RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
Credit Based Grading System
Electrical Engineering, VI Semester
EE-6001 Electro Magnetic Field Theory

COURSE CONTENTS

Unit I

Cartesian, cylindrical & spherical co-ordinate systems, scalar & vector fields, gradient, divergence & curl of a vector field, Divergence theorem &Stokes's theorem, concept of vectors.Electrostatic Fields – Coulomb's law, electric field intensity due to different charge distribution viz. line charge, sheet charge, Field due to continuous volume – electric potential, properties of potential function, potential gradient equipotential surfaces, line of force, Gauss law, applications of Gauss law, Gauss law in point form method of images.

Unit II

Laplace's & Poisson's equations, solution of Laplace's equation. Electric dipole, dipole moment, potential electric field intensity due to dipole. Behavior of conductors in an electric field. Conductor & insulator, electric field inside a dielectric, polarization. Boundary value conditions for electric Field. Capacitance & Capacitances of various types of capacitors. Energy stored and energy density in static electric field. Current density, conduction & convection current density ohms law in point form, equation of continuity.

Unit III

Static Magnetic Field, Biot-Savart's law, Magnetic Field intensity due to straight current carrying filament, circular, square and solenoidal current carrying wire. Relationship between magnetic flux, flux density & magnetic Field intensity.Ampere's circuital law and its applications, magnetic Field intensity due to infinite sheet and various other configurations, Ampere's circuital law in point form.Magnetic force, moving charge in a magnetic field, Lorentz Force on straight and long current carrying conductors in magnetic field, force between two long & parallel current carrying conductors. Magnetic dipole & dipole moment, a differential current loop as dipole, torque on a current carrying loop in magnetic field, Magnetic Boundary conditions.

Unit IV

Scalar magnetic potential and its limitations, Vector magnetic potential and its properties, vector magnetic potential due to different simple configurations;Self and Mutual inductances, determination of self & mutual inductances, self-inductance of solenoid, toroid coils, mutual inductance between a straight long wire & a square loop. Energy stored in magnetic Field & energy density. Faraday's Law, transformer & motional EMFs. Displacement current, Maxwell's equations asGeneralization of circuit equations, Maxwell's equation in free space, Maxwell's equation for harmonically varying Field, static and steady fields. Maxwell's equations in differential & integral form.

Unit V

Electro Magnetic Waves Uniform plane wave in time domain in free space, Sinusoidal time varying uniform plane wave in free space, Wave equation and solution for material medium, Uniform plane wave in dielectrics and conductors.Pointing Vector theorem, instantaneous, average and complex pointing vector, and power loss in a plane conductor, energy storage.Polarisation of waves. Reflection by conductors and dielectric – Normal & Oblique incidence. Reflection at surface of a conducting medium, surface impedance, transmission line analogy.

Books Recommended:

1. Elements of Electromagnetic - Mathew N.O Sadiku (Oxford)
2. Electromagnetic Fields P.V. Gupta (Dhanpat Rai)
3. Element of Engineering Electromagnetic N.N. Rao (PHI)
4. Engineering Electromagnetic William H. Hayt (TMH)
5. Electromagnetic - John D.Kraus (Mc Graw hill)
6. Electromagnetic wave & Radiating System Jordan Balmian (PHI)
7. Fields and Wave Electromagnetic. David K. Cheng(Addison Wesley)
8. Electromagnetic Field - S.P. Seth (Dhanpat Rai & Sons)

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Electrical Engineering, VI Semester

EE-6002 Power Electronics

COURSE CONTENTS

Unit - I

Advantages and application of power electronic devices characteristics, Symbol &application of power diodes, power transistors, GTO, Triac, Diac, Power MOSFET, IGBT, LASCR, Fast recovery diode, schottky diode MCTs. Principle of operation of SCR, Two transistor analogy, brief idea of construction of SCR, Static characteristics of SCR, Condition of turn on & off of SCR Gate characteristics, Method for turning on of SCR, Turnoff methods, different commutation techniques (Class A,B,C,D,E, & F Commutation) firing of SCR, Resistance firing Ckt, Resistance, capacitance firing circuit, UJT firing cut, protection of SCR over voltage, Over current, Superior firing, Design of snubber circuit and protection of gate of SCR, heating, cooling & mounting of SCR.

Unit-II

Operation and analysis of single phase (Half wave & Full Wave) and multiphase (Three Phase) uncontrolled and controlled rectifier circuit with resistive, resistive& inductive load (continuous & non continuous conduction, inductive loads and RLE loads. Estimation of average load voltage and load current for above rectifier circuits active and reactive power input. Effect of freewheeling diode and source inductance on performance of these rectifier circuits .Comparison of mid-point& Bridge rectifier circuits. Power factor correction, simulation and modeling of convertor topologies in Matlab/Simulink.

Unit-III

Voltage source & current source inverter, Single phase and three phase bridge inverter, Self-cumulated inverters,, Mc- murray&MCmurray bed ford inverters, Voltage control of single phase and three phase bridge inverter, Harmonics & their reduction techniques. Simulation and modeling of single phase and three phase inverters in Matlab/Simulink.

Unit-IV

Principle of chopper operation, Various control strategies in chopper, Step up &step-up/step down choppers, chopper configuration (Type A,B, C,D, & E), Current & voltage commutation of chopper circuits Jones & Morgens chopper. Simulation and modeling of choppers in Matlab/Simulink.

Unit-V

Single phase (midpoint& bridge configuration) and three phase cyclo convertor configuration andoperating principles.AC voltage controllers (using SCRs &Traics) single phase full wave controllerwith R and RL load, Estimation of RMS load voltage, RMS load current and inputpower factor, three phase AC voltage controller (Without analysis)Switched mode voltage regulator buck, Boost, Buck & Boost, Cuk regulators.

References:

1.M.H. Rashid, Power Electronics Circuits, Devices and Applications, Pearson Education, Singapore, 1993.
2.Dr. P.S. Bhimbhra, Power Electonics, Khanna Pub.
3.M Ramsmoorthy, An Introduction to transistor and their application, Affiliated East-West Press.
4.Shailendra Jain, Modeling and Simulation using Matlab Simulink, Wllley India Pvt. Ltd.
5.M.D. Singh, K.B. Khanchandani, Power Electronics, TMH, Delhi, 2001.
6.Chakravarti A., Fundamental of Power Electronics and Drives, Dhanpat Ray &Co.,
7.VedamSubramanyam, Power Electronics New Age International Revised II ed.2006.
8.Randall Shaffer, Fundaments of Power Electronics With MATLAB Cengage Leaening 2008.

LIST OF EXPERIMENTS

1- V-I CHARACTERISTICS OF SCR
2- V-I CHARACTERISTICS OF DIAC
3- V-I CHARACTERISTICS OF BJT
4- V-I CHARACTERISTICS OF TRIAC
5- V-I CHARACTERISTICS OF MOSFET
6- TRANSFER CHARACTERISTICS OF MOSFET
7- OUTPUT CHARACTERISTICS OF IGBT
8- TRANSFER CHARACTERISTICS OF IGBT
9- SINGLE PHASE SCR HALF CONTROLLED CONVERTER WITH R LOAD
10- 1Φ SCR FULLY CONTROLLED CONVERTER WITH R-LOAD
11- STUDY OF 3Φ SCR HALF CONTROLLED CONVERTER
12- STUDY OF 3Φ SCR FULLY CONTROLLED CONVERTER
13- STUDY OF CLASSES OF COMMUTATION A,B,C,D,E,F.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Electrical Engineering, VI Semester

EE-6003 Microprocessors and Microcontrollers

COURSE CONTENTS

UNIT 1:

Microprocessor 8086 Introduction to 16-bit 8086 microprocessors, architecture of 8086,Pin Configuration, mode, timing diagram, Memory interfacing, interrupts, Instruction set of 8086, Addressing mode, Assembler directives & operations, assembly and machine language programming, subroutine call and returns, Concept of stack, Stack structure of 8086, timings and delays.

UNIT 2:

Input-Output interfacing: Memory Mapped I/O and Peripherals I/O. PPI 8255 Architecture and modes of operation, Interfacing to 16-bit microprocessor and programming, DMA controller (8257) Architecture, Programmable interval timer 8254, USART 8251.

UNIT 3:

Microcontroller 8051 Intel family of 8 bit microcontrollers, Architecture of 8051, Pin description, I/O configuration, interrupts; Interrupt structure and interrupt priorities, Port structure and operation, Accessing internal & external memories and different mode of operations, Memory organization, Addressing mode, instruction set of 8051 and programming.

UNIT 4:

8051 Interfacing, Applications and serial communication 8051 interfacing to ADC and DAC, Stepper motor interfacing, Timer/ counter functions, 8051 based thyristor firing circuit, 8051 connections to RS-232, 8051 Serial communication , Serial communication modes, Serial communication programming, Serial port programming in C.

UNIT 5:

Microcontroller 8096 Introduction to 16-bit Microcontroller, functional block-diagram, memory status, complete 8096 instruction set, classification of instruction set, addressing modes, programming examples using 8096, hardware features of 8096,parallel ports, control &status Registers, Introduction to 16/32 bit PIC microcontrollers and DSPIC.

Reference Books:

1.Hall Douglas V., Microprocessor and interfacing, Revised second edition 2006, Macmillan, McGraw Hill .

2.A.K. Ray &K.M.Bhurchandi, Advanced Microprocessors and peripherals-Architecture, Programming and Interfacing, Tata McGraw - Hill, 2009 TMH reprint..

3. Senthil kumar Saravananjeeva nanthan shah, Microprocessors and Interfacing, oxford university press,2012

4. Kenneth J. Ayala, The 8086 microprocessor: programming and interfacing the PC, Indian - edition CENGAGE Learning.

5. Muhammad Ali Mazidi and Janice Gillespie Mazidi, The 8051 Microcontroller and Embedded Systems, Pearson education, 2005.

6. Kenneth J. Ayala, The 8051 Microcontroller Architecture, III edition, CENGAGE Learning.

7. V. Udaya shankara and M.S. Mallikarjuna swamy, 8051 Microcontroller: Hardware, Software & Applications, Tata McGraw - Hill, 2009.

8. McKinlay, The 8051 Microcontroller and Embedded Systems - using assembly and C, PHI, 2006 / Pearson, 2006.

9. Tim Wilmshurst, Designing embedded system with PIC microcontrollers Principles and applications. 2nd ed. 2011 Bsp books pvt ltd.

LIST OF EXPERIMENTS

1. Programs for 16 bit arithmetic operations for 8086 (using Various Addressing Modes).
2. Program for sorting an array for 8086.
3. Program for searching for a number or character in a string for 8086
4. Program for string manipulations for 8086.
5. Program for digital clock design using 8086.
6. Interfacing ADC and DAC to 8086.
7. Parallel communication between two microprocessors using 8255.
8. Serial communication between two microprocessor kits using 8251.
9. Interfacing to 8086 and programming to control stepper motor.
10. Programming using arithmetic, logical and bit manipulation instructions of 8051.
11. Program and verify Timer/Counter in 8051.
12. Program and verify Interrupt handling in 8051.
13. UART Operation in 8051.
14. Communication between 8051 kit and PC.
15. Interfacing LCD to 8051.
16. Interfacing Matrix/Keyboard to 8051.
17. Data Transfer from Peripheral to Memory through DMA controller 8237/8257.

Note: Minimum of 12 experiments to be conducted.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Electrical Engineering, VI Semester

EE-6004 Power System - II

COURSE CONTENTS

Unit -I

General - Problems associated with modern interconnected power Systems, deregulation, power systems restructuring, distributed generation, congestion, available transfer capacities, pricing of energy and transmission services.

Unit-II

Power flow studies - Formulation of static power flow equations and solutions using Gauss-Seidel, Newton Raphson and FDLF methods, comparison of these methods, Economic operation of power system – Economic dispatch, Emission dispatch, line loss, ITL, economic dispatch using lagrangian multiplier method.

Unit-III

MW Frequency control- Fundamental of Speed Governing, Modeling of Speed Control Mechanism, Primary ALFC, Closing of ALFC, Static & Dynamic Response to Primary ALFC, Speed Control Characteristics ,Fundamental of AGC,AGC in Isolated & Interconnected Power Systems, Modeling of the Tie line, Static & Dynamic response of two area system, Economic dispatch Control.

Unit-IV

Reactive Power & Voltage control –Protection & Absorption of Reactive Power Method of Voltage Control, Static VAR systems, Different types, Application ,characteristics, characteristics of an excitation system, DC AC and static excitation system, General block diagram representation of voltage regulators.

Unit-V

Power System Stability - Steady state, dynamic and transients stability, Swing equation , equal area criterion, solution of swing equation using step by step method modified Eulers method and Rnge-Kutta method, methods of improving transient stability.

Reference Books :

1. I.J. Nagrath& D.P. Kothari , Modern Power System Analysis, Tata Mc Graw – Hill Publication Company Ltd 2nd edition.
2. C.L. Wadhwa ,Electrical Power Systems ,New Age International (P) Limited Publishers, 2nd edition 1998.
3. T.J.E. Miller , Reactive power Control in Electric Systems, John Wiley & Sons.
4. A Chakrawarti, Power System Analysis:Operation and Control PHI Learning 3rd edition
5. Elgerd O.I., “Electric Energy Systems Theory”, TMH, New Delhi, Second Edition 1983.
6. PrabhaKundur, “Power system stability and control”, Mc-Graw Hill Inc, New York, 1993.
7. Taylor C.W., “Power System Voltage Stability”, Mc-Graw Hill Inc, New York, 1993.
8. Nagrath IJ, Kothari D.P., “Power System Engineering”, Tata Mc-Graw Hills, N Delhi 1994.
9.Weedy B.M. “Electric Power System” John Wiley and Sons, 3rd edition.
10.P.S.R. Murthy, “Power System Operation and Control”, B S Publ-ication
11.Power Generation, Operation and Control by A.J. wood and B.F. Wollenberg John Wiley & Sons Inc. 1984.
12.T.K. Nagsarkar, M.S. Sukhiza, -“Power System Analysis”, Oxford University Press.

List of Experiments:

1. To develop a program in Matlab for information of Y-bus matrix for N bus system.

2. Load flow solution for 3-bus system using Gauss- Seidel, Newton Raphson and FDLF methods upto 3 iteration.

2. Load flow solution for IEEE 6-bus and 30-bus system in Matlab using Newton Raphson method.

3. Assessment of transient stability of a single machine system.

4. Effect of compensation on voltage profile of IEEE 6-bus system.

5. Study of any software tools (PSAT, EDSA, MY POWER, ETAPetc).

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Electrical Engineering, VI Semester

EE-6005 Elective – II (I) Digital Signal Processing

COURSE CONTENTS

Unit-I

Introduction to Digital Signal Processing. Discrete time signals & sequences, linear shift invariant systems, stability and causality. Linear-constant coefficient difference equations. Frequency domain representation of discrete time signals and systems.

Unit-II

Applications of z-transforms, solution of difference equations of digital filters. System function, stability criterion, frequency response of stable systems. Realization of digital filters - direct, canonic, cascade & parallel forms.

Unit-III

Discrete Fourier series: Properties of discrete Fourier series, DFS representation of periodic sequences. Discrete Fourier Transforms: Properties of DFT: Fast Fourier Transforms (FFT) - Radix-2 decimation in time and decimation in frequency FFT Algorithms. Inverse FFT.

Unit-IV

IIR DIGITAL FILTERS: Analog filter approximations - Butterworth and Chebyshev. Design of IIR Digital filters from analog filters. Bilinear transformation method, step & impulse invariance techniques. Spectral Transformations.

Unit-V

FIR DIGITAL FILTERS: Characteristics of FIR Digital Filters frequency response. Design of FIR Digital Filters using Window Techniques. Comparison of IIR and FIR filters.

References:

1. Oppenheim & Schaffer, Digital Signal Processing, PHI.
2. John G. Proakis Digital Signal Processing: Principles, Algorithms, And Applications, 4/E
3. A. Anand Kumar Digital Signal Processing ,PHI
4. S.K. Mitra, Digital Signal Processing, TMH
5. Prof. N. Sarkar, Elements of Digital Signal Processing, Khanna Publication
6. Ludeman Fundamental of Digital Signal Processing, wileyindia
7. A. Antoniou, Digital Filters Analysis & Design, TMH

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
Credit Based Grading System
Electrical Engineering, VI Semester

EE-6005 Elective – II (2) Digital Control System

COURSE CONTENTS

UNIT I

Introduction to Discrete Time Control System Basic building blocks of Discrete time Control system, Sampling Theorem, Z transform and Inverse Z transform for applications for solving differential equations, Mapping between the S-plane and the Z plane, Impulse sampling and Data Hold.

UNIT II

Pulse Transfer Function and Digital PID Controllers The pulse transfer function, pulse transfer function of Closed Loop systems, Pulse transfer function of Digital PID controller, Velocity & Position forms of Digital PID Controller, Realization of Digital Controllers, Deadbeat response and ringing of poles

UNIT III

Design of Discrete Time Control System by conventional methods Stability analysis in Z-plane, Jury stability criterion, bilinear transformations, Design based on the root locus method, Digital Controller Design using Analytical Design Method.

UNIT IV

State Space Analysis of Discrete Time Control System State space representation of discrete time systems, Solution of discrete time state space equations, Pulse transfer function matrix, Eigen Values, Eigen Vectors and Matrix Diagonalization, Discretization of continuous time state space equations, Similarity transformations.

UNIT V

Pole Placement and Observer Design Concept of Controllability and Observability, Useful transformations in state space analysis and design, Stability improvement by state feedback, Design via pole placement, State observers. Optimal Control Quadratic Optimal Control and Quadratic performance index, Optimal state regulator through the matrix riccati equations, Steady State Quadratic Optimal Control.

Reference Books:

1. Discrete Time Control systems by K. Ogata, Prentice Hall, Second Edition.
2. Digital Control and State Variable Methods by M. Gopal, Tata McGraw Hill.
3. B. C. Kuo, Digital Control Systems, Oxford University Press, 2/e, Indian Edition
4. Digital control of Dynamic Systems by G.F.Franklin, J.David Powell, Michael Workman 3rd Edition, Addison Wesley .
5. Digital Control Engineering by M. Gopal, Wiley Eastern Ltd.
6. Digital Control by Kannan Moudgalya, John Wiley and Sons.
7. Digital Control Systems by Contantine H. Houpis and Gary B. Lamont, 2nd Edition, McGraw-Hill International.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Electrical Engineering, VI Semester

EE-6005 Elective – II (3) – IPR (Intellectual Property Rights)

Course Objective

Acquaint the students with the basic concepts of Intellectual Property Rights; and sensitize the students with the emerging issues in IPR and the rationale for the protection of IPR.

UNIT I Introduction

Introduction and Justifications of IPR, Nature of IP, Major forms of IP- *Copyright, Patent, Trade Marks Designs, Geographic indication, layout design of Semi conductors, Plant varieties, Concept & Meaning of Intellectual Property.*

Major international documents relating to the protection of IP - *Berne Convention, Paris Convention, TRIPS*. The World Intellectual Property Organization (WIPO).

UNIT II Copyright

Meaning and historical development of copyright , Subject matter , Ownership of copyright, Term of copyright, Rights of owner, Economic Rights, Moral Rights. Assignment and licence of rights, Infringement of copyright, Exceptions of infringement, Remedies, *Civil, Criminal, Administrative*, Registration Procedure.

UNIT III Patents

Meaning and historical development,. Criteria for obtaining patents, Non patentable inventions, Procedure for registration, Term of patent, Rights of patentee, Compulsory licence, Revocation, Infringement of patents, Exceptions to infringement, Remedies, Patent office and Appellate Board.

UNIT IV – Trade Marks, Designs & GI

Trade Marks: Functions of marks, Procedure for registration, Rights of holder, Assignment and licensing of marks, Infringement, Trade Marks Registry and Appellate Board.

Designs: Meaning and evolution of design protection, Registration, Term of protection, Rights of holder, unregistered designs.

Geographical Indication: Meaning and evolution of GI, Difference between GI and Trade Marks, Registration, Rights, Authorised user.

UNIT V Contemporary Issues & Enforcement of IPR

IPR & sustainable development, The Impact of Internet on IPR. IPR Issues in biotechnology, E-Commerce and IPR issues, Licensing and enforcing IPR, Case studies in IPR

References:

1. P. Narayanan, Intellectual Property Law, Eastern Law House
2. . Neeraj Pandey and Khushdeep Dharni, Intellectual Property Rights, PHI, 2014
3.N.S Gopala krishnan and T.G. Agitha, Principles of Intellectual Property, Eastern Book Co. Lucknow, 2009.
4.Anand Padmanabhan, Enforcement of Intellectual Property, Lexis Nexis Butter worths, Nagpur, 2012.
5.Managing Intellectual Property The Strategic Imperative, Vinod V. Sople, PHI.
6.Prabuddha Ganguli, " Intellectual Property Rights" Mcgraw Hill Education, 2016.

Course Outcome:

1. Students will be able to understand Primary forms of IPR
2. Students will be able to asses and critique some basic theoretical justification for major forms of IP Protection
3. Students will be able to compare and contrast the different forms of IPR in terms of key differences and similarities.
4. Students will be able understand the registration procedures related to IPR.
5. Students will be exposed to contemporary issues and enforcement policies in IPR.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
Credit Based Grading System

Electrical Engineering, VI-Semester

EX-6006 – Software/Simulation-II

Exercise 1

MATLAB Basic

simulation Mechanism and Simulation Tools, Starting and Ending MATLAB, MATLAB Desktop, Help Browser, Types of Files, Command Input Assistance,Operators and Special Characters, Variables and Arrays, Handling Arrays, Useful Built-in Functions, Control Structures, Input/Output Commands, File Handling

Exercise 2

Introduction to Plotting

The plot command, Formatting and Labeling a Plot, Multiple Plots, Adding Legend, Sub Plots, Plotting Complex Data, 2-D and 3-D Plots, Plotting a Function, Plot Editor, Interactive Plotting using Plotting Tool

Exercise 3

Programming in MATLAB

MATLAB Editor, MATLAB Programming, Debugging MATLAB Programs, MATLAB Debugger, Functions and Function Files, Differential Equation Solver, Symbolic Mathematics, Programming Examples

Exercise 4

Basic Electrical and Networks Applications

Analysis of Electrical Networks – Experiments based on Solution of Series-Parallel Circuits, Solution of system with linear equations - Experiments based on mesh and nodal analysis, Experiments for Validation of Network Theorems, Solution of Network Problems, Solution of First Order Differential Equation – Experiments for the study of Transients, Experiments for AC Signal Waveform Analysis, Study of Resonance in AC Circuit, Study of FrequencyResponseWaveformAnalysis,StudyofResonanceinACCircuit,StudyofFrequencyResponse

Exercise 5

System Modeling using SIMULINK

Simulation Steps, Getting Simulink, Creating and Simulating a Simulink Model, Simulink Solution of Differential Equation, Assigning Variables, Observing Variables During Simulation, Storing/Saving Data, Linking M-file with Model file, Creating and Masking Sub-systems, Solution using Laplace Transform Approach, Solution using Laplace Transform Approach, Study of dynamic response, Simulation of Non-Linear System, Examples such as Simulink model to generate sine, cosine waveform and rampsignal

BOOKS

1.“Modelling And Simulation Using Matlab-Simulink”,2011DrShailendra Jain, Willey India.
2. “Matlab Programming”,Rudraprasad.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Electrical Engineering, VI-Semester

EE-6007 Creativity and Entrepreneurship Development

Course Objective:

Understand and use tools for generating entrepreneurial ideas and problem solving. Understand and use tools for the selection of ideas.

Understand and gain the skills that are needed to implement ideas in today's society

Understand Entrepreneurship's part in process that includes idea generation and implementation.

Understand the concept of Entrepreneurship and its place in today's society

Course Outcomes:

Recognize an opportunity for a user group and frame an appropriate design challenge that addresses the need for the user.

Practice observation, interview and empathy skills to evolve a thorough understanding of the needs of the user.

Share and integrate team leanings.

Generate, develop and describe creative ideas that address the design challenge.

Syllabus:

1. The concept of Entrepreneurship, its history and its place in society.
2. The concept of Entrepreneurship and its relation to concept of innovation.
3. Creative processes for idea generation and problem solving.
4. Business plan.
5. Role of creativity, innovation and business research.
6. Entrepreneurship opportunities in contemporary business environment.

Reference Books :

1. Dollinger M.J. "Entrepreneurship strategies and resources," 3rd edition Pearson Education New Delhi.
2. Panda, Shiba charan "Entrepreneurship development", Anmol publication New Delhi.
3. Richard Blundel & Nigel locket, "Exploring Entrepreneurship : practices & perspectives Oxford.
4. Charles E. Banford & Garry D. Bruton, "Entrepreneurship – A small business Approach, Mcgrawhill Education.
5. P. Narayana Reddy, "Entrepreneurship" : Text and cases, Cengage learning
6. Rajeev Roy, "Entrepreneurship" Oxford.