

Teaching Plan Jan-April 2016

Name of the Faculty: Dr. V. K. Sharma

Name of the Course: B.Sc. (H) Electronics

Semester : II semester (CBCS)

Sec (if any) : NA

Title of the Paper : Semiconductor Devices

Month	Topics Covered	References
January	<p>Theory:- Semiconductor Basics: Introduction to Semiconductor Materials, Crystal Structure, Planes and Miller Indices, Energy Band in Solids, Concept of Effective Mass, Density of States, Carrier Concentration at Normal Equilibrium in Intrinsic Semiconductors, Derivation of Fermi Level for Intrinsic & Extrinsic Semiconductors, Donors, Acceptors, Dependence of Fermi Level on Temperature and Doping Concentration, Temperature Dependence of Carrier Concentrations.</p> <p>Practical: 1. Study of the I-V Characteristics of Diode – Ordinary and Zener Diode. 2. Study of the I-V Characteristics of the CE configuration of BJT and obtain r_i, r_o, β. 3. Study of the I-V Characteristics of the Common Base Configuration of BJT and obtain r_i, r_o, α.</p>	<ul style="list-style-type: none"> • S. M. Sze, Semiconductor Devices: Physics and Technology, 2nd Edition, Wiley India edition (2002). • Ben G Streetman and S. Banerjee, Solid State Electronic Devices, Pearson Education (2006) • Kanaan Kano, Semiconductor Devices, Pearson Education (2004)
February	<p>Theory:- Carrier Transport Phenomena: Carrier Drift, Mobility, Resistivity, Hall Effect, Diffusion Process, Einstein Relation, Current Density Equation, Carrier Injection, Generation And Recombination Processes, Continuity Equation.</p> <p>P-N Junction Diode: Formation of Depletion Layer, Space Charge at a Junction, Derivation of Electrostatic Potential Difference at Thermal Equilibrium, Depletion Width and Depletion Capacitance of an Abrupt Junction. Concept of Linearly Graded Junction, Derivation of Diode Equation and I-V Characteristics. Zener and Avalanche Junction Breakdown Mechanism. Tunnel diode, varactor diode, solar cell: circuit symbol, characteristics, applications.</p> <p>Practical: 4. Study of the I-V Characteristics of the Common Collector Configuration of BJT and obtain voltage gain, r_i, r_o.</p>	<ul style="list-style-type: none"> • S. M. Sze, Semiconductor Devices: Physics and Technology, 2nd Edition, Wiley India edition (2002). • Ben G Streetman and S. Banerjee, Solid State Electronic Devices, Pearson Education (2006) • Kanaan Kano, Semiconductor Devices, Pearson Education (2004)

<p>March</p>	<p>5. Study of the I-V Characteristics of the UJT. 6. Study of the I-V Characteristics of the SCR. <u>Test -I: 8th February,Monday (Tentative)</u></p> <p>Theory:- Bipolar Junction Transistors (BJT): PNP and NPN Transistors, Basic Transistor Action, Emitter Efficiency, Base Transport Factor, Current Gain, Energy Band Diagram of Transistor in Thermal Equilibrium, Quantitative Analysis of Static Characteristics (Minority Carrier Distribution and Terminal Currents), Base-Width Modulation, Modes of operation, Input and Output Characteristics of CB, CE and CC Configurations. Metal Semiconductor Junctions: Ohmic and Rectifying Contacts.</p> <p>Practical:- 7. Study of the I-V Characteristics of JFET. 8. Study of the I-V Characteristics of MOSFET. <u>Test : Second week of March</u></p> <p><u>Assignment: Last week of March</u></p>	<ul style="list-style-type: none"> ● S. M. Sze, Semiconductor Devices: Physics and Technology, 2ndEdition, Wiley India edition (2002). ● Ben G Streetman and S. Banerjee, Solid State Electronic Devices, Pearson Education (2006) ● Kanaan Kano, Semiconductor Devices, Pearson Education (2004)
<p>April</p>	<p>Theory:- Field Effect Transistors: JFET, Construction, Idea of Channel Formation, Pinch-Off and Saturation Voltage, Current-Voltage Output Characteristics. MOSFET, types of MOSFETs, Circuit symbols, Working and Characteristic curves of Depletion type MOSFET (both N channel and P Channel) and Enhancement type MOSFET (both N channel and P channel). Complimentary MOS (CMOS). Power Devices: UJT, Basic construction and working, Equivalent circuit, intrinsic Standoff Ratio, Characteristics and relaxation oscillator-expression. SCR, Construction, Working and Characteristics, Triac, Diac, IGBT, MESFET, Circuit symbols, Basic constructional features, Operation and Applications</p> <p>Practical:- 9. Study of Characteristics of Solar Cell 10. Study of Hall Effect.</p> <p>NOTE:Remaining topics, if any & revision.</p>	<ul style="list-style-type: none"> ● S. M. Sze, Semiconductor Devices: Physics and Technology, 2ndEdition, Wiley India edition (2002). ● Ben G Streetman and S. Banerjee, Solid State Electronic Devices, Pearson Education (2006) ● Kanaan Kano, Semiconductor Devices, Pearson Education (2004)

Teaching Plan Jan-April 2016

Name of the Faculty: Mr. Anil Sethi

Name of the Course: GE-II

Semester : II semester **Sec (if any)** : NA

Title of the Paper : Generic Elective- Electronic circuits and PCB design

Month	Topics Covered	References
January	Theory:- Network theorems (DC analysis only): Review of Ohms law, Kirchoff's laws, voltage divider and current divider theorems, open and short circuits. Thevenin's theorem, Norton's theorem and interconversion, superposition theorem, maximum power transfer theorem.	<ul style="list-style-type: none">• Electric circuits, Joseph Edminister, Schaum series.
February	Theory:- Semiconductor Diode and its applications: PN junction diode and characteristics, ideal diode and diode approximations. Block diagram of a Regulated Power Supply, Rectifiers: HWR, FWR- center tapped and bridge FWRs. Circuit diagrams, working and waveforms, ripple factor & efficiency(no derivations).Filters: circuit diagram and explanation of shunt capacitor filter with waveforms. Zener diode regulator: circuit diagram and explanation for load and line regulation, disadvantages of Zener diode regulator. TENTATIVE TEST DATE- 11 FEB 2016	<ul style="list-style-type: none">• Electronic Devices and circuit theory, Robert Boylestad and Louis Nashelsky, 9th Edition, 2013, PHI• Basic Electronics and Linear circuits, N.N. Bhargava, D.C. Kulshresta and D.C Gupta -TMH.• Electronic devices, David A Bell, Reston Publishing Company/DB Tarapurwala Publ.
March	Theory:- BJT and Small Signal amplifier: Bipolar Junction Transistor: Construction, principle & working of NPN transistor, terminology. Configuration: CE, CB, CC.	<ul style="list-style-type: none">• Electronic Devices and circuit theory, Robert Boylestad and Louis

<p>April</p>	<p>Definition of α, β and γ and their interrelations, leakage currents. Study of CE Characteristics, Hybrid parameters. Transistor biasing: need for biasing, DC load line, operating point, thermal runaway, stability and stability factor.</p> <p>Voltage divider bias: circuit diagrams and their working, Q point expressions for voltage divider biasing.</p> <p>Small signal CE amplifier: circuit, working, frequency response, re model for CE configuration, derivation for A_v, Z_{in} and Z_{out}.</p> <p>Theory:-</p> <p>Types of PCB: Single sided board, double sided, Multilayer boards, Plated through holes technology, Benefits of Surface Mount Technology (SMT), Limitation of SMT, Surface mount components: Resistors, Capacitor, Inductor, Diode and IC's.</p> <p>Layout and Artwork: Layout Planning: General rules of Layout, Resistance, Capacitance and Inductance, Conductor Spacing, Supply and Ground Conductors, Component Placing and mounting, Cooling requirement and package density, Layout check.</p> <p>Basic artwork approaches, Artwork taping guidelines, General artwork rules: Artwork check and Inspection.</p> <p>Laminates and Photoprinting: Properties of laminates, Types of Laminates, Manual cleaning process, Basic printing process for double sided PCB's, Photo resists, wet film resists, Coating process for wet film resists, Exposure and further process for wet film resists, Dry film resists</p> <p>Etching and Soldering: Introduction, Etching machine, Etchant system. Principles of Solder connection, Solder joints, Solder alloys, Soldering fluxes. Soldering, Desoldering tools and Techniques.</p>	<p>Nashelsky, 9th Edition, 2013, PHI</p> <ul style="list-style-type: none"> • Basic Electronics and Linear circuits, N.N. Bhargava, D.C. Kulshresta and D.C Gupta -TMH. • Electronic devices, David A Bell, Reston Publishing Company/DB Tarapurwala Publ. • Walter C.Bosshart "PCB DESIGN AND TECHNOLOGY" Tata McGraw Hill Publications, Delhi. 1983 • Clyde F.Coombs "Printed circuits Handbook" III Edition, McGraw Hill.
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	NOTE: Remaining topics, if any & revision.	
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Teaching Plan

Name of the Faculty : Dr. Neetu Singh

Name of the Course : B.Tech. (Electronics)

Semester : VI Sec (if any) : N.A.

Title of the Paper : Engineering Mathematics -II

Month	Topics Covered	References
January	Ordinary Differential Equations: First Order Ordinary Differential Equations, Basic Concepts. Linear Differential Equations of Second Order :Homogeneous Linear Ordinary Differential Equations of second order, :Homogeneous Linear Ordinary Differential Equations with constant coefficients.	Kreyszig, Advanced Engineering Mathematics.
February	Modelling: Free Oscillations, Euler-cauchy Equations, Existence and Uniqueness of solutions, Non-Homogeneous ODEs, Modeling: Forced Oscillations. Higher order homogeneous differential equations. Assignment:15 Feb, Monday	Kreyszig, Advanced Engineering Mathematics.
March	Modelling Separable Ordinary Differential Equations, Modelling, Exact Ordinary Differential Equations. Test:1 Mar, Tuesday	Kreyszig, Advanced Engineering Mathematics.
April	Linear Ordinary Differential Equations. NOTE: Remaining topics, if any &revision.	Kreyszig, Advanced Engineering Mathematics.

Teaching Plan

Name of the Faculty : Dr. Neetu Singh

Name of the Course : B.Tech. (Electronics)

Semester : VI Sec (if any) : N.A.

Title of the Paper : Engineering Mathematics -II

Month	Topics Covered	References
January	Ordinary Differential Equations: First Order Ordinary Differential Equations, Basic Concepts. Linear Differential Equations of Second Order :Homogeneous Linear Ordinary Differential Equations of second order, :Homogeneous Linear Ordinary Differential Equations with constant coefficients.	Kreyszig, Advanced Engineering Mathematics.
February	Modelling: Free Oscillations, Euler-cauchy Equations, Existence and Uniqueness of solutions, Non-Homogeneous ODEs, Modeling: Forced Oscillations. Higher order homogeneous differential equations. Assignment:15 Feb, Monday	Kreyszig, Advanced Engineering Mathematics.
March	Modelling Separable Ordinary Differential Equations, Modelling, Exact Ordinary Differential Equations. Test:1 Mar, Tuesday	Kreyszig, Advanced Engineering Mathematics.
April	Linear Ordinary Differential Equations. NOTE: Remaining topics, if any &revision.	Kreyszig, Advanced Engineering Mathematics.

Teaching Plan January-April 2016

Name of the Faculty : Prashant Kumar

Name of the Course : B.Sc(H)Electronics (C.B.C.S)

Semester : II Semester

Sec (if any) :

Title of the Paper : Applied Physics

Month	Topics Covered	References
January	<p>Theory:-</p> <p>Quantum Physics-Inadequacies of Classical physics Compton's effect, Photo-electric Effect, Wave-particle duality, de Broglie waves. Basic postulates and formalism of quantum mechanics: probabilistic interpretation of waves, conditions for physical acceptability of wave functions Schrodinger wave equation for a free particle and in a force field (1 dimension), Boundary and continuity conditions. Operators in Quantum Mechanics, Conservation of probability, Time-dependent form, Time independent one dimensional Schrodinger wave equation, Potential barrier problems, phenomenon of tunnelling.</p> <p>Practical:- Any 2 out of 7 practical given in syllabus.</p>	<ul style="list-style-type: none"> • Beiser, Concepts of Modern Physics , McGraw-Hill Book Company (1987) • Ghatak & S. Lokanathan, Quantum Mechanics: Theory and Applications, Macmillan India (2004)
February	<p>Theory:-</p> <p>Quantum Physics-</p> <p>Kronig Penney Model and development of band structure. Spherically symmetric potentials, the Hydrogen-like atom problem.</p> <p>Mechanical Properties of Materials- Elastic and Plastic Deformations, Hooke's Law, Elastic Moduli, Brittle and Ductile Materials, Tensile Strength, Theoretical and Critical Shear Stress of Crystals.</p> <p>Practical:- Any 2 out of 7 practical given in syllabus</p>	<ul style="list-style-type: none"> • Beiser, Concepts of Modern Physics , McGraw-Hill Book Company (1987) • Ghatak & S. Lokanathan, Quantum Mechanics: Theory and Applications, Macmillan India (2004) • S. Vijaya and G. Rangarajan, Material Science, Tata Mcgraw Hill (2003) • W. E. Callister, Material Science and Engineering: An Introduction, Wiley India (2006)

<p>March</p>	<p><u>Test:- (Ist) 2nd Week of February</u></p> <p>Theory:- Mechanical Properties of Materials- Strengthening Mechanisms, Hardness, Creep, Fatigue, Fracture. Thermal Properties- Brief Introduction to Laws of Thermodynamics, Concept of Entropy, Concept of Phonons, Heat Capacity, Debye's Law, Lattice Specific Heat, Electronic Specific Heat, Specific Heat Capacity for Si and GaAs, Thermal Conductivity, Thermoelectricity, Seebeck Effect, Thomson Effect, Peltier Effect. Practical:- Any 2 out of 7 practical given in syllabus</p> <p>Assignment:- Mid Semester Break(March)</p>	<ul style="list-style-type: none"> • S. Vijaya and G. Rangarajan, Material Science, Tata Mcgraw Hill (2003) • W. E. Callister, Material Science and Engineering: An Introduction, Wiley India (2006)
<p>April</p>	<p>Theory:- Electric and Magnetic Properties: Conductivity of metals, Ohm's Law, relaxation time, collision time and mean free path, electron scattering and resistivity of metals, heat developed in current carrying conductor, Superconductivity. Classification of Magnetic Materials, Origin of Magnetic moment, Origin of dia, para, ferro and antiferro magnetism and their comparison, Ferrimagnetic materials, Saturation Magnetisation and Curie temperature, Magnetic domains, Concepts of Giant Magnetic Resistance (GMR), Magnetic recording. Practical:- Remaining Practical , if any & revision <u>Test:- (2nd) -2nd Week of April</u></p>	<ul style="list-style-type: none"> • S. Vijaya and G. Rangarajan, Material Science, Tata Mcgraw Hill (2003) • W. E. Callister, Material Science and Engineering: An Introduction, Wiley India (2006)

Teaching Plan

Name of the Faculty: Dr. (Ms). Shalu Chandra

Name of the Course and Subject: B.Sc (H) Electronics (Environmental Science)

Semester: II

Sec (if any):

Title of the paper: Ability enhancement credit course (AECC Jan- May 2016)

Month	Topics Covered	References
January	<p>Unit 6 : Environmental Policies & Practices</p> <ul style="list-style-type: none"> • Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture • Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. • Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context. <p>(7 lectures)</p> <p>1 lecture per week field trip/presentation</p>	<p>Bharucha, E. 2003, Textbook for Environmental Studies, University Grants Commission, New Delhi and Bharati Vidyapeeth Institute of Environmental Education and Research, Pune. 361.</p> <p>Odum, E.P., Odum, H.T. & Andrews, J. 1971. Fundamentals of Ecology. Philadelphia: Saunders.</p> <p>Singh, J.S., Singh, S.P. and Gupta, S.R. 2006. Ecology, Environment and Resource Ecology, Environment and Resource Conservation. Anamaya Publishers.</p>
February	<p>Unit 5 : Environmental Pollution</p> <ul style="list-style-type: none"> • Environmental pollution : types, causes, effects and controls; Air, water, soil and noise pollution • Nuclear hazards and human health risks • Solid waste management: Control measures of urban and industrial waste. • Pollution case studies. (8 lectures) <p>1 lecture per week field trip/presentation</p>	-do-
March	<p>Unit 7 : Human Communities and the Environment</p> <ul style="list-style-type: none"> • Human population growth: Impacts on environment, human health and welfare. • Resettlement and rehabilitation of project affected persons; case studies. • Disaster management: floods, earthquake, cyclones and landslides. (6 lectures) <p>1 lecture per week field trip/presentation</p>	-do-
April	<p>Unit 7 : Human Communities and the Environment</p> <ul style="list-style-type: none"> • Environmental movements: Chipko, Silent valley, Bishnois of Rajasthan. • Environmental ethics: Role of Indian and other religions and 	-do-

	<p>cultures in environmental conservation. • Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi). (6 lectures) 1 lecture per week field trip/presentation</p> <p>The tentative date of assignment/test/project</p> <p>Assignment: 15 March 2016 Submission: March 2016</p> <p>Test/Presentation: 25 February 2016</p>	
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Note: The tentative date of assignment/test/project may also be provided.

The schedule of Field trip may also be provided.

Teaching Plan

Name of the Faculty: Ms. Geetanjali Sageena

Name of the Course: B.Sc. (H) Electronics

Semester: II

Sec (if any): -

Title of the paper: Ability enhancement credit course (AECC Jan- May 2016)

Month	Topics Covered	References
January	<p>Unit 1 : Introduction to environmental studies Multidisciplinary nature of environmental studies;• Scope and importance; Need for public awareness. (2 lectures) 1 lecture per week field trip/presentation</p>	<p>Bharucha, E. 2003, Textbook for Environmental Studies, University Grants Commission, New Delhi and Bharati Vidyapeeth Institute of Environmental Education and Research, Pune. 361.</p> <p>Odum, E.P., Odum, H.T. & Andrews, J. 1971. Fundamentals of Ecology. Philadelphia:</p>

		<p>Saunders.</p> <p>Singh, J.S., Singh, S.P. and Gupta, S.R. 2006. Ecology, Environment and Resource Ecology, Environment and Resource Conservation. Anamaya Publishers.</p>
February	<p>Unit 2 : Ecosystems What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem:• food chains, food webs and ecological succession. Case studies of the following ecosystems : a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)</p> <p>(6 lectures) 1 lecture per week field trip/ presentation</p>	-do-
March	<p>Unit 3 : Natural Resources : Renewable and Non-renewable Resources Land resources and land use change; Land degradation, soil erosion and desertification.• Deforestation: Causes and impacts due to mining, dam building on environment, forests,• biodiversity and tribal populations. Water : Use and over-exploitation of surface and ground water, floods, droughts, conflicts• over water (international & inter-state). Energy resources : Renewable and non renewable energy sources, use of alternate energy• sources, growing energy needs, case studies. (8 lectures) 1 lecture per week field trip/ presentation</p>	-do-
April	<p>Unit 4 : Biodiversity and Conservation Levels of biological diversity : genetic, species and ecosystem diversity; Biogeographic zones• of India; Biodiversity patterns and global biodiversity hot spots India as a mega-biodiversity nation; Endangered and endemic species of India• Threats to biodiversity: Habitat loss,</p>	-do-

	poaching of wildlife, man-wildlife conflicts, biological• invasions; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and• Informational value. (8 lectures) 1 lecture per week field trip/ presentation	
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The tentative date of assignment/test/project

Assignment: 15 March 2016

Test/ Presentation: 25 February 2016