RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA BHOPAL

Credit Based Grading System

Fire Technology & Safety Engineering, VI-Semester

FT-6001 Laws related to Safety, Health & Environment

COURSE OBJECTIVE:

1. To teach the significance of Factories Act and Rules in Safety Engineering.
2. To learn the provisions related fire prevention and protection in different laws, related to Safety, Health & Environment.
3. To teach the provisions and rules related to pollution control in important legislations.
4. To learn the other important legislations from safety, fire prevention and protection point of view.
5. To learn the provisions related to fire prevention and protection in fire service act and rules.

COURSE CONTENT:

Objective, Definition, Application including chapter-IV, Chapter-IVA, Chapter-IX of Factories Act 1948 and Chapter IX, Chapter-X of M.P. Factories rules 1962, Madhya Pradesh Control of Industrial Major Accident Hazard Rules 1999.

Objective, Definition, Application & provisions related to safety, fire prevention and fire protection in Laws such as Indian Explosive Act 1884, Gas Cylinder Rules 2004, Static and Mobile Pressure Vessel Rules, Petroleum Act 1934 with Rules 2002, Calcium Carbide Rules 1987.

Objective, Definition, Application provisions and rules related to control of pollution in important legislation such as Water (Prevention and Control of Pollution) Act, Air (Prevention and control of pollution) Act, Environment (Protection) Act 1986 with MSIHC Rules, Chemical Accident (EPPR) Rules 1996.

Objective, Definition, Application & provisions related to safety, fire prevention and fire protection in Other Important Legislations like-Boilers Act 1923, Electricity Act 2003 with rules, Dock workers (Safety, Health & Welfare) Act & Rules. Safety & Health provisions of Building & other construction workers (R.E.C.S.) Act 1986 and central rules 1998 and Mines Act.

Provisions related to fire prevention and protection in Delhi fire service Act2007 and Delhi fire service rules 2010, fire insurance assessment, Public liability insurance Act 1991 with Rules. Objective, Definition, Application, Provisions and Rules related to accidents, Occupational Diseases and Compensation in Employees State Insurance Act.

COURSE OUTCOME

1. Graduate will be able to explain significance of Factories Act and Rules in Safety Engineering.
2. Graduate will be able to explain provisions related fire prevention and protection in different laws.
3. Graduate will be able to explain provisions and rules related to pollution control in important legislations.
4. Graduate will be able to know other important legislations from safety, fire prevention and protection point of view.
5. Graduate will be able to explain provisions related to fire prevention and protection in fire service act and rules.

EVALUATION

Evaluation will be continuous an integral part of the class as well through external assessment.

REFERENCES

Factories Act 1948, M.P. Factories rules 1962
Indian Explosive Act 1884, Gas Cylinder Rules 2004
Petroleum Act 1934, Petroleum Rules 2002
Environment (Protection) Act 1986
Boilers Act 1923
M.P. C.I.M.A.H. Rules 1999
Delhi Fire Service Act 2007 with Rules 2010.
Employee State Insurance Act & Rules.
Building & other Construction workers, (R.E., C.S.) Act. 1996
Other Important Laws related to Health Safety and Environment.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA BHOPAL

Credit Based Grading System

Fire Technology & Safety Engineering, VI-Semester

FT-6002 Nuclear Safety and Radioactive Materials

COURSE OBJECTIVE:

1. To teach basic concept and fundamentals of Radioactivity and its effect.
2. To learn about the nuclear measurement and materials and their fire extinguishing guide lines.
3. To teach different types of reactors and their Engineered Safety Features in Nuclear Power Plant.
4. To learn the Radioactivity dispersion and waste management.
5. To study world & Indian Nuclear Power Plants & Case Study of major nuclear accidents.

COURSE CONTENT:

RADIATION BASICS

Electromagnetic Waves and spectrum, Radioactivity Phenomena, Alpha, Beta, Gamma Rays, Decay constant & half life, Penetration & Ionizing Effect, Exposure to natural External & Internal Radiation sources, Biological Effects of instant & long time exposures, Protection Factors, like Shielding, distance & time, Units of Radiation & occupational Doses, Roentgen, RAD, Grey, Becquerel & 20m Shevart limit, Weightage of neutron, beta & gamma for biological effects.

NUCLEAR DETECTORS & MATERIALS

Radiation detection & monitoring equipments, Giger Muller (GM) counter & Scintillation counter (SC), Film badge, pocket dosimeter & survey meters, Radioactive Pyrophoric Materials and Fire Extinguishing guide lines, Thorium Uranium and Plutonium, U235 concentration in natural Uranium and enrichment, Role of moderators like graphite & Heavy Water D2O, Radiation Placards & label requirements, Handling of Radiation Emergency (HAZMAT)

NUCLER POWER PLANT & SAFETY

Overview and brief description of BWR, PWR, RBMK, PHWR (CANDU) & gas reactors, Engineered Safety Features (ESF) like Containment, fail safe Cd control Rod/Boron Emergency Power, Steam Quench Water Screen or Pool Bubble, Design Basis Accident Cold Side Large Break Loss Of Coolant Accidents (LBLOCA), Residual Heat Removal & Gravity feed cooling water tank, Reliability improvement features, ATWS, Negative void & moderator/coolant temperature coefficient of reactivity, Doppler effect. ECCS evaluation criteria & acceptance models, Plant operating conditions & accident classification as per code 10 CFR50.

RADIATION DISPERSION AND WASTE MANAGEMENT

Reactor Containment & Ventilation System, Negative Building pressure, Personal Airlock entry, Pre & absolute filters, need of chimney, Super/Sub Adiabatic temperatures verses Altitude & inversion in cold, effect of wind direction, speed terrain & rain on dispersion of radioactivity, Release of Kr, Xe, I, Cs, Rb, Te & Tritium, Special case of Iodine absorption & path to human tonsil and remedies, Radioactive waste management of solid liquid and gases.

WORLD & INDIAN NPP, CANDU, CASE STUDY OF ACCIDENTS

History of NPP, Indian program of NPP, details of CANDU reactor and case study of accident like TMI 1976, Chernobyl 1984, Ishikava 2011.

COURSE OUTCOME

1. Students will be able to learn basics of Radiation and Biological effects.
2. Students will know radiation measurements and handling of radiation emergencies.
3. Learn about Nuclear Power Plants and Safety /Reliability Features.
4. Learn about Reactor Building Ventilation Systems and Nuclear Waste Management.
5. Student will learn World Nuclear Power Plants & analyze nuclear accidents.

LABORATORY

1. Study of Geiger Muller counter structure & circuit.
2. Detection of Radiation by GMC. Pulse height & shape by changing capacitance & resistances.
3. To find dead time of GMC by single source.
4. Study of Sodium Iodide (NaI) scintillation counter structure & circuit.
5. Calibration of (NaI) scintillation counter Height & width of peak as a function of energy of ϒ-radiation.
6. Study of a radiation dosimeter.
7. Study of β Ray Plot

EVALUATION will be continuous and integral part of the class as well through external assessment.

REFERENCES *J. Misumi, B. Wilpert and R.Miller, Nuclear Safety: A Human Factors Perspective, Taylor & Francis.*
Gianni Petrangeli, Nuclear Safety, Elsevier-2006
John C. Lee and Morman J. McCormick, Risk and Safety Analysis of Nuclear Systems, Wiley- 2011
Joe Varela, Hazardous Materials Handbook for Emergency Response, International Thomson Publishing.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA BHOPAL

Credit Based Grading System

Fire Technology & Safety Engineering, VI-Semester

FT-6003 Fire Fighting & Safety Equipments

COURSE OBJECTIVE:

1. To learn about the fire hose pipes and appliances with different fire stream patterns.
2. To teach about the types, operation, maintenance and fire ratings of portable fire extinguishers.
3. To learn about the principles of water supply and its distribution in fire service.
4. To teach about the fundamentals of pumping and pump hose associated with water line distribution in fire fighting.
5. To learn about the types of fire pump and evaluation of pump power with their efficiency.

COURSE CONTENT:

FIRE HOSE AND FOAM APPLIANCES
Hose Damage Types and General Care, Fire Hose Couplings and Hose Appliances Tools, Hose Rolls types and Basic Hose Loads, Types of Supply Hose lays, Nozzle Discharge formula, Nozzle Reaction, Fire Stream Patterns and Nozzles- Solid Stream, Fog Stream and Broken Stream, Maintenance of Nozzle, Foam Proportioners, Delivery Devices and Generating Systems, Foam Hazards and Foam Application Techniques.

FIRE EXTINGUISHER AND RATINGS
Portable Fire Extinguishers, Types and Means of Agent Expelling, Pump Type, Stored Pressure, Water mist Stored, Wet Chemical Stored and Clean agent type Fire Extinguishers, Fire Extinguisher Rating System for A,B,C, D and K class fire, Multiple marking means, Selection and Method of Application, Maintenance Procedures and filling of different types of Fire Extinguisher.

WATER SUPPLY AND DISCHARGE MEASUREMENT
Water Supply Principles in Fire Service, Source and Treatment Process, Water Storage and Distribution, Fire Hydrant Inspection, Maintenance, Fire Hydrant Class with Flow capacity and color code, Discharge Measurement Devices, Pitot Tube, Venturi meter, Quantity Meter, Rota meter and V-Notch.

RELAY PUMPING AND FIRE PUMPS
Drafting and Relay Pumping, Basics of Drafting, Drafting Equipments, Water Lift and Altitude, Drafting Procedure, Need for Relay Pumping, Capacity of Pumpers, Types of Fire Pumps, Piston Pumps, Centrifugal Pump, Rotary Pumps, Pump Panel and its Components.

FIRE SERVICE PUMP HOUSE
Pump House, Operation of Main, Standby and Jockey Pump, Multistage of Pumps, Pump Power- Water Horsepower (WHP), Brake Horsepower (BHP), Efficiency of the Pump, Prime Movers and Pressure setting of Pumps, Continuity Equation and different forms of Energy, Loss of Head in Pipes.

COURSE OUTCOME

1. Graduate will be able to calculate nozzle reaction, discharge rate and fire stream patterns in fire hose pipe.
2. Graduate will be able to perform operation and maintenance of portable fire extinguishers.
3. Graduate will be able to demonstrate fire fighting operation using foam and foam making equipment.
4. Graduate will be able to design capacity of fire pumps and arrangement of fire pumps in pump house.
5. Graduate will be able to explain water supply principles its storage and distribution in fire service.

LABORATORY

1. To perform and practice the water based fire fighting operations using different hand held branch pipe with the help of multipurpose fire tender.
2. To perform and practice the foam based fire fighting operations using 5X foam making branch pipe and medium expansion foam generator with the help of multipurpose fire tender.
3. To perform and practice the foam based fire fighting operations using 10X foam making branch pipe, foam proportioners and high expansion foam generator with the help of multipurpose fire tender.
4. To Perform hydrostatic burst pressure test on hose pipes of different material using test procedure in accordance with IS 443.
5. To perform the abrasion resistance test on hose pipes of different material using hose pressure testing machine.
6. To perform and practice the transformer fire extinguishment using water mist store pressure type portable fire extinguisher.
7. To perform and practice the filling and refilling procedure for Gas Cartridge water and foam types Fire Extinguishers.
8. To perform and practice the filling and refilling procedure for Gas Cartridge Dry Chemical Powder type Fire Extinguisher.

EVALUATION

Evaluation will be continuous an integral part of the class as well through external assessment.

REFERENCES

Paul Spurgeon, Fire Service Hydraulics and Pump Operations, Penn Well Corporation-2012.
Essentials of Fire Fighting International fire Service Training Association.
G.C.Mishra, Concept and Calculation: Fire Service Hydraulics PPA Publications.
N. Sesha Prakash, Manual of Fire Safety CBS Publishers & Distributors Pvt. Ltd.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA BHOPAL

Credit Based Grading System

Fire Technology & Safety Engineering, VI-Semester

FT-6004 Electrical Fire Safety

COURSE OBJECTIVE

1. To learn about measurement and error analysis are a fundamental part of experimental science and also learn about role of transducer in Instrument, Classification.
2. To learn about analog to digital, digital to analog conversion techniques.
3. To learn about the automatic fire detection type and their design.
4. To understand the how to controlling electrical fire hazards.
5. To Teach the effect of electric shocks on human body with its prevention.

COURSE CONTENT:

MEASUREMENT AND ERROR

Accuracy & precision, Sensitivity, Linearity, Resolution, Hysteresis, Loading effect. Measurement of current, Voltage, Power and Impedance. DC & AC Ammeter, AC Voltmeter using Rectifier.

Transducer: Classification of Transducers, Strain Gauge, Displacement Transducer- LVDT (Linear Variable Differential Transformer), Temperature Transducer- RTD (Resistance Temperature Detector), Thermistor, Thermocouple, Piezo Electric Transducer, Optical Transducer- Photo emissive, Photo conductive, Photo Voltaic, Photo- diode Photo Transistor.

DIGITAL MEASUREMENT AND INSTRUMENT

Advantage of Digital instrument over Analog Instrument, DAC (Digital Analog Converter), Variable resistive type, R-2R ladder type, Binary ladder, Weighted Converter using Op-amp and Transistor, ADC (Analog to Digital Converter) - Ramp Technique, Dual slope.

FIRE DETECTION CUM ALARM SYSTEM

Detector and their design- Smoke- Ionization smoke detector, Photo electric smoke detector, Air sampling type smoke detectors, Heat- Rate compensation detectors, Rate of Rise Detector, Electronic Spot type heat detectors, Gas Sensing Fire Detectors, Radiant Energy Sensing Fire Detector- Flame detector, Spark/Ember Detector, Selection of Detector.

CONTROLLING ELECTRICAL FIRE HAZARDS

Over current protection- Relay Fuses, Circuit Breaker, Insulator, Earthing- Their method and applications, Lighting Phenomena & Protection, Cables & Wiring – Polyvinyl Chloride, Mineral Insulated, Silicon Rubber Cable, Cross linked Polyethylene.

ELECTRICAL CURRENT EFFECT IN THE HUMAN BODY

Introduction to electrical safety, Possibility of Getting Electric Shock, Effect of high current, AC shocks versus DC Shock, prevention from Electrical Fire.

COURSE OUTCOME

1. Graduate will be able to get the basic idea of measurement & the error associated with measurement and differentiate between the types of transducers available.
2. Graduate will be able to analysis and design digital to analog converter & analog digital converter.
3. Graduate will be able analyze and design automatic fire detection.
4. Graduate will be able identity & prevent various electrical hazards.

LABORATORY

1. Study and characteristics of LVDT & to measure displacement.
2. Measurement of Temperature using Thermocouple and Thermistor.
3. Specification and working of Fire Safety Equipments.
4. Specification of Electric Supply in different equipment, Housing hold and Industry.
5. Analysis of DC & AC current applications and appliances.
6. Study of Advance Automatic control panel for Fire Safety.
7. Operation of heat detector.
8. Operation of Smoke detector.

EVALUATION

Evaluation will be continuous an integral part of the class as well through external assessment.

REFERENCE

H.S. Kalsi, Electronics Instrument, TMH.
K. Sawhney, Instrumentation & Measurement, Dhanpat Rai & Co.
J. Maxwell Adams, Electrical Safety a Guide to the Causes and Prevention of Electrical Hazards, IEE Power series-19.
D.C. Winburn, Practical Electrical Safety, Marcal Dekker.
S.Rao, Prof. H.L. Saluja, Electrical Safety, Fire Safety Engineering and Safety Management.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA BHOPAL

Credit Based Grading System

Fire Technology & Safety Engineering, V-Semester

Elective-II FT-6005 (1) Entrepreneurship and Management Concept

COURSE OBJECTIVE:

1. To learn the fundamental of systems.
2. To learn about principles and function of management and its theory.
3. To learn about the marketing and its fundamental concepts.
4. To teach the productivity and operations.
5. To learn the fundamental concept of entrepreneurship and opportunity analysis.

COURSE CONTENT:

SYSTEM CONCEPTS

Types, definition & characteristics; supra & subsystems, key component; boundary & interface complexity; feedback (pull) & feed forward (push) controls, open flexible-adaptive system, computer as closed system, law of requisite variety; system coupling, stresses and entropy; functional & cross functional system; Steven Alter's nine element work system model and its comparison with IPO (input-processing-output) model, structure and performance of work systems leading to customer delight.

MANAGEMENT

Importance, definition and functions; schools of theories, knowledge driven learning organization and e-business; environment, uncertainty and adaptability; corporate culture, difficulties and levels of planning, BCG matrix, SWOT analysis, steps in decision making, structured and unstructured decision; dimensions of organizations, size/specialization, behavior formalization, authority centralization, departmentalization, span and line of control, technology and Minzberg organization typology, line, staff & matrix organization, coordination by task force, business process reengineering and process of change management, HR planning placement and training, MIS; attitudes and personality trait, overlap and differences between leader & manager, leadership grid, motivation, Maslow's need hierarchy and Herzberg two factor theory, expectation theory, learning process, team work and stress management.

MARKETING

Importance, definition, core concepts of need want and demand, exchange & relationships, product value, cost and satisfaction (goods and services) marketing environment; selling, marketing and societal marketing concepts; four P's, product, price, placement, promotion; consumer, business and industrial market, market targeting, advertising, publicity, CRM and market research. Finance: Nature and scope, forms of business ownerships, balance sheet, profit and loss account, fund flow and cash flow statements, breakeven point (BEP) and financial ratio analysis, pay-back period, NPV and capital budgeting.

PRODUCTIVITY AND OPERATIONS

Productivity and standard of living, types of productivity, operations (goods and services) Vs project management, production processes and layouts, steps in method improvement, time measurement, rating and various allowances; standard time and its utility, predetermined motion and time method, concepts of product and process specification, TQM, cost of quality, introduction to lean manufacturing (JIT), QFD, TPM & six sigma quality.

ENTREPRENEURSHIP

Definition and concepts, characteristics, comparison with manager, classification, theories of entrepreneur, socio, economic, cultural and psychological; entrepreneur traits and behavior, roles in economic growth, employment, social stability, export promotion and indigenization, creating a venture, opportunity analysis competitive and technical factors, sources of funds, entrepreneur development program.

COURSE OUTCOME

1. Graduate will be able to explain different types and characteristics of systems.
2. Graduate will be able to apply principles of management and its theory at work place.
3. Graduate will be able to explain marketing skills for the selling of goods and services.
4. Graduate will be able to explain productivity and operations in an organization.
5. Graduate will be able to present concept and characteristics of entrepreneurship.

EVALUATION

Evaluation will be continuous an integral part of the class as well through external assessment.

REFERENCES

Daft R; The new era of management; Cengage.
Bhat Anil, Arya kumar; Management: Principles ,Processes Practices; Oxford higher edu.
Davis & Olson; Management Information System; TMH.
Steven Alter; Information systems, Pearson, www.stevenalter.com
Kotler P; Marketing management;
Khan, Jain; Financial Management;
ILO; Work study; ILO.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA BHOPAL

Credit Based Grading System

Fire Technology & Safety Engineering, V-Semester

Elective-II FT-6005 (2) 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

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.

References:

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

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA BHOPAL

Credit Based Grading System

Fire Technology & Safety Engineering, VI-Semester

FT-6006 Fire Fighting Practices

COURSE OBJECTIVE:

To learn and teach about the standard practices associated with management, hydrant, hose, pumps and techniques as per foundation training of fire service manual.

COURSE CONTENT:

MANAGEMENT OF STANDARD PRACTICES
PSP1- To mount the appliance with a crew of four.
PSP2 - To mount the appliance with a crew of five.

FOAM STANDARD PRACTICES
F1- To get a foam making branch to work with a crew of four.
F2- To get an Inline foam Generator to work with a crew of five (one delivery)
F3- To get an In line foam generator to work with a crew of five (two deliveries)
F4- To get an in line variable Inductor to work with a crew of five (one delivery)

HYDRANT/HOSE STANDARD PRACTICES
H1- To replace a burst length of hose with a crew of four.
H2- To divide a length of hose in to two using dividing breeching with a crew of five.
H3- To remove a dividing breeching from a line of hose with a crew of five.

PUMP STANDARD PRACTICES
P1- To get a pump to work from a hydrant using soft suction with a crew of five (two deliveries)
P2- To get a ground monitor to work with a crew of five.
P3- To get a portable pump to work from open water with a crew of five (two deliveries).

TECHNIQUES
T1- To effect a rescue using rope and associated equipments with a crew of three.
T2- To effect a rescue using five personnel, an extension ladder, rope and associated equipment.
T3- To define and implement the nine main protocols required to ensure the safe extrication of casualty from an entrapment situation.
T-4 To define and operate the one meter and two meter safe working area around a motor vehicle involved in a road traffic accident.

COURSE OUTCOME

1. Graduate will able to perform and operates standard practices associated with management, hydrant, hose, pumps and techniques as per foundation training of fire service manual.

EVALUATION
Evaluation will be continuous an integral part of the class as well through external assessment.

REFERENCES
Fire and Rescue Service Manual Volume-4, Foundation Training and Development, HM Fire Service Inspectorate Publications Section.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA BHOPAL

Credit Based Grading System

Fire Technology & Safety Engineering, VI-Semester

FT-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.