B.E - AERONAUTICAL ENGINEERING

SEMESTER – II

Code No.	Course Title	L	T	P	C
THEORY					
U14EN*T*201	Functional English II	2	0	2	3
U14MA*T*201	Engineering Mathematics – II	3	1	0	4
U14PH*T*202	Materials Science	3	0	0	3
U14CH*T*202	Applied Chemistry	3	0	0	3
U14ME*T*201	Engineering Mechanics	3	1	0	4
U14AE*T*201	Elements of Aeronautics	3	1	0	4
PRACTICAL					
U14CH*P*201	Chemistry Laboratory	0	0	3	1
U14CS*P*211	Computing Laboratory	0	0	3	1
U14AE*P*201	CAD Laboratory - I	0	0	3	1
U14GH*P*201	Human Excellence – Family Values	1	0	1	1

TOTAL – 33 HOURS **TOTAL CREDIT – 25**

U14EN*T*201/ FUNCTIONAL ENGLISH - II	L	T	P	C
(Common to all branches of Engineering and Technology)	**2**	**0**	**2**	**3**

OBJECTIVES

- To develop reading accuracy and English fluency
- To Employ appropriate formats in writing and effective
- To compare and relate words/sounds and listen for specific information.
- To maximize the elements of spoken ability

INTERPRETATIONAL DEXTERITY **15 Hours**

Homophones and homonyms - Encoding and decoding advertisements - Transcoding Graphical Representations – Line graph, Bar Chart, Flow Chart, Pie Chart, Table, Tree diagram - Reading brochures, leaflets, instruction manual - Cloze test - Reading Comprehension- Note Making – Linear and non-linear - Book review, Article review

STYLES OF SCRIPTING **15 Hours**

Types of sentences- Concord- Framing Questions – "Wh" questions, Yes/No questions and Question Tags- Modifiers – Dangling, Misplaced, Squinting- Phrasal Expressions- Editing a passage – Punctuation, Spelling, Common errors- Paragraph Writing – Narrative, Descriptive, Argumentative, Comparative / Contrastive.- Letter Writing – requesting information, explaining a situation, letter of acceptance, declining letter, letter of application and resume- Essay Writing

AUDITORY PROFICIENCY **15 Hours**

Listening to monologues, Listening for general content - Listening to dialogues - Listening to a telephonic conversation- Listening for specific information, numbers, time, duration - Listening to conversations between three or more people- Listening to a group discussion and providing factual information, Intensive listening

ORATORICAL EFFICIENCY **15 Hours**

Discussing studies/interests/friends/families-Describe an object or event - Describing a working mechanism - Justify an opinion / Negotiating views - Argumentative speech about a public issue - Responding to situations and providing solutions - Picture Perception

TOTAL: 60 HOURS

REFERENCES

1. Mark Ibbotson, Cambridge English for Engineering Published by Cambridge University Press, 2008.
2. Barbara H. Foley, Elizabeth R. Neblett, English in Action, Adult & Academic ESL, 2003
3. Jeremy Comfort, Pamela Rogerson, Trish Stott and Derek Utley, Speaking Effectively, Cambridge University Press.1994
4. Henry I Christ, English for the College Boards, Amsco. 1987
5. Dorothy Adams, Everyday English: A Course on Communicative English, Cengage learning, 2009

COURSE OUTCOMES

- Distinguish the application of technical diction for the data interpretation while reading
- Construct technical sentences and compose corporate letters
- Improve listening for inferring technical information
- Develop spoken communication needed for presentations and discussions

U14MA*T*201/ ENGINEERING MATHEMATICS - II	L	T	P	C
(Common to all branches of Engineering and Technology)	**3**	**1**	**0**	**4**

OBJECTIVES

On completion of the course, the students are expected

- To understand double and triple integrations and enable them to find area and volume using multiple integrals.
- To know the basics of vector calculus comprising gradient, divergence and curl and line, surface and volume integrals.
- To understand analytic functions of complex variables and conformal mappings.
- To know the basics of residues, complex integration and contour integration.
- To understand Laplace transform and use it to represent system dynamic models and evaluate their time responses.

MULTIPLE INTEGRALS **9 Hours**

Double integration – Cartesian and polar coordinates – Change of order of integration – Change of variables between cartesian and polar coordinates - Triple integration in cartesian coordinates – Application : Area as double integral – Volume as triple integral .

VECTOR CALCULUS **9 Hours**

Gradient, divergence and curl – Directional derivative – Irrotational and solenoidal vectorfields - Green's theorem in a plane, Gauss divergence theorem and Stoke's theorem (excluding proofs) – Simple applications involving cubes and rectangular parallelopipeds.

ANALYTIC FUNCTION **9 Hours**

Functions of a complex variable – Analytic functions – Necessary conditions, Cauchy-Riemann equations in Cartesian coordinates and sufficient conditions (excluding proofs)– Properties of analytic function – Construction of analytic function by Milne Thomson method – Conformal mapping : $w = z + c$, cz , $1/z$ and bilinear transformation.

COMPLEX INTEGRATION **9 Hours**

Statement and applications of Cauchy's integral theorem and Cauchy's integral formula (excluding proofs) – Taylor's and Laurent's series expansions – Singularities – Residues – Cauchy's residue theorem (excluding proof) – Application of residue theorem to evaluate real integrals - Unit circle and semi-circular contours (excluding poles on real axis).

LAPLACE TRANSFORM **9 Hours**

Definition - Properties – Superposition - Shift in t - Shift in s - Time Derivatives - Time Integral – Initial and Final Value Theorems – Periodic functions: sine wave, saw-tooth, square and triangular waves - Inverse Laplace Transform – Simple system dynamic models – Transfer Functions – Poles and Zeroes - Response of First-Order Systems - Solution of RC Free, Step and Sinusoidal Responses; Response of Second-Order Systems - Free Response, step Response - Convolution theorem

L: 45 Hr, T: 15 Hr, TOTAL: 60 HOURS

REFERENCES

1. Kreyzig E., Advanced Engineering Mathematics, John Wiley & Sons (Asia), Pvt, Ltd., Singapore, 10th Edition, 2010.
2. Veerarajan T., Engineering Mathematics (for First Year), Tata McGraw Hill, Pub. Co. Ltd., New Delhi, Revised Edition, 2007.
3. Venkataraman M.K., Engineering Mathematics, Volume - II, The National Pub. Co., Chennai, 2003.
4. Kandasamy P., Thilagavathy K. and Gunavathy K., Engineering Mathematics, S. Chand & Co., New Delhi, 2008.
5. Arunachalam T. and Sumathi K., Engineering Mathematics II, Sri Vignesh Publications, Coimbatore, Third Edition, 2011.
6. Grewal B.S., Higher Engineering Mathematics, Khanna Publishers, Delhi, 42nd Edition, 2012.
7. Philip D. Cha, James J. Rosenberg, Clive L. Dym, Fundamentals of Modelling and Analyzing Engineering Systems, Cambridge University Press, United Kingdom, 2000.

COURSE OUTCOMES

- Evaluate double integral and triple integral to compute area, volume for two dimensional and three dimensional solid structure.
- know the gradient, divergence and curl, related theorems useful for engineering applications.
- Test the analyticity and to construct the analytic function and transform complex functions from one plane to another plane graphically
- Evaluate real and complex integrals over suitable closed paths or contours
- know the Applications of Laplace transform and its properties &to solve certain linear differential equations using Laplace transform technique

U14PH*T*202/ MATERIALS SCIENCE	L	T	P	C
(Common to Mechanical, Mechatronics, Aeronautical and Automobile Engineering)	3	0	0	3

OBJECTIVES

At the end of the course students would be exposed to

- Types of defects in engineering materials and mechanisms of strengthening
- Properties of conducting, super conducting, magnetic and dielectric materials.
- Properties of Semi conducting, optical and new engineering materials.

CONDUCTING AND SUPERCONDUCTING MATERIALS 9 Hours

Conducting Materials : Classical free electron theory of metals-Electrical conductivity – Thermal conductivity - expression – Wiedemann Franz law(derivation) – Lorentz number – drawbacks of classical theory – Fermi distribution function – density of energy states – effect of temperature on Fermi energy.

Superconducting Materials : Superconducting phenomena – properties of superconductors – Meissner effect, Isotope effect, Type I &Type II superconductors – High Tc superconductors - Applications – cryotron, magnetic levitation and squids.

SEMICONDUCTING MATERIALS 9 Hours

Origin of band gap in solids (Qualitative treatment only) - Concept of effective mass of an electron and hole – carrier concentration in an intrinsic semi conductor (derivation) – Fermi level – variation of Fermi level with temperature - Electrical conductivity – band gap semiconductor – carrier concentration in n-type and p-type semi conductors (derivation) – Variation of Fermi level with temperature and impurity concentration – Hall effect – Determination of Hall coefficient – experimental set up – Applications.

MAGNETIC & DIELECTRIC MATERIALS 9 Hours

Magnetic Materials : Properties of dia, para, ferro, anti ferro and ferri magnetic materials - Langevin's theory of paramagnetism – Weiss theory of Ferromagnetism – Domain theory of ferromagnetism - hysteresis – soft and hard magnetic materials – Ferrites – Applications - magnetic recording and readout - Storage of magnetic data, Tapes, floppy, magnetic disc drives – Bubble memory.

Dielectric Materials : Electronic, ionic, orientation and space charge polarization - Frequency and temperature dependence of polarization – Dielectric loss – Dielectric breakdown – different types of break down mechanism - Ferro electric materials - properties and applications.

NANOTECHNOLOGY AND NEW ENGINEERING MATERIALS 9 Hours

New Engineering Materials : Metallic glasses – preparation, properties and applications – shape memory alloys (SMA) – characteristics, properties of NiTi alloy applications advantages and disadvantages of SMA.

Nano Materials : synthesis - plasma arcing – Chemical vapour deposition – sol-gel - Electro deposition – ball milling – properties of nanoparicles and applications. – Carbon nano tubes – fabrication - arc method – pulsed laser deposition - Chemical vapour deposition - structure, properties & applications.

STRENGTHENING OF MATERIALS **9 Hours**

Strengthening mechanisms for the improvement of mechanical properties - cold working precipitation hardening, solute hardening and diffusion hardening - Fracture-Mechanism of brittle fracture (Griffith's theory) and Ductile fracture - difference between brittle and ductile fracture - fatigue failure and its prevention - creep different stages in creep curve-Factors affecting mechanical properties Grain size and heat treatment - Mechanical test Tensile, compression, hardness, impact creep, fatigue and stress.

TOTAL: 45 HOURS

REFERENCE BOOKS

1. Pillai S.O., Solid State Physics, 5th edition, New Age International Publication, New Delhi, 2003.
2. Avadhanalu M.N. and Kshirsagar P.G., A textbook of Engineering Physics, S. Chand & Company Ltd, New Delhi, 2005
3. Gopal S., Materials Science, Inder Publications, Coimbatore, 2007
4. Rajendran V. and Marikani A., Materials science, 5th edition, Tata Mc-Graw-Hill publishing company Ltd, 2004
5. Arumugam M., Physics-II, Materials science for mechanical engineering, Anuradha agencies - publishers, Kumbakonam, 2005

COURSE OUTCOMES

- Apply core concepts in Materials Science to solve engineering problems
- Determine the position of the acceptor or donor levels and the brand gap of an extrinsic semiconductor
- Classify & differentiate the structure and physical properties of conducting materials
- Apply the techniques to manufacturing of modern materials and nano materials for engineering applications
- Recognize the basic concepts of strengthening of materials in technological applications

U14CH*T*202/ APPLIED CHEMISTRY	L	T	P	C
(Common to Mechanical, Mechatronics, Aeronautical and Automobile Engineering)	3	0	0	3

OBJECTIVES

- To inculcate essential knowledge on theoretical and modern technological aspects of fuels and combustion, specialty materials, water technology, corrosion studies and powder metallurgy.

FUELS AND COMBUSTION **9 Hours**

Classification of fuels - coal varieties - analysis of coal (proximate and ultimate analysis) - coke manufacture (Otto-Hoffman byproduct coke oven method) - characteristics of metallurgical coke - cracking (thermal and catalytic cracking definition only) – manufacturing of synthetic petrol (Fischer Tropsch method, Bergius process) – knocking (octane number, cetane number) - gaseous fuels (production, composition and uses of producer gas, water gas and natural gas).

Combustion : gross and net calorific value - determination of calorific value by bomb calorimeter - explosive range - spontaneous ignition temperature - flue gas analysis (Orsat apparatus).

MECHANICAL ENGINEERING MATERIALS **9 Hours**

Abrasives: Moh's scale of hardness - natural abrasives (diamond, corundum, emery, garnets and quartz) - artificial abrasives (silicon carbide, boron carbide).

Refractories: Characteristics - classification (acid, basic and natural refractories) - properties (refractoriness, refractoriness under load, dimensional stability, porosity, thermal spalling) - General manufacturing methods of refractories - preparation, properties and uses of high alumina bricks, magnesite and zirconia bricks.

Lubricants: Classification - Functions - properties (viscosity index, flash and fire point, oiliness, carbon residue, aniline point, cloud and pour point) - greases (calcium based, sodium based, lithium based) - solid lubricants (graphite, molybdenum disulphide).

CORROSION SCIENCE **9 Hours**

Corrosion - Principles of electrochemical corrosion - difference between chemical and electrochemical corrosion - factors influencing corrosion.

Types of corrosion: galvanic corrosion - differential aeration corrosion (soil (microbial) corrosion, pitting corrosion, water line corrosion) - stress corrosion.

Corrosion control: cathodic protection (sacrificial anode) - Protective Coatings (Paint, Electroplating of Copper).

WATER TECHNOLOGY **9 Hours**

Boiler feed water: requirements - disadvantages of hard water (formation of deposits in steam boilers, priming, foaming, caustic embrittlement & boiler corrosion).

Prevention of scale formation: external treatment (ion exchange method) - internal treatment (phosphate, calgon, carbonate, colloidal) - desalination by reverse osmosis - Treatment of Domestic water

PHASE RULE AND POWDER METALLURGY **9 Hours**

Phase rule - condensed phase rule - construction of phase diagram (thermal analysis) – Applications of phase rule: Simple eutectic system (Ag - Pb, Fe - C system).

POWDER METALLURGY : Preparation of metal powders (mechanical pulverization, atomization, chemical reduction, electrolytic process, decomposition) - mixing and blending - compacting - sintering - advantages and limitations of powder metallurgy.

TOTAL: 45 HOURS

REFERENCES

1. Samir Sarkar, Fuels and Combustion, Orient Longman, India.
2. Syed Shabudeen P.S., Engineering Chemistry II, Inder publications, Coimbatore.
3. Derek Pletcher and Frank C Walsh, Industrial Electrochemistry, Blackie Academic and Professional, London.
1. Dara S.S., A Text book of Engineering Chemistry, S. Chand Co. (P) Ltd., New Delhi
2. Jain P.C. and Monika Jain, Engineering Chemistry, Dhanpat Rai Pub. Co. (P) Ltd., New Delhi.

COURSE OUTCOMES

- Classify the different types of fuels and their properties
- Categorize the engineering materials and their uses
- Defend the Corrosion problems
- Design a water purifier
- Identify the techniques of preparing metal powder

U14ME*T*201/ ENGINEERING MECHANICS	L	T	P	C
(Common to CE, AUE, AE, ME, MCE & TXT)	3	1	0	4

OBJECTIVES

- To understand the concept of equilibrium of particles and rigid bodies.
- To understand the concept of first and second moment of area.
- To understand the concept of various types of frictions.
- To understand the principle of work energy method, Newton's law and impact of elastic bodies.

BASICS & STATICS OF PARTICLES **9 Hours**

Introduction - Units and Dimensions - Laws of Mechanics Lame's theorem, Parallelogram and triangular Laws of forces – Coplanar Forces - Resolution and Composition of forces – Free body diagram - Equilibrium of a particle.

EQUILIBRIUM OF RIGID BODIES **9 Hours**

Moment of a force about point – Varignon s theorem- Moment of a couple-Resolution of force in to force couple system-Resultant of coplanar non concurrent system - Types of supports and their reactions- Requirements of stable equilibrium - Equilibrium of Rigid bodies in two dimensions.

PROPERTIES OF SURFACES AND SOLIDS **9 Hours**

First moment of area and the Centroid of sections Rectangle, circle, triangle, T section, I section Angle section and Hollow section. Second and product moments of plane area Rectangle, triangle, circle. T Section, I section, Angle section and Hollow section, Parallel axis theorem and perpendicular axis theorem - Polar moment of inertia.

FRICTION **9 Hours**

Frictional force-Law of coloumb friction , simple contact friction, Rolling resistance and Belt friction, Ladder friction, Wedge friction.

DYNAMICS OF PARTICLES **9 Hours**

Kinematics: Rectilinear & Curvilinear motion of particles, Displacements Velocity and acceleration.

Kinetics: Newton's law, Work Energy method, Impulse and Momentum, Impact of elastic bodies.

L: 45 Hr, T: 15 Hr, TOTAL: 60 HOURS

REFERENCES

1. Sukumar T.R. and Sridhar S., Engineering Mechanics, Inder Publications, Coimbatore, 2013.
2. Hibbeller, R.C., Engineering Mechanics, Vol. I Statics and Vol. II Dynamics, Pearson Education, Asia Pvt. Ltd., 2000.
3. Ashok Gupta, Interactive Engineering Mechanics Statics A Virtual Tutor, Pearson Education, Asia Pvt. Ltd., New Delhi, 2002.

4. Palanichamy M.S., and Nagan S., Engineering Mechanics (Statics & Dynamics) Tata McGraw Hill, 2001.
5. Irving H. Shames, Engineering Mechanics – Statics and Dynamics, IV Edition, Pearson Education, Asia Pvt. Ltd., 2003.
6. Beer F.P. and Johnson Jr. E.R., Vector Mechanics for Engineers, Vol. I Statics and Vol. II Dynamics, McGraw-Hill International Edition, 2004.
7. Rajasekaran S. and Sankarasubramanian G., Fundamentals of Engineering Mechanics, Vikas Publishing House Pvt. Ltd., Second Edition, 2002.

COURSE OUTCOMES

- Explain the concept of equilibrium of particles and rigid bodies.
- Apply the concepts of equilibrium and moment of inertia for various shapes sections.
- Make use of various concepts of friction.
- Solve problems using the concepts in kinematics and kinetics.

U14AET201/ ELEMENTS OF AERONAUTICS	L	T	P	C
(For Aeronautical Engineering)	3	0	1	4

OBJECTIVES

- To promote an understanding of the aeronautical field and a higher level of motivation among students by providing an overall perspective before they begin their more specialized courses. A broad base is developed into which subsequent courses can be integrated in depth.

INTRODUCTION TO AIRPLANES **9 Hours**

Introduction, historical background, Different types of flight vehicles, Components of an airplane and their functions. Conventional control, Basic instruments for flying, (Physical properties and structure of the atmosphere, Temperature, Pressure and altitude relationships), Evolution of lift, Drag and moment. Aerofoils, Familiarization of aero modeling. An introduction to Avionics: Flight deck and cockpit.

AIRPLANE STRUCTURES AND MATERIALS **9 Hours**

Introduction to structural design of Aircraft and spacecraft, flight loads, general types of construction, Monocoque, Semi-monocoque and composite structure construction, Typical wing and fuselage structure, Metallic and Non metallic materials, Use of aluminium alloy, titanium, stainless steel and composite materials in aerospace.

AIRCRAFT ENGINES **9 Hours**

Selection of power plants: piston, turbo-propeller, turbofan, and jet engines with after burner / thrust augmentation. Use of propeller and jets for thrust production, Comparative merits. Theory of Propellers, Horizontal and vertical takeoffs and landings.

SPACE SYSTEM DESIGN **9 Hours**

Overview on space environment, introduction to space debris, Launch site selection, Brief introduction to rockets, ramjet, and SCRAMJET, Thrust vector control mechanisms, staging of rockets, space mission, re-entry vehicles, life support systems for manned space missions, Fuel cells, Introduction to space mechanics: Kepler's laws of planetary motion, introduction to satellites, Interplanetary missions, Space exploration.

ROTORCRAFT, UAVs, AND AIRCRAFT SYSTEMS **9 Hours**

Introduction to Helicopters and Micro lights.Introduction to UAVs and MAVs. Types and applications, Maintenance, safety and operations. Basic principles and lay out of various aircraft systems: Hydraulic system, Aircraft Fuel system, Engine fuel system, Air conditioning and Pressurisation system Flight control system, Navigation and Weapon control system, Under carriage and Brake system, High lift devices.

L: 45 Hr, P: 15 Hr, TOTAL: 60 HOURS

REFERENCES

1 Dava Newman, Interactive Aerospace Engineering and Design, McGraw-Hill.

2 John Cutler & Jeremy Liber, Understanding Aircraft Structures, 4th edition, Sheridan House Inc.

3 Austin R., Unmanned Aircraft Systems, AIAA Education Series, 2010.
4 FAA-H-8083-25A, Pilot's Handbook of Aeronautical Knowledge, FAA, DOT, USA.
5 Anderson J.D., Introduction to Flight, McGraw-Hill 7th edition, 2013.
6 George P. Sutton and Oscar Biblarz, Rocket Propulsion Elements, 7th edition, John Wiley & Sons, Inc., New York, 2001.
7 Jack D.Mattingly, "Elements of *Propulsion*: *Gas Turbines* and Rockets", 2nd Edition.

COURSE OUTCOMES

- To provide students with an introduction to the aerospace field.
- To teach students about the fundamentals of vehicle flight in the atmosphere
- To teach students about the fundamentals of vehicle flight in space
- To provide students with an understanding of performance
- To provide students with engineering background suitable for subsequent course work in aerospace engineering.

U14CS*P*211/ COMPUTING LABORATORY	L	T	P	C
Common to AE,BIO,CE,EIE,FT,ME,MCE,TXT	**0**	**0**	**3**	**1**

OBJECTIVES

- To analyze webpage and identify its elements and attributes
- Learn the basic language of the web: HTML.
- Be able to embed social media content into web pages.
- Implement and understand how to get used with MATLAB

LIST OF EXPERIMENTS

1. Study of HTML tags
2. Design a web page using basic html tags
3. Design a webpage using table tags
4. Design a webpage using forms and frames
5. Design a webpage using list tags
6. Develop a website of your interest(include a minimum of 3 web pages)
7. Study of MATLAB functions
8. Working with matrix operations
9. Working with image arithmetic
    - Addition of two images
    - Subtraction of two images
10. Write a Matlab program for the following
    - Read an image and crop
    - Read an image and resize
11. Working with Integration and Differentiation
12. Working with graphs

TOTAL: 45 HOURS

COURSE OUTCOMES

- Develop static web pages using HTML.
- Perform basic MATLAB operations.
- Make use of MATLAB to work with images and graphs.
- Perform integration and differentiation using MATLAB.
- Develop team spirit and professional attitude towards the development of simple web applications

U14AE*P*201 - CAD LAB – I	L	T	P	C
(For Aeronautical Engineering)	0	0	3	1

OBJECTIVES

- To introduce the concept of 2-D drafting using CAD packages.

LIST OF EXERCISES

1. Study of drafting software.
2. Development of Part drawing for Simple components.
3. Development of Isometric drawing for Simple components.
4. Development of Assembled drawing for Screw Jack.
5. Development of Assembled drawing for Landing Gear.
6. Development of Part drawing for Wing Structure components.
7. Development of t Part drawing for Fuselage structure components.
8. Development of three view diagram of a typical Helicopter.
9. Development of three view diagram of a typical Aircraft.

TOTAL: 45 HOURS

List of Tools required

- Drafting & modeling software (Like AUTOCAD)

COURSE OUTCOMES

- Use the AutoCAD software program to create drawings from scratch and to modify, manipulate, copy, delete, save, and plot drawings.
- Use the full range of AutoCAD commands and options and employ shortcuts and time-saving strategies to operate the program at a level of efficiency acceptable for employment as a CAD Engineer.
- Create, render, and manipulate 3D AutoCAD drawings and convert 2D drawings to 3D drawings.
- Identify or roughly define the terms, concepts, and standards associated with the topics of the course.
- Report to a workplace regularly and punctually, engage effectively and congenially with peers and supervisors, work from written as well as oral instructions, use assigned time efficiently for productive work, and meet production deadlines.
- Demonstrate graphical and computational problem-solving skills appropriate to the level of the coursework.

U14GHE*P*201/ HUMAN EXCELLENCE - FAMILY VALUES	L	T	P	C
	1	0	1	1
(Common to all branches of Engineering and Technology)				

OBJECTIVE:

- To inculcate the basic need for family life and peace in it.
- To lead spiritual development through good family life.
- To know the 5C's & 5E's.
- To know the examples for Self Control.
- To practice meditation & pranayamam.

PEACE IN FAMILY **2 Hours**

Family value : Meaning – Introduction – Essential family values – Family members and their responsibility - Greatness of friendship – Individual & family peace – Reason for misunderstanding in the family – no comment – no command – no demand – no ego – peace of mind.

BLESSING – EFFECTS IN FAMILY **2 Hours**

Blessing: Introduction - Benefits – Method – Mental Frequency level - effect of vibrations – make blessings a daily habit of Blessing.

GREATNESS OF WOMANHOOD **1 Hours**

Good – cultured behavioral patterns – love and compassion - Greatness of womanhood

FOOD IS MEDICINE **2 Hours**

Food is medicine - Healthy food habits - Transformation into seven minerals – Food based on character.

PERSONALITY DEVELOPMENT CONCEPTS - 5C'S & 5E'S **4 Hours**

Personality-concepts, definition,-types of personality-personality development activities- how to develop a good personality factors affecting personality development tools of improve personality-steps to a dynamic personality-5 C's and 5 E's.

LEADERSHIP TRAITS **2 Hours**

Leadership traits – style – factors of leadership – principles of leadership.

TIME MANAGEMENT **2 Hours**

Time management - Self-development – importance of self development – how to develop oneself – continuous learning – working a plan – sound mind follows sound body –complete responsibility – practice – those who make it, made it – never give-up – meditation – ten commandments of self development – self control technique for teenagers.

SPIRITUAL DEVELOPMENT THROUGH GOOD FAMILY LIFE 3 Hours

Introduction - Kayakalpa yoga - aim-kayakalpa philosophy - physical body – life force & mind - sexual vital fluid – bio-magnetism – Responsibility of men and women – need of morality – spiritual development - importance of kayakalpa training.

EXERCISE & MEDITATION 12 Hours

Simplified Physical Exercise & Kayakalpa & Meditation Practice.

Total: 30 Hours

COURSE OUTCOMES

- Behaves as a family member and their responsibility.
- Develop skills make a good personality.
- Acquire knowledge on self-control technique for teenagers.
- Learnt soul's functional base operating the Genetic Centre

B.E – AUTOMOBILE ENGINEERING

SEMESTER – II

Code No.	Course Title	L	T	P	C
THEORY					
U14EN*T*201	Functional English II	2	0	2	3
U14MA*T*201	Engineering Mathematics – II	3	1	0	4
U14PH*T*202	Materials Science	3	0	0	3
U14CH*T*202	Applied Chemistry	3	0	0	3
U14ME*T*201	Engineering Mechanics	3	1	0	4
U14EE*T* 211	Basics of Electrical and Electronics Engineering	3	0	0	3
PRACTICAL					
U14PH*P*201	Physics Laboratory	0	0	3	1
U14AU*P*201	CAD Laboratory	0	0	3	1
U14EE*P*211	Basics of Electrical and Electronics Engineering Lab	0	0	3	1
U14GH*P*201	Human Excellence - Family Values	1	0	1	1

TOTAL – 32 HOURS **TOTAL CREDITS – 24**

U14EE*T*211/ BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING	L	T	P	C
	3	0	0	3
(For Mechanical, Automobile& Biotechnology)				

OBJECTIVES

- To study the characteristics of circuit elements
- To understand relationships among current, voltage and power in DC and AC circuits
- To study the construction, characteristics and applications of amplifiers and oscillators circuitry

ELECTRIC CIRCUITS FUNDEMENTALS 9 Hours

Electric current and Ohm's law – Resistance and Resistivity – Relation between Voltages, Current, Resistance and Power - Capacitance – Parallel plate capacitor – Energy stored in a capacitor.

ELECTROMAGNETISM 9 Hours

Magnetic field - Field intensity, magnetic flux , Flux density – Permeability – Magnetic effects of electric current – Magnetic circuit – Faraday's laws of Electromagnetic Induction – Self-inductance and Mutual inductance – Energy stored in magnetic field – Magnetic Hysteresis.

AC-CIRCUITS 9 Hours

Alternating voltages and current – Sinusoidal waveform – cycle and frequency – RMS value – vector diagram of sine waves of same frequency – Alternating current through Resistance, Inductance and Capacitance – current through series circuits – Power factor – Active and Reactive power – Generation of three phase voltage – Voltages, Currents and Power in Star and Delta connected loads.

ELECTRICAL MACHINES (Qualitative Treatment Only) 9 Hours

DC motor – Principle of operation – Back-emf and voltage equation – Torque and speed Characteristics of Series and Shunt connected motors – Transformer – Ideal Transformer relationship – Three phase induction motor – Cage rotor and Wound rotor – Principle of operation – Slip – Torque Slip characteristics – Single phase induction motors.

ELECTRONIC CIRCUITS 9 Hours

Semiconductor diode – Half wave and Full wave rectifier – Bipolar Junction transistors – circuit configurations – static characteristics – load line and biasing – simple introduction to amplifiers – Introduction to Binary logic gates – AND, OR, NOT, NAND, NOR, EX-OR & EX-NOR.

TOTAL: 45 HOURS

REFERENCES

1. Thomas L Floyd, Electronic Devices, 6th edition, Pearson Education, 2003.
2. Muthusubramanian R., Salivahanan S. and Muraleedharan. K.A., Basic Electrical Electronics and Computer Engineering, Tata Mcgraw Hill, 2nd edition, 2006.
3. Thyagarajan T., Sendur Chelvi K.P. and Rangaswamy T.R., Engineering Basics, Revised 2nd edition, New Age International Pvt. Ltd.
4. Theraja B.L., Fundamentals of Electrical Engineering and Electronics, S. Chand Publishing, 2012.

COURSE OUTCOMES

- Acquire the knowledge of fundamental laws of electrical and electronics engineering.
- State the definition of magnetic circuits.
- Choose suitable motor for desired application.
- The students have the ability to apply the fundamental laws of magnetic circuits to electrical machines.
- The learners can verify the truth table of digital logic gates.

U14 AU*P* 201/ CAD LABORATORY	L	T	P	C
(For Automobile Engineering)	**0**	**0**	**3**	**1**

LIST OF EXPERIMENTS

1. Introduction to CAD Commands
2. Creation of simple objects
3. Special curves
4. Projection & Section of simple solids
5. Orthographic views of solids
6. Isometric views of objects
7. Simple trusses
8. 3D modeling of simple solids
9. 2D multiple views from 3D model

TOTAL: 45 HOURS

COURSE OUTCOMES

- Draw 2D and 3D drawings using drafting software
- Convert orthographic view into isometric view
- Become familiar to draw Special curves

U14EE*P*211/ BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING LAB	L	T	P	C
(For Automobile Engineering)	0	0	3	1

AIM

To provide experimental skill in the operation of DC, AC machines and Hands on experience in the development of electronic circuits.

OBJECTIVES

- To experimentally verify the principle of operation, performance characteristics of DC Motors and AC Motors.
- To obtain the characteristics of electronic devices and its applications

LIST OF EXPERIMENTS

1. Load Test on DC Shunt Motor
2. Load Test on DC Series Motor
3. Speed Control of DC Shunt Motor
4. Load Test on three phase Induction Motor
5. Load Test on single phase Induction Motor
6. Load test on single phase transformer
7. Half wave and full wave rectifier
8. Characteristics of CE transistor configuration
9. Characteristics of PN diode
10. Verification of truth table of logic gates

TOTAL: 45 HOURS

COURSE OUTCOMES

- The Students will gain the basic knowledge and understanding the concept of AC and DC machines.
- Students will know the working principle, performance characteristics, (Torque, Speed, Efficiency) control and applications of Electrical Machines.
- Students will be able to design and conduct performance experiments in machines and Rectifiers.
- To familiarize the starting methods of all rotating machines.
- Students will be exposed to the practical applications of identify and solve machines related problems.

B.Tech – BIOTECHNOLOGY

SEMESTER – II

Code No.	Course Title	L	T	P	C
THEORY					
U14EN*T*201	Functional English II	2	0	2	3
U14MA*T*201	Engineering Mathematics – II	3	1	0	4
U14PH*T*206	Applied Physics	3	0	0	3
U14CH*T*205	Chemistry for Biotechnology	3	0	0	3
U14EET211	Basics of Electrical and Electronics Engineering	3	0	0	3
U14BT*T*201	Biomolecules and Genetics	3	0	0	3
PRACTICAL					
U14PH*P*201	Physics Laboratory	0	0	3	1
U14CS*P*211	Computing Laboratory	0	0	3	1
U14BT*P*201	Biomolecules and Genetics Laboratory	0	0	3	1
U14GH*P*201	Human Excellence - Family Values	1	0	1	1

TOTAL – 31 HOURS **TOTAL CREDITS – 23**

U14PH*T*206/ APPLIED PHYSICS	L	T	P	C
(For Biotechnology)	3	0	0	3

OBJECTIVES

At the end of the course the students would be exposed to

- Properties of conducting, super conducting, magnetic and dielectric materials.
- Properties of Semi conducting, optical and new engineering materials.
- Application of ultrasonic and nuclear physics in medicine.

CONDUCTING AND SUPERCONDUCTING MATERIALS 9 Hours

Conducting Materials: Classical free electron theory of metals-Electrical conductivity – Thermal conductivity - expression – Wiedemann Franz law(derivation) – Lorentz number – drawbacks of classical theory – Fermi distribution function – density of energy states – effect of temperature on Fermi energy.

Superconducting Materials : Superconducting phenomena – properties of superconductors – Meissner effect, Isotope effect, Type I &Type II superconductors – High Tc superconductors - Applications – cryotron, magnetic levitation and squids.

SEMICONDUCTING MATERIALS 9 Hours

Origin of band gap in solids (Qualitative treatment only) - Concept of effective mass of an electron and hole – carrier concentration in an intrinsic semi conductor (derivation) – Fermi level – variation of Fermi level with temperature - Electrical conductivity – band gap semiconductor – carrier concentration in n-type and p-type semi conductors (derivation) – Variation of Fermi level with temperature and impurity concentration – Hall effect – Determination of Hall coefficient – experimental set up – Applications.

MAGNETIC & DIELECTRIC MATERIALS 9 Hours

Magnetic Materials: Properties of dia, para, ferro, anti ferro and ferri magnetic materials - Langevin's theory of paramagnetism – Weiss theory of Ferromagnetism – Domain theory of ferromagnetism - hysteresis – soft and hard magnetic materials – Ferrites – Applications - magnetic recording and readout - Storage of magnetic data, Tapes, floppy,magnetic disc drives – Bubble memory.

Dielectric materials : Electronic, ionic, orientation and space charge polarization - Frequency and temperature dependence of polarization – Dielectric loss – Dielectric breakdown – different types of break down mechanism - Ferro electric materials - properties and applications.

NANOTECHNOLOGY AND NEW ENGINEERING MATERIALS 9 Hours

New Engineering Materials : Metallic glasses – preparation, properties and applications – shape memory alloys (SMA) – characteristics, properties of NiTi alloy applications advantages and disadvantages of SMA.

Nano Materials : synthesis - plasma arcing – Chemical vapour deposition – sol-gel - Electro deposition – ball milling – properties of nanoparicles and applications. – Carbon nano tubes – fabrication - arc method – pulsed laser deposition - Chemical vapour deposition - structure, properties & applications.

MEDICAL PHYSICS **9 Hours**

Ultrasound picture of human body – Block diagram of basic pulse Echo system – A Scan – B scan & M Scan Phsychological effect - ultrasound therapy – Phonocardiograph (PCG) source of radioactivity for nuclear medicine - statistical aspects – Basic instrumentation (Geiger Muller counter, Photo multiplier Tube & Scintillation detector (Renogram) and its clinical applications (Thyroid and Kidney function) – Nuclear medicine imaging devices - Gamma Camera - Positron camera.

TOTAL: 45 HOURS

REFERENCE BOOKS

1. Rajendran V., Engineering Physics, Tata McGraw Hill Publishing Company Ltd, New Delhi, 2011.
2. Gopal S., Materials Science, Inder Publications, Coimbatore, 2007.
3. Ali Omar M., Elementary Solid State Physics, Pearson Education (Singapore), Indian Branch, New Delhi, 2002.
4. Palanisamy P.K., Materials Science, 2nd Edition, Scitech Pub. India, Pvt., Ltd., Pillai S.O., Solid State Physics, 5th edition, New Age International Publication, New Delhi, 2003.
5. Avadhanalu M.N. and Kshirsagar P.G., A textbook of Engineering Physics, S. Chand & Company Ltd, New Delhi, 2005 (Units: 1,2,3,4).
6. Arumugam M., Physics-II (For Civil, Chemical, Textile, Biotechnology, Polymer and Fashion technology), Anuradha agencies, Kumbakonam, 2005 (Units: 5).

COURSE OUTCOMES

- Apply core concepts in Materials Science to solve engineering problems
- Determine the position of the acceptor or donor levels and the brand gap of an extrinsic semiconductor
- Classify & differentiate the structure and physical properties of conducting materials
- Apply the techniques to manufacturing of modern materials and nano materials for engineering applications
- Sketch the skills and techniques for biotechnological and medical applications

U14CHY205 CHEMISTRY FOR BIOTECHNOLOGY	L	T	P	C
(For Biotechnology)	3	0	0	3

OBJECTIVES

- To correlate theoretical principles with application oriented studies
- To inculcate a basic foundation in stereochemistry of Biomolecules
- To embellish the usage of chemistry to exhibit engineering and technical concepts by presenting a overview on theoretical and modern technological aspects in polymers, water technology and biomolecular analysis as required for the Bio technology students.

CHEMICAL BONDING IN BIOMOLECULES 9 Hours

Ionic, covalent and co-ordinate covalent bonds (overview only), hybridization (sp, sp^2, sp^3, sp^3d, sp^3d^2 in simple molecules), hydrogen bonding and its consequences, Van der Waal's forces (dipole – dipole, dipole – induced dipole, induced dipole – induced dipole interactions) - dipole moment (applications).

INTRODUCTION TO STEREOCHEMISTRY 9 Hours

Isomerism : Introduction and classification of isomerism.

Structural isomerism : Definition, chain, position, functional, mesomerism, tautomerism, Conformational isomerism in simple organic molecules

Notation : d and l; R and S ; E and Z notation of simple organic molecules

Configurational isomerism or geometrical isomerism: definition – in alkenes and cyclopropanes

Optical isomerism : Definition and conditions of optical isomerism - Optical activity – Chirality – Optical isomerism in tartaric and lactic acids - optical activity without asymmetric carbon (allelenes, Biphenyl derivatives) – definition of Enantiomers, diastereomers, Mesocompounds, racemic mixture, asymmetric synthesis – Walden inversion

WATER TECHNOLOGY 9 Hours

Disadvantages of raw water in industries – conditioning methods : external treatment methods (ion exchange method), internal treatment (colloidal, phosphate, calgon and carbonate methods) – desalination (reverse osmosis and electrophoresis) – Treatment of sewage water.

CHEMISTRY OF POLYMERS 9 Hours

Introduction - classification based on source, application, thermal properties (thermosetting and thermoplastics) - effect of polymer structure on properties – types of polymerization (addition, condensation, co-polymerization and Ring polymerisation) - mechanism of polymerization (free radical mechanism and coordination mechanism - monometallic)

Bio Polymers and its applications : Cellulose, Starch, Collagen, Lignins and Chitosins

QUANTITATIVE ANALYSIS 9 Hours

Determination of the amount of calcium in milk powder by EDTA Complexometry - Estimation of iodine in iodized common salt by Iodometry - Estimation of phosphoric acid in

soft drinks (coca cola) by molybdenum blue method - Synthesis of fluorescein, and its use in angiogram techniques - Super absorbent polymers : preparation, properties and uses

TOTAL: 45 HOURS

REFERENCES

1. Finar I.L., Organic chemistry, Publishing house, UK.
2. Fifield F.W. and Kealey D., Principles and Practice of Analytical Chemistry, Blackwell Publishing, London.
3. Jain P.C. and Monika Jain, Engineering Chemistry, Dhanpat Rai Pub. Co. (P) Ltd., New Delhi.
4. Seymour R.B. and Carraher, Polymer Chemistry, Plenum publishing corporation, New york,
5. Syed Shabudeen P.S. and Shoba U.S., Chemistry for Textiles, Inder publications, Coimbatore
6. Amarika Singh, Vairam S., and Suba Ramesh, Chemistry for Engineers, Wiley India ltd., New Delhi
7. Bahl B.S. and Arun Bahl, A Textbook Of Organic Chemistry, S. Chand & Co., New Delhi

COURSE OUTCOMES

- Outline basic concepts of stereochemistry
- Discuss the mechanism of polymer formation
- Paraphrase an experiment in required sequence
- Design a waste water purifier

U14BT*T*201/ BIOMOLECULES AND GENETICS	L	T	P	C
(For Biotechnology)	3	0	0	3

OBJECTIVES

- To expose the students to the area of biochemistry/cell biology and basic genetics. This knowledge is required to understand Biochemistry, molecular biology and genetic engineering.

CARBOHYDRATES **9 Hours**

Definition; Carbohydrates-; Classification- Monosaccharides - Structure, and function, Disaccharides- Structure and function- Sucrose, Lactose, Polysaccharides- Starch, cellulose, heparin, hyaluronic acid.

LIPIDS **9 Hours**

Definition: Classification of lipids- Simple lipids -Physical and chemical properties of fats. Saponification number; Compound lipids-Structure and function of phospholipids and Glycolipids. Fatty acids (C16, C18) - Saturated and unsaturated fatty acids; Essential fatty acids. Steroids : Cholesterol Structure and functions.

AMINO ACIDS, PEPTIDES, VITAMINS AND MINERALS **9 Hours**

Amino acid- Definition, Structure and classification; Essential amino acids; Peptides- Definition, Structure and properties. Vitamins- Definition, Structure; Physiological functions of fat and water soluble vitamins. Minerals - Essential macro and micro minerals, sources and functions.

CLASSICAL GENETICS **9 Hours**

Mendelian genetics- Introduction, Principles; Monohybrid, Dihybrid and Trihybrid crosses; Backcross and testcross; Linkage, Crossing over, Genetic mapping, recombination; Multiple alleles- Blood group antigens.

CHROMOSOME STRUCTURE AND ORGANIZATION **9 Hours**

Nucleic acids: structure of DNA, RNA; Chromosome organization of eukaryotes. Ploidy- polyploidy and Aneuploidy; Human karyotypes; Human sex Chromosome-linked disorders - Hemophilia, Fragile X; Special chromosomes - Polytene chromosomes and Lamp Brush chromosome.

TOTAL: 45 HOURS

REFERENCES

1. Enger, Concepts in Biology, Tata McGraw-Hill Publ., 11th Edition, 2005.
2. Gardner E.J., Simmons M.J.and Slustad D.P., Principles of Genetics, 8th Edition, Wiley Publishers, 1999.
3. McKee E. and McKee T., Biochemistry – an Introduction, Win. C. Brown Publ., 1996.
4. Soper R, Taylor DJ., Green NPO., Stout GW.(1998) "*Biological Science*" 3rd Edition. Cambridge Univ Press.

COURSE OUTCOMES

- Draw the structure and explain the classification and functions of carbohydrates
- Describe the structure and functions of lipids, and cholesterol
- Classify and discuss the properties and functions of amino acids, vitamins and minerals
- Recall the concepts of mendelian genetics and multiple allelism
- Understand and explain the structure of chromosomes and related disorders

U14BT*P*201/ BIOMOLECULES AND GENETICS LABORATORY	L	T	P	C
	0	0	3	1
(For Biotechnology)				

OBJECTIVES

- To teach basic skills required for analysis of biomolecules such as carbohydrates, proteins, lipids, etc.
- To enable the student to perform simple experiments in Genetics.

LIST OF EXPERIMENTS

1. Qualitative analysis of Carbohydrates (glucose, galactose, fructose, maltose, sucrose and starch)
2. Qualitative analysis of amino acids (tyrosine, tryptophan, methionine, alanine and proline)
3. Qualitative analysis of lipids (general lipids)
4. Qualitative analysis of Proteins (simple and glycoproteins)
5. Qualitative analysis of minerals.
6. Blood grouping
7. Isolation of starch from potato
8. Identification of mitotic stages in onion root tip
9. Identification of polytene chromosomes
10. Genetic Mapping (Problems to be worked out)

TOTAL 45 HOURS

REFERENCES

1. Shanmugam S and Sathishkumar T. Complete Laboratory Handbook on Engineering Biotechnology and Life Sciences, 1st Edition, India: Inder Publishers, 2009.

COURSE OUTCOMES

- Ability to perform experiments for qualitative analysis of biomolecules.
- Ability to carry out simple experiments related to Cell Biology and Genetics

B.E CIVIL ENGINEERING

SEMESTER – II

Code No.	Course Title	L	T	P	C
THEORY					
U14EN*T*201	Functional English II	2	0	2	3
U14MA*T*201	Engineering Mathematics II	3	1	0	4
U14PH*T*201	Materials Science	3	0	0	3
U14CH*T*201	Chemistry for Civil Engineering	3	0	0	3
U14ME*T*201	Engineering Mechanics	3	1	0	4
U14CE*T*201	Construction Materials	3	0	0	3
PRACTICAL					
U14 CH*P*201	Chemistry Laboratory	0	0	3	1
U14CS*P*211	Computing Laboratory	0	0	3	1
U14CE*P*201	Construction Materials Laboratory	0	0	3	1
U14GH*P*201	Human Excellence - Family Values	1	0	1	1

TOTAL – 32 HOURS **TOTAL CREDITS – 24**

U14PH*T*201 / MATERIALS SCIENCE	L	T	P	C
(For Civil Engineering)	3	0	0	3

OBJECTIVES

At the end of the course the students would be exposed to fundamental knowledge in

- Design of acoustically good buildings
- Properties and applications of conducting materials, Superconducting materials, magnetic and dielectric materials.
- Preparation, properties and applications of Metallic glasses, Shape memory alloys and Nano materials.

ACOUSTICS **9 Hours**

Classification of sound – characteristics of musical sound –loudness –Weber-Fechner law – decibel, phon – Reverberation – reverberation time – derivation of Sabines formula for reverberation time (rate of growth and rate of decay) –Absorption coefficient and its determination – factors affecting acoustics of buildings –optimum reverberation time, loudness, focusing, echo, echelon effect, resonance and noise and their remedies –sound absorbing materials –noise pollution – noise control in machines.

CONDUCTING AND SUPERCONDUCTING MATERIALS **9 Hours**

Conducting Materials : Classical free electron theory of metals-Electrical conductivity – Thermal conductivity - expression – Wiedemann Franz law(derivation) – Lorentz number – drawbacks of classical theory – Fermi distribution function – density of energy states – effect of temperature on Fermi energy.

Superconducting Materials : Superconducting phenomena – properties of superconductors – Meissner effect, Isotope effect, Type I &Type II superconductors – High Tc superconductors - Applications – cryotron, magnetic levitation and squids.

SEMICONDUCTING MATERIALS **9 Hours**

Origin of band gap in solids (Qualitative treatment only) - Concept of effective mass of an electron and hole – carrier concentration in an intrinsic semi conductor (derivation) – Fermi level – variation of Fermi level with temperature - Electrical conductivity – band gap of a semiconductor – carrier concentration in n-type and p-type semi conductors (derivation) – Variation of Fermi level with temperature and impurity concentration – Hall effect – Determination of Hall coefficient – experimental set up – Applications.

MAGNETIC & DIELECTRIC MATERIALS **9 Hours**

Magnetic Materials : Properties of dia, para, ferro, anti ferro and ferri magnetic materials - Langevin's theory of paramagnetism – Weiss theory of Ferromagnetism – Domain theory of ferromagnetism - hysteresis – soft and hard magnetic materials – Ferrites – Applications - magnetic recording and readout - Storage of magnetic data, Tapes, floppy, magnetic disc drives – Bubble memory.

Dielectric Materials : Electronics, ionic, orientation and space charge polarization - Frequency and temperature dependence of polarization – Dielectric loss – Dielectric breakdown – different types of break down mechanism - Ferro electric materials - properties and applications.

NEW ENGINEERING MATERIALS AND NANOTECHNOLOGY 9 Hours

New Engineering Materials : Metallic glasses – preparation, properties and applications – shape memory alloys (SMA) – characteristics, properties of NiTi alloy applications advantages and disadvantages of SMA.

Nano Materials : Synthesis - plasma arcing – Chemical vapour deposition – sol-gel - Electro deposition – ball milling – properties of nanoparicles and applications. – Carbon nano tubes – fabrication - arc method – pulsed laser deposition - Chemical vapour deposition - structure, properties & applications.

TOTAL: 45 HOURS

REFERENCE BOOKS

1. Gaur R.K. and Gupta S.L., Engineering Physics, 8th edition, Dhanpat Rai Publications (P) Ltd., New Delhi, 2003.
2. Palanisamy P.K., Materials Science, 2nd Edition, Scitech Pub. India, Pvt. Ltd., Chennai, 2003.
3. Gopal S., Materials Science, Inder Publications, Coimbatore, 2007.
4. Pillai S.O., Solid State Physics, 5th edition, New Age International Publication, New Delhi, 2003.
5. Avadhanalu M.N. and Kshirsagar P.G., A textbook of Engineering Physics, S. Chand & Company Ltd., New Delhi, 2005
6. Rajendran V. and Marikani A., Materials science, 5th edition, Tata Mc-Graw-Hill publishing company Ltd., 2004

COURSE OUTCOMES

- Apply core concepts in Materials Science to solve engineering problems
- Describe the impact of acoustic engineering solutions in a constructional environmental, and societal context
- Determine the position of the acceptor or donor levels and the brand gap of an extrinsic semiconductor,
- Classify & differentiate the structure and physical properties of conducting materials
- Apply the techniques to manufacturing of modern materials for engineering practice.

U14CH*T*201/ CHEMISTRY FOR CIVIL ENGINEERING	L	T	P	C
(For Civil Engineering)	3	0	0	3

OBJECTIVES

- To impart a sound knowledge of theoretical and modern technological aspects of, water technology, corrosion studies and specialty engineering materials as required for the civil engineers.

WATER TECHNOLOGY **9 Hours**

Water hardness - Boiler feed water - boiler corrosion - priming and foaming - formation of deposits in steam boilers and heat exchangers – caustic embrittlement - disadvantages (wastage of fuel, decrease in efficiency, boiler explosion) - prevention of scale formation : Internal treatment (phosphate, calgon, carbonate, colloidal), external treatment (ion exchange method) - desalination by reverse osmosis - Treatment of common effluents.

CORROSION SCIENCE **9 Hours**

Corrosion : principles of electrochemical corrosion - difference between chemical and electrochemical corrosion - factors influencing corrosion.

Types of corrosion : galvanic corrosion, differential aeration corrosion (soil (microbial) corrosion, pitting corrosion, water line corrosion) , stress corrosion

Corrosion control : cathodic protection (sacrificial anode) - electroplating (Copper plating).

ENGINEERING MATERIALS **9 Hours**

Abrasives: Moh's scale of hardness - natural abrasives (diamond, corundum, emery, garnets and quartz) - artificial abrasives (silicon carbide, boron carbide).

Refractories: characteristics - classification (acid, basic and natural refractories) - properties (refractoriness, refractoriness under load, dimensional stability, porosity thermal spalling) - general manufacturing methods of refractories - preparation, properties and uses of high alumina bricks, magnesite and zirconia bricks only.

Lubricants: functions - classification with examples - properties (viscosity index, flash and fire point, oiliness, carbon residue, aniline point, cloud and pour point) – greases (calcium based, sodium based, lithium based only) - solid lubricants (graphite, molybdenum sulphide).

CHEMISTRY OF CONSTRUCTION MATERIALS **9 Hours**

Cement : Chemical composition – setting and hardening — special cements (high alumina cement, sorel cement, white Portland cement, water proof cement).

Paint : constituents – functions – special paints (fire retardant, water repellant, temperature indicating and luminous paints) - Varnishes and lacquers

COMPOSITE MATERIALS **9 Hours**

Composites: definition – characteristics – constituents – types: properties and applications of fibre reinforced plastic (FRP), metal matrix composites (MMC), ceramic matrix composites (CMC), Engineered cementitious composites (ECC), Natural fiber reinforced composite

Engineering Plastics : Preparation (mechanism not required) and applications of polyamide, polycarbonates, polyurethanes and thermocole - polymer blends and alloys

TOTAL: 45 HOURS

REFERENCES

1. Rangwala, Engineering Materials, Charator Publishing House, India.
2. Jain P.C. and Monica Jain, Engineering Chemistry, Dhanpat Rai Publishing company (P) Ltd, New Delhi, National Building Code – 2002.
3. Rajput R.K., Engineeing Materials, S. Chand & Company Ltd., New Delhi.
4. Syed Shabudeen P.S., Engineering Chemistry II, Inder publications, Coimbatore .
5. Dara S.S., A Textbook of Engineering Chemistry, S. Chand & Company Ltd., New Delhi
6. Kenneth G. Butinski, Engineering Material, Prentice – Hall of India, New Delhi

COURSE OUTCOMES

- Design a water purifier**.**
- Defend the Corrosion problems
- Identify the different construction materials and their constituents
- Describe the impact of composite materials and engineering plastics in construction
- Categorize the engineering materials and their uses .

U14CE*T*201/ CONSTRUCTION MATERIALS	L	T	P	C
(For Civil Engineering)	3	0	0	3

OBJECTIVES

- At the end of this course the student should have learnt about the various materials, both conventional and modern, that are commonly used in Civil Engineering construction. Further he should be able to appreciate the criteria for choice of the appropriate material and the various tests for quality control in the use of these materials.

STONES-BRICKS-CONCRETE BLOCKS **9 Hours**

Stone as building material-Criteria for selection-Tests on stones-Deterioration and preservation of stone work-Bricks-Classification- Manufacture of clay bricks-Tests on bricks-Compressive strength-Water absorption-Efflorescence –Bricks for special use-Refractory bricks-cement and concrete hollow blocks-Light weight concrete blocks-Code Practices.

LIME-CEMENT-AGGREGATES-MORTAR **9 Hours**

Lime-preparation of lime mortar-Cement-Ingredients-Manufacturing process-Types and Grades-Properties of cement and cement mortar- Hydration-Compressive strength-Tensile strength-Soundness and consistency-Setting time- Aggregates-Natural stone aggregates-Industrial byproducts-Crushing strength-Impact strength-Flakiness-Abrasion resistance-Grading-sand-Bulking-Code practices.

CONCRETE **9 Hours**

Concrete-ingredients-Manufacture-Batching plants-RMC-Propertie of fresh concrete- slump-flow and compaction-Properties of hardened concrete- Compressive, Tensile and shear strength- Modulus of rupture- Tests- Mix specification- Mix proportioning-IS method- High strength concrete and HPC- Other types of concrete-Code Practices.

TIMBER AND OTHER MATERIALS **9 Hours**

Timber- Market forms-Industrial timber-Plywood-veneer-Thermocole-Panels of laminates-Steel-Aluminium and other metallic materials-Composition-uses-market forms-Thermomechanical treatment-Paints- Varnishes-Distempers-Coe Practices.

MODERN MATERIALS **9 Hours**

Glass-Ceramics-Sealants for joints- Fibre glass and metal reinforced plastic-clay products-Refractories-Composite materials –Types-Applications of laminar composites- Fibre textiles-Geosynthetics for Civil Engineering Applications- Flyash.

TOTAL: 45 HOURS

REFERENCES

1. Varghese P.C., Building Materials, PHI Learning Pvt. Ltd., 2005.
2. Rangwala S.C., Engineering materials, Charotar Publishing House, 2008.
3. Premalatha J., Building materials, Inder Publications, 2010.

4. Shetty M.S., Concrete Technology (Theory and Practice), S. Chand & Co Ltd.
5. Rajput R.K., Engineering materials, S. Chand & Company Ltd., 2000.
6. Duggal S.K., Building Materials, New Age International (P) Ltd., 2009.

COURSE OUTCOMES

- Compare the properties of most common and advanced building materials.
- Understand the typical and potential applications of these materials
- Understand the quality test procedures for various materials
- Know about the structural forms of various materials
- Acquire knowledge on advanced materials used in civil engineering field.

U14CE*P*201/ CONSTRUCTION MATERIALS LABORATORY	L	T	P	C
	0	0	3	1
(For Civil Engineering)				

LIST OF EXPERIMENTS

1. Tests on Aggregate
2. Moisture Content of Concrete Aggregate"
3. Specific Gravity and Absorption of Coarse Aggregate
4. Specific Gravity and Absorption of fine Aggregate"
5. Resistance to Degradation of Small-size coarse Aggregate by Abrasion in the Los Angeles Machine
6. Aggregate crushing strength test
7. Abrasion test
8. Shape Test (Flakiness Index)
9. Shape test (Elongation Index)
10. Shape Test (Angularitv Number)
11. Unit Weight and Voids in Aggregate in its compacted or loose condition"
12. Sieve analysis of fine and coarse aggregate

Tests on Cement

1. Blaine's Air Permeability test
2. Fineness of Hydraulic Cement by No.100 or No. 200 Sieve"
3. Normal Consistency of Hydraulic Cement"
4. Initial and Final Time of Setting of Cement"
5. Density and Specific Gravity of cement"
6. Compressive Strength of Hydraulic Cement Mortars"
7. Tensile Strength of Cement Mortar
8. Compressive strength of brick
9. Strength tests on Flooring tiles

TOTAL: 45 HOURS

COURSE OUTCOMES

- Find the physical and mechanical properties of construction materials like cement, sand and aggregates by conducting various laboratory tests.

B.E - COMPUTER SCIENCE AND ENGINEERING

SEMESTER – II

Code No.	Course Title	L	T	P	C
THEORY					
U14EN*T*201	Functional English II	2	0	2	3
U14MA*T*201	Engineering Mathematics – II	3	1	0	4
U14PH*T*203	Materials Science	3	0	0	3
U14EE*T*212	Electrical and Electronic Circuits	3	1	0	4
U14IT*T*201	Foundations of Information Technology	3	0	0	3
U14CS*T*201	Digital Systems and Design	3	1	0	4
PRACTICAL					
U14EE*P*212	Electrical and Electronic Circuits Laboratory	0	0	3	1
U14CS*P*201	Computer Hardware Lab	0	0	3	1
U14CS*P*202	Digital Systems and Design Laboratory	0	0	3	1
U14GH*P*201	Human Excellence - Family Values	1	0	1	1

TOTAL – 33 HOURS **TOTAL CREDITS – 25**

U14PH*T*203 / MATERIALS SCIENCE	L	T	P	C
(Common to ECE, EIE, CSE & IT)	3	0	0	3

OBJECTIVES

At end of the course students would be exposed to

- Conducting, super conducting, magnetic and dielectric materials in electrical devices.
- Semi conducting, optical and new engineering materials in switching and display devices, data storage.

CONDUCTING AND SUPERCONDUCTING MATERIALS 9 Hours

Classical free electron theory of metals-Electrical conductivity – Thermal conductivity - expression – Wiedemann Franz law(derivation) – Lorentz number – drawbacks of classical theory – Fermi distribution function – density of energy states – effect of temperature on Fermi energy.

Superconducters: Superconducting phenomena – properties of superconductors – Meissner effect, Isotope effect, Type I &Type II superconductors – High Tc superconductors - Applications – cryotron, magnetic levitation and squids.

SEMICONDUCTING MATERIALS 9 Hours

Origin of band gap in solids (Qualitative treatment only) - Concept of effective mass of an electron and hole – carrier concentration in an intrinsic semi conductor (derivation) – Fermi level – variation of Fermi level with temperature - Electrical conductivity – band gap semiconductor – carrier concentration in n-type and p-type semi conductors (derivation) – Variation of Fermi level with temperature and impurity concentration – Hall effect – Determination of Hall coefficient – experimental set up – Applications.

MAGNETIC & DIELECTRIC MATERIALS 9 Hours

Magnetic Materials : Properties of dia, para, ferro, anti ferro and ferri magnetic materials - Langevin's theory of paramagnetism – Weiss theory of Ferromagnetism – Domain theory of ferromagnetism - hysteresis – soft and hard magnetic materials – Ferrites – Applications - magnetic recording and readout - Storage of magnetic data, Tapes, floppy, magnetic disc drives – Bubble memory .

Dielectric Materials: Electronic, ionic, orientation and space charge polarization - Frequency and temperature dependence of polarization – Dielectric loss – Dielectric breakdown – different types of break down mechanism - Ferro electric materials - properties and applications.

NEW ENGINEERING MATERIALS AND NANOTECHNOLOGY 9 Hours

New Engineering Materials : Metallic glasses – preparation, properties and applications – Shape memory alloys (SMA) – characteristics, properties of NiTi alloy applications - advantages and disadvantages of SMA.

Nano Materials : synthesis - plasma arcing – Chemical vapour deposition – sol-gel - Electro deposition – ball milling – properties of nanoparicles and applications. – Carbon nano tubes – fabrication - arc method – pulsed laser deposition - Chemical vapour deposition - structure, properties & applications.

OPTICAL MATERIALS **9 Hours**

Optical properties of semiconductors – Excitons- Traps – colour centre – Types of colour centres – luminescence – fluorescence and phosphorescence - liquid crystal display – Dynamics scattering display – Twisted nematic crystal display – Non- linear materials – second harmonic generation – optical mixing – optical phase conjugation.

TOTAL: 45 HOURS

REFERENCES

1. Pillai S.O., Solid State Physics, 5th edition, New Age International Publication, New Delhi, 2003
2. Gopal S., Materials Science, Inder Publications, Coimbatore, 2007.
3. Palanisamy P.K., Materials Science, 2nd edition, Scitech Pub. India, (P) Ltd., Chennai, 2003.
4. Gaur R.K. and Gupta S.L., Engineering Physics, 8th edition, Dhanpat Rai Publications (P) Ltd., New Delhi, 2003 (Units: 1,2).
5. Rajendran V., Marikaniv A., Materials science, 5th edition, Tata Mc-Graw-Hill publishing company Ltd., 2004 (Units: 3,4,5).

COURSE OUTCOMES

- Apply core concepts in Materials Science to solve engineering problems
- Determine the position of the acceptor or donor levels and the brand gap of an extrinsic semiconductor,
- Classify & differentiate the structure and physical properties of conducting materials
- Apply the techniques to manufacturing of modern materials for engineering practice.
- Recognize the various nanomaterials for engineering and technological applications

U14EE*T*212/ ELECTRICAL AND ELECTRONIC CIRCUITS	L	T	P	C
	3	1	0	4
(Common to CSE & IT)				

OBJECTIVES

- To study the characteristics of circuit elements
- To understand relationships among current, voltage and power in DC and AC circuits
- To study the construction, characteristics and applications of amplifiers and oscillators circuitry

DC CIRCUITS **9 Hours**

Electrical quantities – SI units – Circuit elements – Ohm's law – Kirchoff's laws – DC series and parallel circuits – Mesh and nodal analysis – Star to delta conversions – Simple problems.

AC CIRCUITS **9 Hours**

Sinusoidal excitation – RMS , Average and Peak values – Phasor representation – Power factor – Single phase RC,RL and RLC circuits – Series and Parallel resonance – Introduction to three phase circuits: V, I and P equations – Simple problems.

SEMICONDUCTOR DIODE AND APPLICATIONS **9 Hours**

N and P type semiconductors – PN junction – Biasing – VI characteristics – Diode operation – Rectifiers – Half wave, Full wave , Bridge rectifiers – Power supply filters – Zener diode – Applications – Optical diode.

TRANSISTORS AND APPLICATIONS **9 Hours**

Transistors – Operation, Characteristics, Biasing – BJT amplifiers – CE – CB – CC – Multistage amplifiers – JFET, MOSFET – Characteristics, Biasing – SCR – Phototransistor.

OSCILLATORS AND OPERATIONAL AMPLIFIERS **9 Hours**

Principle of oscillators – RC feedback Circuits – LC feedback circuits – Relaxation oscillators – Introduction to Operational Amplifiers – Input modes and Op- amp parameters – Op-amp with negative feedback – Comparator – Summing amplifier – Integrator and Differentiator.

L: 45 Hr T: 15 Hr TOTAL: 60 HOURS

REFERENCES

1. Edminister and Nahvi, Electronic Circuits, Schaum's outlines, Tata MCGraw – Hill, 1999.
2. Robert L. Boylested and Louis Nahelsky, Electronic Devices & Circuit theory, 7th Edition, Prentice Hall, 1999.
3. Choudhury R. and Jain S., Linear Integrated Circuits, 3rd edition, New Age Pub., 2007.
4. David A. Bell, Electronic Devices and Circuits, Prentice Hall of India, 2004.
5. Muthusubramaniam R., Salivahanan S. and Muraleedharan K.A., Basic Electrical Electronics and Computer Engineering, Tata McGraw Hill, 2nd edition, 2006
6. Thomas L. Floyd, Electronic Devices, 6th edition, Pearson Education, 2003

COURSE OUTCOMES

- Define & identify the basic electrical quantities and also able to calculate approximately the voltage, current parameters in DC circuits using basic laws.
- Understand the phasor representation of various AC circuit parameters and acquire knowledge on fundamentals of three phase ac circuits.
- Differentiate the various semiconductor diodes and rectifiers
- Summarize the characteristics of different types of transistors.
- Apply the achieved basic knowledge about oscillators & op-amp to different dc applications.

U14IT*T*201/ FOUNDATIONS OF INFORMATION TECHNOLOGY	L	T	P	C
	3	0	0	3
(Common to CSE & IT)				

Computer Basics and Architecture **10 Hours**

Information Technology Basics: Introduction-Role of IT-Information Technology and Internet

Computer Organization and Architecture: Introduction-CPU-Communication among various units - Instruction Format-Instruction Cycle-Instruction Set-Data Representation in Computers-Coding schemes

Computer Memory and Storage: Memory Hierarchy-Types of Memory-CPU interaction with memory-Secondary Storage devices and its types

Basics of Operating Systems and Networks **9 Hours**

Operating systems: Evolution-Types of Operating System –Functions of Operating System-Coordinating machine activities-Handling competition among processes

Data Communication and Computer Networks: Introduction-Data Communication-Transmission Media-Modulation-Multiplexing-Switching-Network Topologies-Communication Protocol-Network devices

Basics of Internet and Databases **8 Hours**

Internet and Internet Tools: Internet Basics- Applications of Internet-Data over Internet-Web Browser-Email, Search Engines, Instant Messaging

Database Fundamentals: Logical and Physical Data Concepts- Database Management System-Architecture-Database Models-Types of databases-Data warehousing and Mining

Basics of Data abstraction and Software Engineering **9 Hours**

Data abstraction: Basic data structures - Implementation - Classes and objects - Object Oriented Programming

Software Engineering: Lifecycle-Methodologies-Modularity-Quality Assurance-Documentation-Human Machine Interface-Software Ownership and Liability

Basics of Computer Graphics and Multimedia **5 Hours**

Computer Graphics: Overview of 3D Graphics-Modeling-Rendering-Animation-**Multimedia Essentials**: Building blocks-Multimedia system-Applications of multimedia

Current and Future trends in IT **4 Hours**

E-Commerce- EDI-Wireless Application Protocol-Smart Card- IPTV-Blogging-RFID-Brain Computer Interface

TOTAL: 45 HOURS

REFERENCES

1. Introduction to Information Technology, Pearson Education, ITL Education solutions Ltd., 2012
2. Glenn Brookshear J., Computer Science: An Overview, 11th edition, Pearson Education, 2012.
3. Rajaraman V., Introduction to Information Technology, 2nd edition, PHI Learning Private Limited, 2013.

COURSE OUTCOMES

- Outline various functional components of computer system.
- Summarize the functions of operating systems
- Define different types of network topologies and protocols.
- Explain the various internet tools and terminology.
- Explain the basic concept of data abstraction, database, software engineering and multimedia technologies.

U14CS*T*201/ DIGITAL SYSTEMS AND DESIGN	L	T	P	C
(For Computer Science)	3	1	0	4

OBJECTIVES

- To provide students in-depth theoretical base of the Digital Electronics.
- To provide the fundamental designing concepts of different types of Logic Gates, Minimization techniques etc.
- To familiarize the students regarding designing of different types of the Digital circuits.
- To provide the computational details for Digital Circuits. To introduce the basic concept of Hardware Components.

NUMBER SYSTEM AND BASIC LOGIC 10 Hours

Number systems-Binary, Octal, Hexadecimal, Number base conversions, Binary codes: Weighted codes-BCD - 8421-2421, Non Weighted codes - Gray code - Excess 3 code Binary arithmetic, 1's complements, 2's complements, and Code conversions. Study of logic gates-Boolean algebra, Boolean postulates and laws –De-Morgan's Theorem- Principle of Duality – Minterm- Maxterm - Canonical forms - Conversion between canonical forms, Karnaugh map Minimization – Don't care conditions, Tabulation method.

COMBINATIONAL CIRCUITS 9 Hours

Problem formulation and design of combinational circuits, adder, subtractor, Serial adder/ Subtractor - Parallel adder/ Subtractor - Carry look ahead adder - BCD adder - Magnitude Comparator, parity checker, Encoder , decoder, Multiplexer/ Demultiplexer , code converters, Function realization using gates and multiplexers.

SEQUENTIAL CIRCUIT 8 Hours

Flip flops SR, JK, T, D and Master slave – Characteristic table and equation –Application table – Edge triggering –Level Triggering –Realization of one flip flop using other flip flops – Register – shift registers - Universal shift register. Classification of sequential circuits-Moore and Mealy.

DESIGN OF SEQUENTIAL CIRCUITS 10 Hours

Design of synchronous sequential circuits: state diagram- State table –State minimization – State assignment. Counters: Synchronous Binary counters – Modulo-n counter- Decade - BCD counters, Asynchronous counter, Ring counters. Hazards: Static – Dynamic.

DIGITAL LOGIC FAMILIES AND PLD 8 Hours

Memories – ROM, PROM, EEPROM, RAM – Programmable Logic Devices: Programmable Logic Array (PLA)- Programmable Array Logic (PAL)- Implementation of combinational logic using PROM, PLA and PAL. Introduction to FPGA. Digital logic families: TTL, ECL, CMOS.

L: 45 Hr, T: 15 Hr, TOTAL: 60 HOURS

REFERENCES

1. Morris Mano M. and Michael D. Ciletti, Digital Design, 4th edition, Pearson Education (P) Ltd., New Delhi, 2008.
2. John .M Yarbrough, Digital Logic Applications and Design, Thomson- Vikas Publishing House, New Delhi, 2002.
3. Salivahanan S. and Arivazhagan A., Digital Circuits and Design, 3rd edition, Vikas Publishing House (P) Ltd., New Delhi, 2009.
4. Charles H. Roth., Fundamentals of Logic Design, 6th edition, Thomson Publication Company, 2009.
5. Donald P. Leach and Albert Paul Malvino, Digital Principles and Applications, 6th edition, Tata McGraw Hill Publishing Company Limited, New Delhi, 2007.
6. Jain, R.P. "Modern Digital Electronics", Third Edition., Tata McGraw–Hill publishing company limited, New Delhi, 2003.
7. Thomas L. Floyd, "Digital Fundamentals", Pearson Education, Inc, New Delhi, 2003
8. Donald D. Givone, Digital Principles and Design, Tata Mc-Graw Hill Publishing company Ltd., New Delhi, 2010.

COURSE OUTCOMES

- Translate numerical values in various number systems and perform number conversions between number systems.
- Demonstrate the knowledge of logic gates, Boolean algebra and apply optimal minimization techniques to simplify the Boolean function.
- Analyze and design combinational and sequential circuits.
- Apply the knowledge to solve the real time problems related to digital circuits.
- Compare various programmable devices and digital logic families.

U14EE*P*212/ ELECTRICAL AND ELECTRONIC CIRCUITS LABORATORY	L	T	P	C
	0	0	3	1
(For Computer Science)				

OBJECTIVES

- To study the characteristics of resonant circuits
- To obtain the characteristics of electronic devices
- To obtain the characteristics of amplifier circuits

LIST OF EXPERIMENTS

1. Verification of Kirchhoff's Laws
2. Series & Parallel Resonance
3. Power Measurement in series RLC circuit.
4. Half wave and full wave rectifier
5. Zener diode Regulator
6. Common Emitter Transistor characteristics
7. JFET characteristics
8. Wein Bridge oscillator
9. Comparator, summing Amplifier using Op-Amp
10. Integrator and Differentiator using Op-Amp

TOTAL: 45 HOURS

COURSE OUTCOMES

- Understand and verify the breadboard connections.
- Check the working condition of a cathode ray oscilloscope.
- Understand the basic laws of electric circuits.
- Understand the working of various electronic devices.
- Understand the performance of an amplifier to carryout different operations.

U14CS*P*201 / COMPUTER HARDWARE LABORATORY	L	T	P	C
(For Computer Science)	0	0	3	1

OBJECTIVES

- Acquire in-depth practical knowledge of computer hardware.
- Understanding the connection of networks.
- Develop skills related to the troubleshooting PC.

LIST OF EXERCISES

1. Study the components through assembling and disassembling of PC.
2. Study of different types of network topologies and cables along with crimping.
3. Study of network devices.
4. Installation and configuration of Windows and Linux operating systems.
5. Troubleshooting frequently occurring problems and driver installation.
6. Application software installation.
7. IP configuration and connecting a small LAN including file sharing.
8. Implementing a host machine architecture.
9. Study of DOS commands.
10. Process Handling through task manager.

TOTAL: 45 HOURS

COURSE OUTCOMES

- Explain the various computer hardware components and their functionality.
- Illustrate the assembling process of a computer system.
- Explain the local area network and file sharing methods.
- Perform the installation of Windows and Linux operating system.
- Summarize the basic DOS commands.

U14CS*P*202 / DIGITAL SYSTEMS AND DESIGN LABORATORY	L	T	P	C
	0	0	3	1
(For Computer Science)				

OBJECTIVES

- To provide students in-depth practical base of the Digital Electronics.
- To familiarize the students regarding designing of different types of the Digital circuits.
- To provide the computational details for Digital Circuits.

LIST OF EXPERIMENTS

1. Verification of Boolean theorems using digital logic gates
2. Design and implementation of combinational circuits using basic gates for arbitrary functions, code converters, etc.
3. Design and implementation of 4-bit binary adder / subtractor using basic gates and MSI devices
4. Design and implementation of parity generator / checker using basic gates and MSI devices
5. Design and implementation of magnitude comparator
6. Design and implementation of application using multiplexers
7. Design and implementation of shift registers
8. Design and implementation of synchronous and asynchronous counters
9. Simulation study of any combinational and sequential circuit using VHDL.

COURSE OUTCOMES

On successful completion of this course, the student should be able to

- Construct truth table for specific digital logic functionality.
- Illustrate digital logic function using optimal minimization techniques.
- Construct and troubleshoot the digital circuits.
- Solve the problems related to digital circuits.
- Experiment with digital circuits using VHDL.

TOTAL: 45 HOURS

B.E - ELECTRONICS AND COMMUNICATION ENGINEERING

SEMESTER - II

Code No.	Course Title	L	T	P	C
THEORY					
U14EN*T*201	Functional English II	2	0	2	3
U14MA*T*201	Engineering Mathematics – II	3	1	0	4
U14PH*T*203	Materials Science	3	0	0	3
U14CH*T*203	Chemistry for Circuit Engineering	3	0	0	3
U14EC*T*201	Circuit Theory	3	1	0	4
U14EC*T*202	Electron Devices	3	1	0	4
PRACTICAL					
U14PH*P*201	Physics Laboratory	0	0	3	1
U14EC*P*201	Electric Circuits and Simulation Laboratory	0	0	3	1
U14EC*P*202	Electronic Devices Laboratory	0	0	3	1
U14GH*P*201	Human Excellence - Family Values	1	0	1	1

TOTAL – 33 HOURS **TOTAL CREDITS – 25**

U14CH*T*203/ CHEMISTRY FOR CIRCUIT ENGINEERING	L	T	P	C
(Common For ECE, EEE, EIE, IT)	3	0	0	3

OBJECTIVES

To impart a sound knowledge on basics of

- Theoretical and modern technological aspects of modern polymeric materials technology for micro electrical, electronics, instrumentation and communication fields.

INTRODUCTION TO CONDUCTING POLYMERIC MATERIALS 9 Hours

Formation of polymers – chain growth and step growth polymerization - copolymerization - Thermoplastics and thermosets - Micro structures in polymers – polymer length - molecular weight - amorphous and crystalline - thermal transitions in plastics.

APPLIED CONDUCTING POLYMERS 9 Hours

Synthesis, structure, morphology, conductivity doping, theory and uses of Poly(sulfur nitride), polyacetylene, polyphenylene, poly(para-phenylene), poly(phenylene vinylenes), poly(phenylene sulfide), Polypyrrole and Polythiophene, Polyaniline, Stacked Phthalocyanine polymers - Polymers with transition metals in the side-group structure and their uses.

INTRODUCTION TO ORGANIC ELECTRONIC MATERIALS 9 Hours

Organo-electronic materials – classification – Organic thin-film transistor (OTFT) – architecture, operating mode - fabrication techniques - structure-property relationship - Methods of improving performance – structural perfection - device architecture - Electrical and environmental stability – chemical effects on stability - Gate dielectrics on electrical functionality.

ADVANCED MATERIALS FOR ORGANIC ELECTRONICS 9 Hours

Pentacene transistors – performance - Engineered pentacenes – Reversible functionalization – end - substituted derivatives - perifunctionalized pentacenes – Heteropentacenes - Semiconductors based on polythiophene and Indolo[3,2-*b*]carbazole – polydialkylterthiophenes – polydialkylquaterthiophenes - polythiophene nanoparticles - indocarbazole designs.

MANUFACTURE METHODS 9 Hours

Production of substrates for organic electronics - Reel-to-reel Vacuum metallization - Organic vapor phase deposition – production of TFTs, OLED, organic photovoltaics - Micro- and nanofabrication techniques – thermal imaging – printing - Digital lithography for TFT fabrication - solution based printing.

TOTAL: 45 HOURS

REFERENCES

1. Kiichi Takemoto, Raphael M. Ottenbrite, Mikiharu Kamachi, Functional Monomers and Polymers, CRC Press, New York.
2. Kaiser A.B., Electronic properties of conjugated polymers, Basics models and applications, Springer verlag, Berlin.
3. Chilton J.A. and Goosey M.T., Special polymers for electronics and optoelectronics, Kluwer Academic Pub., London.
4. Hagen Klauk, Organic Electronics: Materials, Manufacturing and Applications, Wiley – VCH, Weinheim
5. Hand book of Conducting Polymers, e-book
6. Gowariker V.R., Viswanathan N.V. and Jayadev Sreedhar, Polymer Science, New Age Int. Pvt. Ltd., New Delhi

COURSE OUTCOMES

- Analyse and determine the required conducting polymers in fabrication of organic electronic devices
- Describe the mechanism of formation of conducting polymeric materials
- Design an Organic Thin film transistor
- Outline the performance of Pentacene transistors

U14EC*T*201 / CIRCUIT THEORY	L	T	P	C
(Common For ECE, EIE)	3	1	0	4

OBJECTIVES

- Recognize and apply basic electrical units and terminology
- Identify the circuit elements and their corresponding schematic symbols - voltage and current sources (ac and dc), resistors, transformers, capacitors, inductors
- State and apply the laws, rules and theorems to analyze electrical circuit
- Analyze steady state and transient response of source free / driven RL and RC circuits.
- Design and analyze series and parallel Resonance circuits.

DC CIRCUITS ANALYSIS **9 Hours**

Basic Definitions: Charge, Current, Voltage and Power, Circuit elements: Resistors, Inductors, capacitors, Voltage and Current Sources - Ohm's Law, Kirchhoff's Current Law, Kirchhoff's Voltage Law, Circuit elements (R, L, C, Voltage and Current Sources) in Series and Parallel, Voltage and Current Division, Source Transformation, Delta-Star and Star-Delta transformation, Mesh Analysis , super mesh ,Nodal analysis, Super node.

NETWORK THEOREMS **9 Hours**

Superposition Theorem, Thevenin's Theorem and Norton's Theorem, Maximum Power Transfer Theorem, Reciprocity Theorem, Verification of Theorems, Introduction to PSPICE.

SINUSOIDAL STEADY STATE ANALYSIS **9 Hours**

Sinusoids, Phasors, Phasor representation of R, L and C, Phasor Diagrams, Impedance, Admittance, Susceptance, Conductance and Reactance.

AC Circuit Power Analysis-Instantaneous Power, Average Power, RMS Power, Apparent Power and Power Factor, Complex Power, Mesh Analysis & Nodal Analysis, Verification of Maximum Power Transfer theorem

FIRST ORDER AND SECOND ORDER CIRCUITS **9 Hours**

Basic RL and RC Circuits: The Source-Free RL Circuit, the Source-Free RC Circuit, The Unit-Step Function, Driven RL Circuits, Driven RC Circuits- Source free series and parallel RLC circuits

RESONANCE AND COUPLED CIRCUITS **9 Hours**

Frequency Response of Parallel and Series Resonance circuits-determination of Resonant Frequency, Q – Factor and Bandwidth.

Magnetically Coupled Circuits - Self Inductance, Mutual Inductance, Coefficient of Coupling, Energy in a coupled circuit, Linear Transformer, Ideal Transformer, Duality.

L:45 Hr, T:15 Hr TOTAL: 60 HOURS

REFERENCES

1. Charles K. Alexander and Mathew N.O. Sadiku, Fundamentals of Electric Circuits, 3rd edition, McGraw-Hill, 2008.
2. David E. Johnson, Johny R. Johnson and John L. Hilburn, Electric Circuit Analysis, 2nd edition, Prentice-Hall Int.
3. Murthy K.V.V., Kamath M.S., Basic Circuit Analysis, Jaico Publishing House, 1999.
4. Norman Balaba nian, Electric Circuits, Int. Edition, McGraw-Hill, 1994.
5. Decarlo R.A. and Lin P.M., Linear circuit analysis - The time domain, Phasor and Laplace transform approach, Oxford press, 2nd edition, 2003.
6. William H. Hayt, Jr Jack E. Kemmerly and Steven M. Durbin, Engineering Circuit Analysis, 7th edition, Tata MC GrawHill, 2010.
7. Joseph Edministor and Nahvi (Mohmood), Theory & Problems of Electric Circuits, 5th edition, MC Graw Hill, 2011.

COURSE OUTCOMES

- Able to model passive elements & sources
- Apply circuit theory concepts to compute voltage, current & resistance in DC&AC circuits.
- Use SPICE as a simulation tool to analyze electric circuits.
- Estimate the transient response of simple RL, RC & RLC circuits.
- Predict the frequency response of resonance circuits.

U14EC*T*202 / ELECTRONIC DEVICES	L	T	P	C
(For Electronics and Communication Engineering)	3	0	0	3

OBJECTIVES

- Describe the basic concepts of Electron Ballistics
- Illustrate the formation of a p-n junction diode (built-in potential, electric field, charge transport).
- Explain the construction, operation and characteristics of BJT, JFET and MOSFET
- Appraise the functioning of special semiconductor devices: Tunnel diode, SCR, DIAC, TRIAC, UJT, optoelectronic devices.
- Discuss the manufacturing methods for the production of Integrated Circuits.

ELECTRON BALLISTICS **9 Hours**

Force on charge particles in electric field – Motion of charge in uniform and time varying electric fields – Force in a magnetic field – Current Density – Motion in a Magnetic Field – Electrostatic deflection in a cathode ray tube – Magnetic deflection in a cathode ray tube – Deflection sensitivity- Magnetic Focusing –Parallel Electric and Magnetic Fields - Perpendicular Electric and Magnetic Fields – Cyclotron

SEMICONDUCTOR DIODES **9 Hours**

Law of electrical neutrality – Mobility, drift current – Diffusion current – Continuity equation. Band structure of PN Junction – Current Components in a PN Diode –Diode current equation – Temperature dependence of diode characteristics - Calculation of transition and diffusion capacitance – Switching characteristics of diode- Applications - Zener diode – Break down Mechanisms – Zener diode as voltage regulator- Varactor diode – Schottky diode

BIPOLAR JUNCTION TRANSISTORS AND FIELD EFFECT TRANSISTORS **9 Hours**

Transistor types – Current components – Ebers – Moll model – Transistor Configurations – Characteristics - Transistor switching times – Transistor as an amplifier. Operation and characteristics of JFET- Generalized FET Amplifier – FET as a voltage variable resistor - MOSFET - Principle of operation - Depletion and Enhancement MOSFET - Output and Transfer Characteristics

SPECIAL SEMICONDUCTOR DEVICES **9 Hours**

Tunnel diode, Operation and Characteristics - SCR ,TRIAC, DIAC - Applications. UJT - Operation - Characteristics – Equivalent Circuit and Applications – Opto electronic devices- LED - Photo diode –Photo transistor

FABRICATION OF SEMICONDUCTOR DEVICES **9 Hours**

Basic monolithic integrated Circuits - Epitaxial growth - masking and etching - Diffusion of impurities- Transistors for monolithic circuits - Monolithic Diodes – Integrated Resistors - Integrated Capacitors & Inductors – Integrated Field Effect Transistors. Definition of LSI, MSI, VLSI circuits

TOTAL: 45 HOURS

REFERENCES

1. David A. Bell, Electronic Devices and Circuits, 4th edition Prentice Hall of India, 2006.
2. Robert L. Boylested and Louis Nashelsky, Electronic Devices and Circuits Theory, 10th edition, Prentice Hall India, 2009.
3. Theodore F. Bogart Jr, Jeffrey S. Beasley and Guillermo Rico, Electronic Devices and Circuits, 6th edition, Pearson Education, 2004.
4. Jacob Millman, Christos C. Halkias and Chetan D. Parikh, Integrated Electronics, 2nd edition, Tata McGraw–Hill, 2009.
5. Jacob Millman, Christos C. Halkias and Sathyabrata Jit, Electronic Devices and Circuits, 3rd edition, Tata McGraw–Hill, 2011.

COURSE OUTCOMES

- Recognize the concepts of Electron ballistics
- Understand the principles of Semiconductor Physics
- Illustrate the characteristics of diodes, BJT, FET, MOSFET and their applications.
- Develop skills to implement simple projects using the basic devices

U14EC*P*201/ ELECTRIC CIRCUITS & SIMULATION LABORATORY	L	T	P	C
	0	0	3	1
(For Electronics and Communication Engineering)				

OBJECTIVES

- Assemble simple electric circuits with passive elements and sources.
- Verify laws and theorems in electric circuits
- Design and analyze series and parallel resonant circuits
- Use simulation tools to analyze electric circuits.

LIST OF EXPERIMENTS

1. Measurement of current and voltage in series and parallel circuits.
2. Verification of Kirchhoff's Laws.
3. Verification of Thevenin's Theorem
4. Verification of Reciprocity Theorem
5. Verification of Super position Theorem
6. Verification of Maximum Power Transfer Theorem
7. Frequency Response of Series and Parallel resonance circuits

PSPICE SIMULATION

8. Verification of Theorems
9. Analysis of Transient Response of RL & RC circuits
10. Analysis of Series and parallel resonance circuits

TOTAL: 45 HOURS

COURSE OUTCOMES

- Practice proper use of measuring instruments.
- Relate physical observations and measurements involving electrical circuits to theoretical principles.
- Experiment series and parallel resonance circuits.
- Able to use simulation tools to analyze electric circuits.

U14EC*P*202/ ELECTRONIC DEVICES LABORATORY	L	T	P	C
(For Electronics and Communication Engineering)	0	0	3	1

OBJECTIVES

- Sketch the characteristics of the semiconductor devices: Diode, Zener diode, Transistor, FET, MOSFET, UJT, SCR, Photo diode & Photo transistor.
- Demonstrate the application circuits: rectifier, voltage regulator and BJT amplifier.

LIST OF EXPERIMENTS

1. PN Diode VI –Characteristics
2. Half Wave and Full wave rectifier
3. Zener Diode characteristics and Voltage regulator
4. Transistor (CE) characteristics and h parameter determination
5. JFET characteristics
6. MOSFET characteristics
7. UJT characteristics
8. SCR characteristics
9. TRIAC and DIAC characteristics
10. Photo Diode and Photo Transistor characteristics
11. BJT as an amplifier and switch

TOTAL: 45 HOURS

COURSE OUTCOMES

- Analyze the characteristics and behavior of devices like diode, zener diode, BJT, FET, MOSFET, UJT, SCR and optoelectronic devices
- Verify the working of diodes, transistors and their applications
- Build a common emitter/base/collector amplifier and measure h-parameters.

B.E - ELECTRICAL AND ELECTRONICS ENGINEERING

SEMESTER – II

Code No.	Course Title	L	T	P	C
THEORY					
U14EN*T*201	Functional English II	2	0	2	3
U14MA*T*201	Engineering Mathematics – II	3	1	0	4
U14PH*T*205	Applied Physics	3	0	0	3
U14CH*T*203	Chemistry for Circuit Engineering	3	0	0	3
U14EE*T*201	Circuit Theory	3	0	0	3
U14ME*T*204	Thermal Engineering and Fluid Mechanics	3	1	0	4
PRACTICAL					
U14PH*P*201	Physics Laboratory	0	0	3	1
U14EEP201	Basics of Electric Circuits lab	0	0	3	1
U14ME*P*202	Thermal Engineering and Fluid Mechanics Lab	0	0	3	1
U14GH*P*201	Human Excellence - Family Values	1	0	1	1

TOTAL – 32 HOURS **TOTAL CREDIT – 24**

U14PHT205 / APPLIED PHYSICS	L	T	P	C
(For Electrical and Electronics Engineering)	3	0	0	3

OBJECTIVES

At the end of the course the students would be exposed to fundamental knowledge in

- Design of acoustically good buildings
- Properties and applications of conducting materials, Superconducting materials, magnetic and dielectric materials.
- Preparation, properties and applications of Metallic glasses, Shape memory alloys and Nano materials.
- Plasma, types and its applications

ACOUSTICS **9 Hours**

Classification of sound – characteristics of musical sound –loudness –Weber-Fechner law – decibel, phon – Reverberation – reverberation time – derivation of Sabines formula for reverberation time (rate of growth and rate of decay) –Absorption coefficient and its determination – factors affecting acoustics of buildings –optimum reverberation time, loudness, focusing, echo, echelon effect, resonance and noise and their remedies –sound absorping materials –noise pollution – noise contrl in machines.

CONDUCTING AND SUPERCONDUCTING MATERIALS **9 Hours**

Conducting Materials : Classical free electron theory of metals-Electrical conductivity – Thermal conductivity - expression – Wiedemann Franz law(derivation) – Lorentz number – drawbacks of classical theory – Fermi distribution function – density of energy states – effect of temperature on Fermi energy.

Superconducting Materials : Superconducting phenomena – properties of superconductors – Meissner effect, Isotope effect, Type I &Type II superconductors – High Tc superconductors - Applications – cryotron, magnetic levitation and squids.

SEMICONDUCTING & OPTICAL MATERIALS **9 Hours**

Origin of band gap in solids (Qualitative treatment only) - carrier concentration in an intrinsic semi conductor (derivation) – Fermi level – variation of Fermi level with temperature - Electrical conductivity – band gap semiconductor – carrier concentration in n-type and p-type semi conductors (derivation) – Variation of Fermi level with temperature and impurity concentration –

Optical properties of semiconductors – Excitons- Traps – colour centre – Types of colour centres – luminescence – fluorescence and phosphorescence.

MAGNETIC & DIELECTRIC MATERIALS 9 Hours

Magnetic Materials : Properties of dia, para, ferro, anti ferro and ferri magnetic materials - Langevin's theory of paramagnetism – Weiss theory of Ferromagnetism – Domain theory of ferromagnetism - hysteresis – soft and hard magnetic materials – Ferrites – Applications - magnetic recording and readout - Storage of magnetic data, Tapes, floppy,magnetic disc drives – Bubble memory.

Dielectric Materials : Electronic, ionic, orientation and space charge polarization - Frequency and temperature dependence of polarization – Dielectric loss – Dielectric breakdown – different types of break down mechanism - Ferro electric materials - properties and applications.

PLASMA AND NANOTECHNOLOGY 9 Hours

Plasma Technology : properties of plasma- types of plasma- thermal and non thermal plasma-Production of glow discharge plasma-Cold plasma- applications in textile and biomedical field.

Nano Materials - synthesis - plasma arcing – Chemical vapour deposition – sol-gel - Electro deposition – ball milling – properties of nanoparicles and applications. – Carbon nano tubes – fabrication - arc method – pulsed laser deposition - Chemical vapour deposition - structure, properties & applications.

TOTAL: 45 HOURS

REFERENCES

1. Gopal S., Materials Science, Inder Publications, Coimbatore, 2007.
2. Palanisamy P.K., Materials Science, 2nd edition, Scitech Pub. India (P) Ltd.
3. Pillai S.O., Solid State Physics, 5th edition, New Age Int. Publication, New Delhi, 2003.
4. Avadhanalu M.N. and Kshirsagar P.G., A textbook of Engineering Physics, S. Chand & Company Ltd., New Delhi, 2004
5. Goldston R.J., Rutherford P.H., Introduction of Plasma Physics-I, CRC publication, New York, America, 2000
6. Rajendran V. and Marikani A., Materials Science, Tata McGraw Hill Publishing Company Ltd., New Delhi, 2004

COURSE OUTCOMES

- Apply core concepts in Materials Science to solve engineering problems
- Describe the impact of acoustic engineering solutions in a constructional environmental, and societal context.
- Determine the position of the acceptor or donor levels and the brand gap of an extrinsic semiconductor,
- Classify & differentiate the structure and physical properties of conducting materials
- Apply the concepts of nanomaterials and modern materials for explaining surface properties like adhesion etc. in engineering practice.

U14EE*T*201 / CIRCUIT THEORY	L	T	P	C
(For Electrical and Electronics Engineering)	3	1	0	4

OBJECTIVES

- To understand the concept of electrical circuits, characteristics of circuit elements and power sources.
- To analyse A.C. circuits, the concept of active, reactive and apparent powers, power factor and resonance in series and parallel circuits.
- To solve electrical network problems using mesh and nodal analysis and by applying network theorems.
- To know the basic concepts of magnetic coupled circuits
- To know the fundamental relationships involved with three phase circuits and power measurement.

BASIC CIRCUIT CONCEPTS **9 Hours**

Introduction to Electrical Circuits: voltage, current, power and energy. Circuit elements : R,L,C parameters – Energy sources – Kirchhoff's laws –Series and parallel DC circuits-voltage division and current division-power in dc series and parallel circuits-network reduction techniques – Source transformation- star-to-delta and delta-to-star transformation.

AC CIRCUIT CONCEPTS **9 Hours**

The sine wave- Angular relation of a sine wave-The sine wave equation-Voltage and current Values of sine wave- Phase relation in Pure R, L and C . Complex impedance :impedance diagram– Phasor diagram- Analysis of series, parallel and Compound circuits. Power and power factor: Instantaneous Power - Average Power- Apparent Power and Power Factor-Reactive Power- Power Triangle. Series resonance and Parallel resonance – bandwidth and Q factor.

CIRCUIT ANALYSIS & NETWORK THEOREMS **9 Hours**

Nodal analysis and Mesh analysis for D.C and A.C circuits, Superposition theorem, Thevenin's theorem, Norton's theorem, Reciprocity theorem, maximum power transfer theorem, Duality in networks-problems.

MAGNETIC COUPLED CIRCUITS **9 Hours**

Self and mutual inductance-coefficient of coupling-dot convention-analysis of simple coupled circuits-ideal transformer-analysis of series and parallel connection of coupled coils-tuned circuits-analysis of magnetic circuits-comparisons of magnetic and electric circuits-magnetic leakage and fringing-parallel magnetic circuit.

THREE PHASE CIRCUITS **9 Hours**

Phase sequence-line and phase quantities-Three phase star and delta connections -analysis of three phase circuits with star and delta connected balanced and unbalanced loads- power measurement in three phase circuits using two wattmeter method-power factor of an unbalanced system.

L: 45 Hr T: 15 Hr TOTAL: 60 HOURS

REFERENCES

1. William H. Hayt Jr, Jack E. Kemmberly, and Steven M. Durbin, Engineering circuit analysis, Tata McGraw-Hill, New Delhi, 2002.
2. Joseph A. Edminister and Mahmood Nahvi, Electric Circuits, Schaum's Series, Tata, McGraw-Hill, New Delhi, 2004.
3. Arumugam M. and Premkumar N., Electric Circuit Theory, Kanna Publishers, New Delhi, 1991.
4. Gupta B.R, Fundamentals of ElectruCircuits, S. Chand & Company (P) Ltd., New Delhi. 2002.
5. Paranjothi S.R., Electric Circuit Analysis, New Age International (P) Ltd., New Delhi, 2000.
6. Sudhakar A. and Shyammohan S.P., Circuits and Networks: Analysis and Synthesis, Tata McGraw-Hill, New Delhi, 2004.

COURSE OUTCOMES

- Determine the current and voltage magnitudes by applying laws. Students can also reduce the complex circuits to simple forms using reduction techniques and source transformations. Students will be able to draw the phasor diagrams and can find the design parameters (Q factor and bandwidth) for series and parallel resonance circuits.
- Reduce the complex circuits to simple circuits and apply mesh and nodal analysis to compute the current and voltage magnitudes in different branches of the given circuit.
- Understand the concepts of magnetic circuits and can compute the effective inductance with respect to different parameters like number of turns, flux, area, direction of winding current and flux density. Students understand the 3 phase concepts and its types applicable for both balanced and unbalanced load.

U14ME*T*204/ THERMAL ENGINEERING AND FLUID MECHANICS	L	T	P	C
	3	1	0	4
(For Electrical and Electronics Engineering)				

OBJECTIVES

- To introduce principles of power generation utilizing various sources
- To introduce the basic concepts in various thermal applications like IC engines, gas, steam turbines and compressors.
- To gain knowledge regarding the fundamentals of fluid flow and their Applications.

POWER PLANT ENGINEERING 9 Hours

Introduction, Classification of Power Plants – Working principles of thermal (coal, gas and diesel), Hydro-electric and Nuclear Power plants – Merits and Demerits – Non-conventional power generation methods- Solar and wind power – Boilers - construction and working principles of Cochran, Babcock and Wilcox boilers

PRIME MOVERS 9 Hours

Steam turbines-Impulse (Delaval) and reaction turbines – Hydraulic prime movers- Pelton and Kaplan turbines- Internal combustion engines as automobile power plant – Working principles of Petrol and Diesel Engines – Four stroke and two stroke cycles – Comparison of four stroke and two stroke engines.

REFRIGERATION AND AIR CONDITIONING 9 Hours

Positive displacement compressors – Reciprocating compressors- Rotary positive displacement compressors - Construction and working principles of centrifugal and axial flow compressors. Refrigeration –Vapour compression and vapour absorption refrigeration – Air conditioning- Terminology- Classification as to season of the year - window room air conditioning- thermoelectric cooling-applications.

FLUID PROPERTIES AND FLOW CHARACTERISTICS 9 Hours

Fluid properties – Viscosity – Surface Tension – Capillarity – Fluid Pressure and Pressure Head – Types of Fluid Flow – Flow Lines – Continuity Equation Euler's equations – Bernoulli's Equation and Applications – Viscous flow and turbulent flow

FLUID FLOW APPLICATIONS 9 Hours

Energy losses due to fluid flow – Flow through Circular Pipes - Flow through pipes in series and parallel – Major and Minor Losses – Hydraulic Grade Line and Total Energy Line – Working principles of centrifugal pumps, reciprocating pumps (single acting and double acting).

L: 45 Hr, T: 15 Hr, TOTAL: 60 HOURS

REFERENCES

1. Domkundwar S., Kotandaraman C.P. and Domkundwar A.V., Thermal Engineering, Dhanpat Rai & Co, 2002.

2. Modi P.N. and Seth S.M., Hydraulic & Fluid Mechanics including Hydraulic Machines, Standard Book, 2006.
3. Venugopal K. and Prabhuraja V., Basic Mechanical Engineeering, Anuradha Publishers, 2005
4. Bansal R.K., Fluid Mechanics & Hydraulic Machines, Lakshmi Publications (P) Ltd., 2006

COURSE OUTCOMES

- Demonstrate understanding of basic concepts of thermodynamics, power plants and prime movers.
- Understand the working of air conditioning systems.
- Solve problems in fluid properties and flow dynamics.

U14ME*P*202/ THERMAL ENGINEERING & FLUID MECHANICS LABORATORY	L	T	P	C
	0	0	3	1
(For Electrical and Electronics Engineering)				

OBJECTIVES

- Expected to gain knowledge regarding the working of IC engines and air compressors.
- Expected to gain knowledge regarding the fundamentals of fluid flow and their applications to flow through pipes and hydraulic machines.

LIST OF EXPERIMENTS

THERMODYNAMICS LAB

1. Study of a Petrol Engine
2. Study of a Diesel Engine
3. Study of a IC Engine
4. Performance evaluation of four stroke diesel engine using rope brake dynamometer
5. Test on reciprocating air compressor

FLUID MECHANICS LABORATORY

1. Flow measurements using venturi meter
2. Test to estimate frictional losses in pipe flow.
3. Test on positive displacement pump for obtaining its characteristics curves and design flow parameters.
4. Test on centrifugal pump for obtaining its characteristics curves and design flow parameters.
5. Test on jet pump for obtaining its characteristics curves and design flow parameters.
6. Test on reaction turbine for obtaining the characteristics curve and to design values of specific speed, discharge, output and efficiency.
7. Test on impulse turbine to obtain its characteristics curves and hydraulic design values.

TOTAL: 45 HOURS

COURSE OUTCOMES

- Conduct tests on engine performance.
- Study petrol and diesel engine working principles.
- Examine the pump characteristics and conduct test on turbines.

U14EE*P*201/ BASICS OF ELECTRIC CIRCUITS LABORATORY	L	T	P	C
	0	0	3	1
(For Electrical and Electronics Engineering)				

OBJECTIVES

- To impart hands on experience in verification of circuit laws and theorems, measurement of circuit parameters, study of circuit characteristics and simulation of time response.

LIST OF EXPERIMENTS

1. Verifications of Ohm's Laws & Kirchhoff's Laws.
2. Verifications of Superposition theorem.
3. Verifications of Thevenin's theorem.
4. Verifications of Norton' s theorem.
5. Verifications of Reciprocity theorem.
6. Verifications of Maximum power transfer theorem.
7. Verifications of Mesh analysis.
8. Verifications of Nodal analysis.
9. Phasor relationships in RL & RC circuits.
10. Frequency response RL & RC Circuits
11. Frequency response of series resonance circuit.
12. Frequency response of parallel resonance circuit.

TOTAL: 45 HOURS

COURSE OUTCOMES

- Reduce the given complex circuit to simple circuit by applying theorems and can verify the theoretical and practical outputs
- Find the impedance value of the given circuit at which the maximum power is transferred and also confirms with the practical results
- Find the magnitudes of voltages and currents in the given circuit and verifies experimentally using mesh and nodal analysis
- Demonstrate frequency response, Phasor relationships for the given RL, RC circuits and verify experimentally.
- Design a circuit to accept or reject a particular frequency using resonance principle.

B.E - ELECTRONICS AND INSTRUMENTATION ENGINEERING

SEMESTER – II

Code No.	Course Title	L	T	P	C
THEORY					
U14EN*T*201	Functional English II	2	0	2	3
U14MA*T*201	Engineering Mathematics – II	3	1	0	4
U14PH*T*203	Materials Science	3	0	0	3
U14CH*T*203	Chemistry for Circuit Engineering	3	0	0	3
U14EC*T*201	Circuit Theory	3	1	0	4
U14EI*T*201	Electronic Devices	3	0	0	3
PRACTICAL					
U14PH*P*201	Physics Laboratory	0	0	3	1
U14CS*P*211	Computing Laboratory	0	0	3	1
U14EI*P*201	Circuits and Devices Laboratory	0	0	3	1
U14GH*P*201	Human Excellence - Family Values	1	0	1	1

TOTAL – 32 HOURS **TOTAL CREDITS – 24**

U14EI*T*201 / ELECTRONIC DEVICES	L	T	P	C
(For Electronics and Instrumentation Engineering)	3	0	0	3

OBJECTIVES

- To describe how current flows through PN junction & relating this phenomena to the characteristics & operation of the diodes, bipolar, FET transistors.
- To expose students to the functions and application of diodes, BJT &FET in electronic circuits.

SEMICONDUCTOR DIODE **9 Hours**

Theory of p-n junction – p-n junction as diode – p-n diode currents – Volt-amp characteristics – Diode resistance – Temperature effect of p-n junction – Transition and diffusion capacitance of p-n diode – Diode switching times.

BI-POLAR TRANSISTOR **9 Hours**

Junction transistor – Transistor construction – Detailed study of currents in transistor – Input and output characteristics of CE, CB and CC configurations – Transistor hybrid model for CE configuration – Analytical expressions for transistor characteristics – Transistor switching times – Voltage rating – Power transistors.

FIELD EFFECT TRANSISTORS **9 Hours**

Junction field effect transistor – Pinch off voltage – JFET volt-ampere characteristics – JFET small signal model – MOSFETS and their characteristics – FET as a variable resistor – Unijunction transistor.

OPTO ELECTRONIC DEVICES **9 Hours**

Photo emissivity and photo electric theory – Theory, construction and characteristics: light emitting diodes, liquid crystal cell, seven segment display, photo conductive cell, photodiode, solar cell, photo transistor, opto couplers and laser diode.

OTHER DEVICES **9 Hours**

Theory, characteristics and application: SCR, TRIAC, PUT, tunnel diode, thermistors, piezo electric devices, zener diode, charge coupled devices, varactor diode and LDR.

TOTAL: 45 HOURS

REFERENCES

1. Jacob Millman, Christos C. Halkias, Electronic Devices and Circuits, Tata McGraw Hill Publishing Ltd., New Delhi, 2003.
2. Salivahanan S. and Suresh Kumar N., Electronic Devices and circuits, Tata McGraw Hill Publishing Ltd., New Delhi, 2003.
3. Godse A.P. and Bakshi U.A., Electronic Devices and Circuits, Technical Pub., 2010.
4. David A. Bell, Electronic Devices and Circuits, Prentice Hall of India (P) Ltd., New Delhi, 2003.

COURSE OUTCOMES

- Describe the working principle and characteristics of various electronic devices like FET, BJT, PN Junction Diode and other Electronics devices.

U14EIP201/ CIRCUITS AND DEVICES LABORATORY	L	T	P	C
(For Electronics and Instrumentation Engineering)	0	0	3	1

OBJECTIVES

- To experimentally verify the characteristics of P-N diode, BJT, FET, UJT, TRIAC SCR.
- To verify the various theorems like super position, Thevenin, Norton and Maximum power transfer theorem.

LIST OF EXPERIMENTS

1. Characteristics of semiconductor and Zener diode.
2. Characteristics of transistor under CE configuration and Determination of h parameters
3. Characteristics of transistor under CB configuration and Determination of h parameters
4. Characteristics of JFET.
5. Characteristics of UJT.
6. Verification of ohms law, Kirchhoff's voltage and current laws.
7. Verification of Thevenin's and Norton's Theorems.
8. Verification of Superposition and maximum power transfer theorem.
9. Characteristics of SCR.
10. Characteristics of Triac.
11. Characteristics of MOSFET
12. Characteristics of Resonance circuits.

TOTAL: 45 HOURS

COURSE OUTCOMES

- Demonstrate the working of various electronic devices.
- Compute and experimentally verify thevenin's,Norton,Superposition, Maximum power transfer theorems.

B.Tech - TEXTILE TECHNOLOGY (FASHION TECHNOLOGY)

SEMESTER – II

Code No.	Course Title	L	T	P	C
THEORY					
U14EN*T*201	Functional English II	2	0	2	3
U14MA*T*201	Engineering Mathematics – II	3	1	0	4
U14PH*T*204	Applied Physics	3	0	0	3
U14CH*T*204	Chemistry for Textiles	3	0	0	3
U14FT*T*201	Fiber Science and Yarn Technology	3	0	0	3
U14FT*T*202	Weaving Technology	3	0	0	3
PRACTICAL					
U14PH*P*201	Physics Laboratory	0	0	3	1
U14FT*P*201	Textile Production Process Laboratory	0	0	3	1
U14CS*P*211	Computing Laboratory	0	0	3	1
U14GH*P*201	Human Excellence - Family Values	1	0	1	1

TOTAL – 31 HOURS **TOTAL CREDIT – 23**

U14PHT204 / APPLIED PHYSICS	L	T	P	C
(Common to Textile Technology and Fashion Technology)	3	0	0	3

OBJECTIVES

At the end of the course the students would be exposed to

- Properties of conducting, super conducting, magnetic and dielectric materials.
- Properties of Semi conducting, optical and new engineering materials.
- Application of ultrasonic and nuclear physics in medicine.

CONDUCTING AND SUPERCONDUCTING MATERIALS 9 Hours

Conducting Materials : Classical free electron theory of metals-Electrical conductivity – Thermal conductivity - expression – Wiedemann Franz law(derivation) – Lorentz number – drawbacks of classical theory – Fermi distribution function – density of energy states – effect of temperature on Fermi energy.

Superconducting Materials : Superconducting phenomena – properties of superconductors – Meissner effect, Isotope effect, Type I &Type II superconductors – High Tc superconductors - Applications – cryotron, magnetic levitation and squids.

SEMICONDUCTING MATERIALS 9 Hours

Origin of band gap in solids (Qualitative treatment only) - Concept of effective mass of an electron and hole – carrier concentration in an intrinsic semi conductor (derivation) – Fermi level – variation of Fermi level with temperature - Electrical conductivity – band gap semiconductor – carrier concentration in n-type and p-type semi conductors (derivation) – Variation of Fermi level with temperature and impurity concentration – Hall effect – Determination of Hall coefficient – experimental set up – Applications.

MAGNETIC & DIELECTRIC MATERIALS 9 Hours

Magnetic Materials : Properties of dia, para, ferro, anti ferro and ferri magnetic materials - Langevin's theory of paramagnetism – Weiss theory of Ferromagnetism – Domain theory of ferromagnetism - hysteresis – soft and hard magnetic materials – Ferrites – Applications - magnetic recording and readout - Storage of magnetic data, Tapes, floppy, magnetic disc drives – Bubble memory.

Dielectric Materials : Electronic, ionic, orientation and space charge polarization - Frequency and temperature dependence of polarization – Dielectric loss – Dielectric breakdown – different types of break down mechanism - Ferro electric materials - properties and applications.

NEW ENGINEERING MATERIALS **9 Hours**

Metallic glasses – preparation, properties and applications – shape memory alloys (SMA) – characteristics, properties of NiTi alloy applications advantages and disadvantages of SMA .

Ceramics-Classification of ceramics- Fabrication, Properties and application. Biomaterials- Biomechanisim - Classification of Biomaterials-Processing, Properties and applications.

NANO SCIENCE AND PLASMA TECHNOLOGY **9 Hours**

Nano Materials : synthesis - plasma arcing – Chemical vapour deposition – sol-gel - Electro deposition – ball milling – properties of nanoparicles and applications. – Carbon nano tubes – fabrication - arc method – pulsed laser deposition - Chemical vapour deposition - structure, properties & applications.

Plasma Technology: properties of plasma- types of plasma- thermal and non thermal plasma-Production of glow discharge plasma-Cold plasma- applications in textile and biomedical field.

TOTAL: 45 HOURS

REFERENCES

1. Gopal S., Materials Science, Inder Pub., Coimbatore, 2007.
2. Pillai S.O., Solid State Physics, 5th edition, New Age International Pub., New Delhi, 2003.
3. Avadhanalu M.N. and Kshirsagar P.G., A textbook of Engineering Physics, S. Chand & Company Ltd., New Delhi, 2005
4. Rajendran V. and Marikani A., Materials Science, Tata McGraw Hill Pub. Company Ltd., New Delhi, 2004
5. Goldston R.J. and Rutherford P.H., Introduction of Plasma Physics-I, CRC Pub., New York, America, 2000

COURSE OUTCOMES

- Apply core concepts in Materials Science to solve engineering problems
- Illustrate the electrical / thermal conductivity of semiconductors and determine the position of the acceptor or donor levels and the brand gap of an extrinsic semiconductor,
- Classify & differentiate the structure and physical properties of conducting materials
- Apply the concepts of nanomaterials and modern materials for explaining surface properties like adhesion etc. in engineering practice.
- Identify methods for etching of fabrics

U14CH*T*204 / CHEMISTRY FOR TEXTILES	L	T	P	C
(Common to Textile Technology and Fashion Technology)	3	0	0	3

OBJECTIVES

- To correlate theoretical principles with application oriented studies
- To embark on the usage of theoretical and modern technological aspects in polymers and dyes to exhibit engineering and technical concepts as required for Textile and Fashion Technology students.

WATER TECHNOLOGY **9 Hours**

Disadvantages of hard water in textile industries – Conditioning methods : external treatment (Ion exchange method), internal treatment (colloidal, phosphate, calgon & carbonate methods) – desalination (reverse osmosis and electro-dialysis) – Common effluent treatment.

POLYMERS **9 Hours**

Introduction – Degree of polymerization – functionality - classification based on source, application, thermal properties (thermosetting and thermoplastics) - effect of polymer structure on properties – types of polymerization (addition, condensation, co-polymerization, Ring polymerisation) - mechanism of polymerization (free radical mechanism)

Preparation (mechanism not required) and applications of polythene, polypropylene, polystyrene, polyamides (nylon 6,6), polyesters (PET)

CHEMICAL BONDING **9 Hours**

Ionic, covalent and co-ordinate covalent bonds (overview only) -- hydrogen bonding and its consequences - van der Waal's forces (dipole – dipole, dipole – induced dipole, induced dipole – induced dipole interactions) - Interaction of enzymes with fibres (basic concepts only)

Thermal analysis (TGA and DSC): Principle, Instrumentation and application in Textiles

DYES **9 Hours**

Introduction - Classification system of dyes - Chromophore and auxochromes – Important chemical chromophores of dyes classes (azo, anthraquinone, phthalocyanin, Indigoid, polymethine, phthalocyanine, metal complex, Fluorescent) - synthesis of azo dye (Congo red), triaryl methane dye (Malachite green), Anthraquinone dye (Alizarin - 1,2 dihydroxy anthraquinone), Indigoid dye (Indigo), phthalein dyes (Eosin)

ANTHOLOGY OF SPECIALITY CHEMICALS IN TEXTILES 9 Hours

An introduction on chemistry of the following in textiles: Dispersing agents (Naphthalene condensate products, Polymeric dispersing agent), levelling agents (nonionic, or carrier) Retarding agents (cationic leveling agents), Dye fixing agents (Metallic type, formaldehyde and Polyamine type)

Interaction between fibers and dyes (basic concepts only) - Dyes substrate affinity (dyes for cellulose fibres, silk)

TOTAL: 45 HOURS

REFERENCES

1. Finar I.L, Organic chemistry, Pub. House, UK.
2. Hungar K., Industrial Dyes - Chemistry, properties and applications, Wiley VCH Verlag GmbH & Co., KGaA, Weinheim.
3. Sivaramakrishnan C.N., Anthology of speciality chemicals for textiles, Colour Pub. (P) Ltd., Mumbai, India.
4. Seymour R.B. and Carraher, Polymer chemistry, Plenum Pub. Corporation, New York.
5. Kuriacose J.C. and Rajaram J., Chemistry in Engineering and Technology, Vol. 1 & 2, Tata McGraw-Hill Pub. Co., Ltd., New Delhi.
6. Syed Shabudeen P.S. and Shoba U.S., Chemistry for textiles, Inder Pub., Coimbatore.
7. Amarika Singh, Vairam S. and Suba Ramesh., Chemistry for engineers., Wiley India Ltd., New Delhi
8. Bahl B.S. and Arun Bahl., A Textbook Of Organic Chemistry, S. Chand & Co., New Delhi
9. Hungar K., Industrial Dyes - Chemistry, properties and applications, John Wiley & Sons

COURSE OUTCOMES

- Design a water purifier
- Discuss the mechanism of polymer formation
- Classify dyes and describe its interaction with fibers using bonding.
- Analyse the usage of specialty chemicals in dyes

U14FT*T*201/ FIBRE SCIENCE AND YARN TECHNOLOGY	L	T	P	C
(For Fashion Technology)	3	0	0	3

OBJECTIVES

- To acquire knowledge on properties of textile fibres and their manufacturing methods
- To impart knowledge on the conventional and modern yarn manufacturing process

TEXTILE FIBRES **9 Hours**

Introduction: Definition of staple fibre, filament, bicomponent fibres. Classification of natural and man-made fibres, essential and desirable properties of fibres.

Production and cultivation of Natural Fibers: Cultivation of cotton, production of silk (sericulture), wool and jute – physical and chemical structure of these fibres.

Production sequence of modified cellulosic fibres: Viscose Rayon, Acetate Rayon, high wet modulus and high tenacity fibres. Physical and chemical properties of the above fibres.

PRODUCTION SEQUENCE AND PHYSICAL AND CHEMICAL PROPERTIES OF SYNTHETIC FIBERS **9 Hours**

Polyester, Nylon and Acrylic. Introduction to spin finishes and texturisation.

Speciality fibres: High temperature and flame retardant fibres, elastomeric fibres, Polylactic Acid (PLA) fibre, nano-fibres, metallic fibres-Gold and Silver coated, super-absorbent fibres for medical and hygiene applications.

SHORT STAPLE SPINNING SYSTEM (COTTON) **9 Hours**

Sequence of process in cotton spinning - Ginning-objectives, types, suitability and principle of working; objectives and principles of working of Blow room, Carding, Drawing, Combing, Simplex and spinning machines -Ring spinning and Ringless-Rotor spinning, Air jet spinning and DREF spinning machines.

LONG STAPLE SPINNING SYSTEM **9 Hours**

Sequence of process in woolen and worsted spinning; objectives and principles of Scouring, Drying, Oiling, Dyeing, Blending, Carding, Gilling and Combing, Roving and Spinning – Siro, Solo and Compact spinning systems.

POST SPINNING **9 Hours**

Objectives and principles of working of Reeling, Assembly winder, Ring doubler and Two for one twister (TFO); Single yarn and ply yarn characteristics and their applications. Sewing threads. Package faults (Cones, Cheese and Hanks) and identification.

TOTAL: 45 HOURS

REFERENCES

1. Morton W.E. and Hearle J.W.S., Physical Properties of Textile Fibres, The Textile Institute, Manchester, U.K., 1993.
2. Mukhopadhyay S.K., Advances in Fibre Science, The Textile Institute, U.K., 1992.
3. Gupta V.B., Textile Fibres: Developments and Innovations, Vol. 2, Progress in Textiles: Science and Technology, Edited by V.K. Kothari, IAFL Pub., 2000.
4. Oxtoby E., Spun Yarn Technology, Butterworth & Co., London, 1991.
5. Chellamani K.P. and Chattopadhyay D., Yarns and Technical Textiles, SITRA Pub., 1st edition, 1999.
6. Corbman B.P., Textiles: Fibre to Fabric, McGraw Hill int. edition,1983.
7. Mishra S.P., Fibre Science and Technology, New Age Int. Pub., 2000
8. Klien W.G., The Technology of Short Staple Spinning, Vol. 1-5, The Textile Institute, Manchester, 1988
9. Mahendra Gowda, R.V., New Spinning Systems, NCUTE Pub., 2nd edition, 2006

COURSE OUTCOMES

- Acquire knowledge on the basic forms of textiles namely fibres, their classification and properties, and on the cultivation/production of natural fibres as well as modified fibres from natural raw materials.
- Outline the production of synthetic fibres, and acquire knowledge on their physical and chemical properties as well as their applications.
- Outline sequentially the processes involved in spinning cotton and worsted yarns, and describe the working of various machines used, from fibre preparation to yarn spinning

U14FT*T*202 / WEAVING TECHNOLOGY	L	T	P	C
(For Fashion Technology)	3	0	0	3

OBJECTIVES

- Acquire knowledge in weaving preparatory process
- Develop skills in basic principles of working of shuttle and shuttleless loom mechanisms
- Understand the process of weaving and controlling quality

YARN PREPARATION FOR WEAVING **9 Hours**

Process Flow – objectives of winding; principles of cheese and cone winding Machines; concepts in yarn clearing – mechanical, optical and electronic clearers; knotters and splicers; Yarn quality requirements for weaving.

BEAM PREPARATION FOR WEAVING **9 Hours**

Objectives of warping, material flow in beam warping and creels used in warping machines; sectional warping machines.

objectives of sizing; sizing materials and recipes used for different types of fibers; sizing machines; control systems used in sizing machine; sizing filament yarns; concept of single end sizing

SHUTTLE WEAVING **9 Hours**

Objectives and working principles – primary, secondary and auxiliary motions; Types of looms – Handloom, Non-automatic, Semi-automatic and Automatic looms; Drop box looms; Terry loom, mechanisms of Tappet, Dobby and Jacquard weaving.

SHUTTLELESS WEAVING **9 Hours**

Basic principles of various shuttleless weaving machines – Projectile, Rapier, Air-jet, Water-jet, Multi-phase; productivity and techno-economics of these machines.

PROCESS CONTROL IN WEAVING **9 Hours**

Process and quality control measures in pirn winding, cone winding, beam warping, sectional warping, sizing, and weaving. Computerised fabric inspection, Loom data system.

TOTAL: 45 HOURS

REFERENCES

1. Allan Ormerod, Walter S. Sondhelm, Weaving-Technology and Operations, Textile Institute Pub., 1995.
2. Lord P.R. and Mohammed, Weaving: Conversion of yarn to fabric, M.H. Merrow Pub. Co Ltd., U.K., 1998.
3. Talukdar, Introduction to winding and warping, Mahajan Pub. (P) Ltd., 1998.
4. Talukdar, Wadekar and Ajgaonkar, Sizing–Materials, methods and machines, 2nd edition, Mahajan Pub. (P) Ltd., 1998.
5. Gokarneshan N., Weaving Preparation Technology, Abhishek Pub., 2009
6. Talukdar, Sriramulu and Ajgaonkar, Weaving–Machines, Mechanisms, Management, Mahajan Pub. (P) Ltd., 1998

COURSE OUTCOMES

- Outline the objectives and working principles of various weaving preparatory processes.
- Describe the working principle of automatic and non automatic looms used for fabric manufacture.
- Acquire knowledge on the process and quality control in the preparatory processes as well as in weaving.

U14FT*P*201/ TEXTILE PRODUCTION PROCESS LABORATORY	L	T	P	C
	0	0	3	1
(For Fashion Technology)				

LIST OF EXPERIMENTS

1. Study of longitudinal and cross sectional view of natural and synthetic fibres
2. Identification of fibres through flammability test.
3. Identification of fibres through solubility test.
4. Determination of moisture regain of fibres
5. Determination of blend proportions of blends
6. Study of blow room
7. Study of carding
8. Study of Draw frame
9. Study of comber and simplex
10. Study of ring frame and Open end spinning.
11. Study of non automatic and automatic looms
12. Study of knitting machines

TOTAL: 45 HOURS

COURSE OUTCOMES

- Ability to identify the given fibre by choosing proper scientific method
- Knowledge of production process methods of yarn and woven and knit fabric
- Acquire Skill to determine the blend proportion

B.Tech - INFORMATION TECHNOLOGY

SEMESTER – II

Code No.	Course Title	L	T	P	C
THEORY					
U14EN*T*201	Functional English II	2	0	2	3
U14MA*T*201	Engineering Mathematics – II	3	1	0	4
U14PH*T*203	Materials Science	3	0	0	3
U14EE*T*212	Electrical and Electronic Circuits	3	1	0	4
U14CH*T*203	Chemistry for Circuit Engineering	3	0	0	3
U14IT*T*201	Foundations of Information Technology	3	0	0	3
PRACTICAL					
U14CH*P*202	Chemistry Laboratory	0	0	3	1
U14EE*P*212	Electrical and Electronic Circuits Laboratory	0	0	3	1
U14IT*P*201	Computer Hardware and Peripherals Laboratory	0	0	3	1
U14GH*P*201	Human Excellence - Family Values	1	0	1	1

TOTAL – 32 HOURS **TOTAL CREDIT – 24**

U14IT*P*201/ COMPUTER HARDWARE AND PERIPHERALS LABORATORY	L	T	P	C
	0	0	3	1
(For Information Technology)				

OBJECTIVES

- Acquire in-depth practical knowledge of the computer hardware and computer networks.
- Understand the assembly of PC and connection of networks
- Develop skill related to the trouble shooting and configuration of PC.

LIST OF EXPERIMENTS

1. Study of different types of cables and network topologies
2. Study of different types of network devices
3. Study and identification of Major parts of PC
4. Assembly and Disassembly of PC
5. Connecting a small LAN
6. IP configuration and Subnet masking.
7. Study and troubleshoot the boot process
8. Installation and configuration of Windows 2000
9. Implementation of Wireless Network
10. Study, Identification, Assembly and Disassembly of Printer and Monitor

TOTAL: 45 HOURS

COURSE OUTCOMES

- Explain the various computer hardware components and their functionality. [S]
- Illustrate the assembling process of a computer system. [S]
- Explain the local area network and file sharing methods. [S]
- Perform the installation of Windows and Linux operating system. [S]
- Explain the configuration of wireless adapter. [S]

B.E - MECHANICAL ENGINEERING

SEMESTER – II

Code No.	Course Title	L	T	P	C
THEORY					
U14EN*T*201	Functional English II	2	0	2	3
U14MA*T*201	Engineering Mathematics – II	3	1	0	4
U14PH*T*202	Materials Science	3	0	0	3
U14CHT202	Applied Chemistry	3	0	0	3
U14ME*T*201	Engineering Mechanics	3	1	0	4
U14EE*T*211	Basics of Electrical & Electronics Engineering	3	0	0	3
PRACTICAL					
U14CH*P*201	Chemistry Laboratory	0	0	3	1
U14CS*P*211	Computing Laboratory	0	0	3	1
U14EE*P*211	Basics of Electrical & Electronics Engineering Laboratory	0	0	3	1
U14GH*P*201	Human Excellence - Family and Professional Values	1	0	1	1

TOTAL – 32 HOURS **TOTAL CREDITS – 24**

B.E - MECHATRONICS ENGINEERING

SEMESTER – II

Code No.	Course Title	L	T	P	C
THEORY					
U14EN*T*201	Functional English II	2	0	2	3
U14MA*T*201	Engineering Mathematics – II	3	1	0	4
U14PH*T*202	Materials Science	3	0	0	3
U14CH*T*202	Applied Chemistry	3	0	0	3
U14ME*T*201	Engineering Mechanics	3	1	0	4
U14MC*T*201	Electronic Devices and Circuits	3	0	0	3
PRACTICAL					
U14CH*P*201	Chemistry Laboratory	0	0	3	1
U14CS*P*211	Computing Laboratory	0	0	3	1
U14EC*P*207	Electronic Devices and Circuits Laboratory	0	0	3	1
U14GH*P*201	Human Excellence - Family Values	1	0	1	1

TOTAL – 32 HOURS **TOTAL CREDIT – 24**

U14MC*T* 201/ **ELECTRONIC DEVICES AND CIRCUITS**	**L**	**T**	**P**	**C**
(For Mechatronics Engineering)	**3**	**0**	**0**	**3**

CIRCUIT THEORY **9 Hours**

Network Theorems: Kirchoff's laws – Thevinin's and Norton's theorems - Superposition theorem. Two port networks: Z Parameters – Y parameters h parameters.

THEORY OF SEMICONDUCTOR DEVICES **9 Hours**

PN junction – diode equation (Derivation not required) – forward and reverse bias – Diode dc and ac resistances – Zener diode – Bipolar Junction Transistor – CE, CB and CC configurations– Biasing of a transistor; fixed bias, collector feedback bias, self bias – FET – Common source and drain characteristics of JFET and MOSFET.

APPLICATIONS OF DIODES **9 Hours**

HW and FW rectifiers – Filters with Capacitior and Inductors -Clippers and Clampers – Voltage Multipliers – Voltage regulators – Zener, series and shunt types.

AMPLIFIERS AND OSCILLATORS **9 Hours**

Small signal amplifiers – h parameter model for low frequencies – Feedback amplifiers, cascading amplifiers, differential amplifier – Oscillators – Hartley and Colpitt oscillators.

OPERATIONAL AMPLIFIERS **9 Hours**

Ideal characteristics – Inverting, Non-inverting – summer – Comparator, Integrator, differentiator – Schmitt trigger – R.C. Phase shift oscillator, Wein Bridge Oscillator – Multivibrators.

TOTAL: 45 HOURS

REFERENCES

1. Albert Malvino and Bates J., Electronic Principles, Tata McGraw- Hill Pub. Company Ltd., 7th edition, 2008.
2. Millman J., Halkias C.C. and Satyabrata Jit, Electronic Devices and Circuits, Tata McGraw Hill, New Delhi, 2nd edition, 2008.
3. Thomas L. Floyd, Electronic Devices, Pearson Education Asia, 5th edition, 2001.
4. William Hayt, Kemmerly J. and Durban S.M., Engineering Circuit Analysis, McGraw Hill Education, 2011.
5. Sudhakar, Shyammohan and Palli S., Circuits and Networks: Analysis & Synthesis, Tata Mc Graw Hill, New Delhi, 4th edition, 2010 (Unit: 1).

6. Salivahanan S., Suresh kumar N. and Vallavaraj A., Electronic Devices and Circuits,
   Tata Mc Graw Hill publishing company, New Delhi, 2nd edition, 2008 (Units: 2,3,4).
7. Roy Chowdhury D. and Jain Shail B., Linear Integrated Circuits, New Age Int. Pub., 4th edition, 2010 (Unit: 5).

COURSE OUTCOMES

- Use passive elements and basic theorems to solve the electric circuits.
- Relate the basic semiconductor physics to the characteristics and biasing of low powered electronic devices.
- Design regulators and rectifiers using diodes.
- Design amplifiers for oscillators using transistors.
- Use operational amplifiers to solve simple mathematical operations and build conventional vibrators.

U14EC*P*207/ ELECTRONIC DEVICES AND CIRCUITS LABORATORY	L	T	P	C
	0	0	3	1
(For Mechatronics Engineering)				

OBJECTIVES

- To obtain the characteristics of electronic devices
- To obtain the characteristics of amplifier circuits
- To simulate electronic circuits using standard software packages

LIST OF EXPERIMENTS

1. Characteristics of Semiconductor diode and Zener diode
2. Input and Output characteristics of BJT
3. Characteristics of JFET
4. Frequency response of CE amplifier
5. Clipper and Clamper
6. Phase shift and Wein Bridge oscillators using OP-AMP
7. Astable multivibrator using OP-AMP
8. Monostable and Bistable multivibrator using OP-AMP
9. Voltage Regulator (Zener diode, Transistor series and shunt)
10. Half-wave and Full-wave Rectifier with and without filter.
11. Circuit design using software (Multisim, Pspice)
12. Printed Circuit Board (PCB) design and fabrication using (software) for simple circuits.

TOTAL: 45 HOURS

COURSE OUTCOMES

- Construct input output characteristics of electronic devices.
- Measure current voltage resistance capacitance of a given circuit.
- Design and construct regulators, rectifiers, amplifiers and oscillators using electronic devices and operational amplifiers.
- Simulate electronic circuits using software.

B.Tech - TEXTILE TECHNOLOGY

SEMESTER – II

Code No.	Course Title	L	T	P	C
THEORY					
U14EN*T*201	Functional English II	2	0	2	3
U14MA*T*201	Engineering Mathematics – II	3	1	0	4
U14PH*T*204	Applied Physics	3	0	0	3
U14CH*T*204	Chemistry for Textiles	3	0	0	3
U14ME*T*201	Engineering Mechanics	3	1	0	4
U14TX*T*201	Textile Fibers	3	0	0	3
PRACTICAL					
U14PH*P*201	Physics Laboratory	0	0	3	1
U14CS*P*211	Computing Laboratory	0	0	3	1
U14TX*P*201	Fiber Analytical Laboratory	0	0	3	1
U14GH*P*201	Human Excellence - Family Values	1	0	1	1

TOTAL – 32 HOURS **TOTAL CREDITS – 24**

U14TX*T*201/ TEXTILE FIBRES	L	T	P	C
(For Textile Technology)	3	0	0	3

OBJECTIVES

At the end of the course the students would be exposed to

- Basic concepts about Textile Fibres
- Basic concepts about Specialty Fibres

INTRODUCTION **9 Hours**

Definition of fibre, filament and yarn. Characteristics of fibre forming polymers, molecular weight, orientation and crystallinity. Classification of fibres. Essential and desirable properties of fibres. Concept of thermoplastic and thermoset materials.

NATURAL FIBRES **9 Hours**

Vegetable fibres:

Cotton: Development of fibre in seed, morphological & chemical structure, physical & chemical properties and applications.

Chemical constituents, physical, chemical properties and applications of jute and linen fibres.

Animal fibres:

Wool: Types of wool, grading of wool, morphological & chemical structure, physical & chemical properties and applications.

Silk: Types, morphological & chemical structure, physical & chemical properties and applications. Production of silk.

REGENERATED FIBRES **9 Hours**

Basic production system of man-made fibres. Merits and demerits of man-made fibres;Viscose rayon: Raw material, physical & chemical properties and applications; Concept of high wet and low wet modulus fibres; Introduction to acetate & triacetate fibres, modal , lyocell and Tencel fibre.

Protein Base: General properties and applications of Caesin, soyabean and zein fibres.

SYNTHETIC FIBRES **9 Hours**

Polyamide: Raw material, physical & chemical properties and applications of Nylon6&Nylon 6, 6; Polyester: Raw material, physical & chemical properties and applications. Flame retardant PET, Hygroscopic PET fibre and their applications. Polyacrylonitrile fibre: Raw material, physical & chemical properties and applications of

acrylic and modacrylic fibre; Polypropylene and polyethylene: Raw material, physical & chemical properties and applications

SPECIALTY FIBRES AND FIBRE IDENTIFICATION 9 Hours

Raw material, General properties and applications of Aramid fibre, Carbon, Glass, PVA, Polyurethane, PVC fibre; Identification of textile fibres by microscopic, solubility, flammability and density methods.

TOTAL: 45 HOURS

CASE STUDY:

1. Demographic cultivation and production of cotton fibre in India.
2. Production trend of synthetic fibres for last five years.
3. Worldwide production of high performance fibres.

REFERENCES

1. Vaidya A.A., Production of synthetic fibres, Prentice Hall of India (P) Ltd., New Delhi, 1988.
2. Gupta V.B. and Kothari V.K., Manufactured fibre Technology, Chapman and hall, 1st edition, 1997.
3. Moncrieff R.W., Man made fibres, Butterworths Ltd., 1975.
4. Gordon Cook J., Hand book of Textile fibres, Vol. 1–Natural fibres, CBS Pub. and Distributors, 2005.
5. Gordon Cook J., Hand book of Textile fibres, Vol. 2–Manmade fibres, CBS Pub. and Distributors, 2005.
6. Sreenivasa murthy H.V., Introduction to Textile Fibres, The Textile Association (India) Pub., Mumbai, 1987.
7. Mishra S.P., A Textbook of fibre science and technology, New Age Int., 2000.
8. Gohl E.P.G. and Vilensky L.D., Textile Science, CBS Pub. and Distributors, New Delhi, 2003.

COURSE OUTCOMES

- Classify the textile fibres
- Describe about the properties of major textile fibres
- Compare the fundamental properties of major fibres
- List the end uses of major textile fibres
- Describe about the structure of textile fibres

U14TX*P*201 / FIBRE ANALYTICAL LABORATORY	L	T	P	C
(For Textile Technology)	0	0	3	1

LIST OF EXPERIMENTS

1. Identification of textile fibres by microscopy method.
2. Studying swelling behavior of cotton/Viscose fibres.
3. Fibre maturity measurement by caustic soda method.
4. Identification of textile fibres by flammability methods.
5. Determination of moisture absorption properties of textile fibres.
6. Identification of textile fibres through solubility test.
7. Determination of blend proportion of given samples.
8. Effect of acids on fibres under various factors (Temperature/Time /Concentration).
9. Effect of alkalis on fibres under various factors (Temperature/ Time / Concentration).
10. Effect of oxidizing agents on fibres under various factors (Temperature/ time/Concentration).
11. Determination of molecular weight of polymers using viscometry.
12. Study of spin finish in manufactured fibres through soxhlet extraction

Creative Evaluation (Any two)

1. Properties of various domestic cotton variety
2. Properties of various imported cotton variety
3. Collection and characteristics analysis of various micro denier fibres
4. Collection and study of modified polyester fibres samples

TOTAL: 45 HOURS

COURSE OUTCOMES

- Identify & distinguish the major textile fibres
- Estimate the moisture regain and blend proportion of textile fibres
- Experiment on effect of temperature, time and concentration on fibre degradation
- Sketch the cross sectional and longitudinal view of major textile fibres
- Evaluate the spin finish percentage of manmade fibre & molecular weight of a polymer