gas, determination of calorific value by Junker's calorimeter.

Alloys

Introduction and classification of alloys, necessity of making alloys, Study of some important alloys (Brass, Bronze, Duralumin, Magnalumin and Steel).

Metallurgy

Introduction, General metallurgical operations (crushing and grinding, concentration of the ore, working of concentrated ore and purification or refining of ore). Metallurgy of IRON, COPPER & ALUMINIUM.

Water Chemistry for Boilers

Introduction of water, sources, common impurities, hardness of water, disadvantages of hard water, Boiler troubles (Scale and Sludge formation, Caustic embrittlement, Priming and foaming, boiler corrosion).

Metal Finishing

Introduction, Technological importance of metal finishing, Electroplating, electroplating of Cr, Ni and Cu. Electro less plating, Electro less plating of nickel and copper.

Books Recommended:

Inorganic Chemistry by J. D. Lee
Inorganic Chemistry by Cotton Wilkinson
Organic Chemistry by Finar
Engineering Chemistry by Shashi Chawla
Physical Chemistry by Atkins

Laboratory work:

(A) WATER ANALYSIS

- (i) Estimate the percentage of available chlorine in the given sample of bleaching powder.

- (ii) To determine chloride ion in the given water sample by Argentometric method (Mohr's method).
- (iii) Determination of Chemical Oxygen demand (COD) in the given waste water sample.
- (iv) Find out the total, temporary and permanent hardness of given water sample by EDTA titration method using EBT as indicator.
- (v) Find out the alkalinity of the water sample in grams/liter using double indicator method

(B) VOLUMETRIC ANALYSIS

- (i) Determine the strength of unknown Copper sulfate in gm/lit by titrating it against sodium thiosulfate using starch as indicator. You are provided with standard N/20 copper sulfate.
- (ii) Find out the strength of unknown FAS in gms/lit by titrating it with potassium dichromate using N-phenyl anthranilic acid as internal indicator.
- (iii) Find out the strength of unknown FAS in gms/lit by titrating it with potassium dichromate using Potassium ferricyanide as external indicator.

(C) INSTRUMENTAL ANALYSIS

- (i) Measure the pH values of the various water samples provided to you with the help of pH meter.
- (ii) Find out the strength of HCl acid with the help of pH meter by titrating against NaOH by pH metry.
- (iii) Find out the strength of HCl acid with the help of Conductometer by titrating against NaOH by Conductometry
- (iv) Estimate the concentration of Na and K in the given sample using Flame photometer.

(D) GRAVIMETRIC ANALYSIS

Estimation of Barium as Barium sulfate gravimetrically

(E) ORE ANALYSIS

Estimation of Calcium in lime stone or dolomite.

SIR PADAMPAT SINGHANIA UNIVERSITY, UDAIPUR

COURSE CONTENTS

First year (II Semester) **Batch: 2009-2013**

L T P C

3 0 1 4

Course Code: PH-104

Course Name: Engineering Physics

Objective: *This is an introductory course on engineering physics for mechanical and civil engineering students which covers the basic introduction to vector physics, electromagnetics, quantum mechanics and their applications to the electrical, thermal and magnetic properties of metals, band theory of solids, classification of solids into metals, semiconductors and insulators.*

Use of vectors in practical mechanics. Conservative vector fields and their potential functions-gravitational and electrostatic examples. Gradient of a scalar field. Flux, divergence of a vector. Gauss theorem, Irrotational versus rotational vector fields. Physical significance of circulation, curl of a vector field, Stokes' theorem, physical applications.

Electromagnetics: Basic laws of electromagnetism, Maxwell's equations and electromagnetic waves.

Black body radiation, Planck's radiation law, Compton effect, Nature of waves & particles, Wave-packets and uncertainty, Wave particle duality, Wave mechanics and its mathematical tools with applications.

Review shortcomings of Bohr model, Hydrogen atom problems, angular momentum quantization, space quantization, normal Zeeman effect, electron spin.

Theory of Relativity: Inertial frame of reference, nonlinear frames and fictitious forces, relativity of length, time, velocity, mass and energy.

Laser action and properties of laser radiation, common laser systems: Ruby laser, He-Ne laser, semiconductor laser, Basics and applications of holography.

Conduction in metals, Mobility and conductivity, Classical free electron theory of metals, Electrical conductivity, Thermal conductivity, Wiedmann Franz law, Lorentz number, Drawbacks of classical theory, *Statistical distributions* – classical and quantum statistics, Fermi distribution function, Effect of temperature on Fermi function, electron in a

periodic potential and origin of the energy gap, energy bands in solids, classification of solids into metals, semiconductors and insulators.

Engineering materials: conducting, dielectric, magnetic and semiconducting materials

Recommended reading:

1. **B. B. Laud, Electromagnetics, New Age International (P) Ltd.**
2. **Purcell E.M. Electricity and Magnetism - Berkeley Physics Course, Vol.2, Tata McGraw-Hill.**
3. **A. Beiser, Concepts of Modern Physics, 5th ed., McGraw-Hill**
4. **K.S. Krane, Modern Physics, 2nd ed., Wiley**
5. **J. Taylor, C. Zafiratos, M. A. Dubson, Modern Physics for Scientists and Engineers, 2/E , Prentice Hall**
6. **C. Kittel, Introduction to Solid State Physics, 7th ed., Wiley India Pvt. Ltd.**
7. **S. O. Pillai, Solid State Physics, 6th ed., New Age International Publishers Ltd**
8. **G. Aruldas and P. Rajagopal, Modern Physics, PHI.**

Laboratory work:

List of experiments

- CME21. To study the resistivity of semiconductor with temperature and determination of energy band gape of semiconductor using four-probe method.**
- CME22. Determination of Plank's constant using LED.**
- CME23. To verify the Bio-savart's law.**
- CME24. To study the energy band gap and determination of temperature coefficient of junction voltage and reverse saturation current of a P-N junction.**
- CME25. To study the Hall effect in semiconductors.**
- CME26. To determine the frequency of A. C. mains by means of a sonometer using non-magnetic / magnetic wire.**
- CME27. To determine wavelength of He-Ne laser using millimeter scale as a grating.**
- CME28. To determine the velocity of ultrasonic waves in a liquid say kerosene oil or carbon tetrachloride.**
- CME29. To determine the height of the building with the help of sextant.**

SIR PADAMPAT SINGHANIA UNIVERSITY, UDAIPUR

COURSE CONTENTS

First year (II Semester) **Batch: 2009-2013**

L T P C

2 0 0 2

Course Code: English & Professional Communication-II

Course Name: **HU 102**

***Objective:** The course is designed to train the students in the art of communication through language exercises of both general and technical varieties.*

Course Outline:

Perspectives on Academic and Non-Academic Writing • Letter Writing: Business Letters, Informal Letters and Letters to Editor. • Précis Writing • Report Writing- Technical, Non-technical and Lab report. Developing Interpersonal Skills Ability to read and manage the emotions, motivations and behaviors of one and others during social interactions. Developing the ability to master the art of presentation. • Group Discussions, Study Skills, Language Focus, Speaking. • Effective Presentations, Importance of Body Language in Presentation, Podium panic. • Listening Skills, Note Taking and Preparation of minutes. Resume Writing and Revision of Grammar • Resume Checklist, Types of Resumes, Cover Letter, Acceptance Letter, Rejection Letter, and Resignation Letter. • Revision of Tenses, Conditionals, Direct and Indirect Speech, Basic Sentence Patterns, Active and Passive Voice.

Recommended Reading:

1. Krishna Mohan and Meera Banerjee. Developing Communication Skills. Macmillan India Ltd.
2. Kahn, John, Ellison ed. How to Write and Speak Better. The Reader's Digest Association Ltd, London.
3. Radhakrishnan Pillai, etal. Written English for you. Emerald Publishers, Chennai.
4. Coffey M.P. Communication through Writing: Prentice Hall Publishers.
5. Meenakshi Raman, Sangeeta Sharma. Technical Communication, Oxford University Press, New Delhi.