[AS-19001] BSc-Applied Chemistry

Teaching Scheme: **Evaluation Scheme:**

Lectures: 3hrs / week **T1-20M, T2-20M**

End-SemExam:60M

Course Outcomes(COs):

Student will able to

CO1: Appreciate material properties and their engineering applications
CO2:Analyse and select the most appropriate engineering material
CO3: Perform experiments to establish suitability of various chemicals, materials and techniques
CO4: Develop problem solving ability to justify choice of chemicals and materials
CO5: Acknowledge the current developments in the field of nanotechnology, energy storage systems and green chemistry for sustainable development

Unit 1: Material Chemistry **[9 Hrs]**

(A) Introduction to the basics of chemistry ,Relevance of Chemistry to different Engineering specializations, Classification of Materials: Metals and alloys, Ceramics and glasses, refractories, cement ,polymers, composites, nanomaterials etc. and their properties.

(B) Corrosion and corrosion control

Electrochemistry of corrosion**,** Mechanism of dry corrosion& wet corrosion ,Factors affecting corrosion, Testing of corrosion- Weight-loss and weight-gain method, Microscopic exam, Methods of prevention of Corrosion- cathodic (Sacrificial, impressed current) and anodic protection, Proper selection of materials, Protective coatings- 2 examples of Metallic coatings, 2 examples of non-metallic coatings, paints

Unit 2: Polymer Chemistry **[7Hrs]**

Introduction, Classification of polymers, Use and disposal of polymers, Polymer terminologies, commercially important polymers with synthesis and applications (plastics, fibres, adhesives, elastomers, conducting polymers), properties of polymers- Solubility, Molecular Weight, Crystallinity, Glass transition temperature, Role of additives in polymers, Reinforced plastics .

Unit 3: Instrumental methods of Chemical Analysis [7Hrs]

Qualitative and quantitative analysis, Conventional methods of analysis: Titrimetry, gravimetry, Modern analytical techniques: an overview, electro-analytical, chromatography, thermo-analytical, Spectroscopy, XRD, TEM,SEM, nephlometry, turbidimetry, **Spectroscopy**: Principle, Basic instrumentation, Ultraviolet-Visible spectroscopy, Infra-Red Spectroscopy, Spectroscopy as an analytical tool, Accuracy, Precision, Reliability of Analytical data, confidence limits

Unit 4: Energy Storage systems [7Hrs]

Introduction and overview, Basic principles &electrochemistry, batteries- characteristics, Li ion batteries
Fuel cells- Principle of Fuel Cell, , Components of fuel cell. Various types of Fuel cell AFC, PEMFC, methanol based fuel cell and their applications. Hydrogen production; Hydrogen storage system

Unit 5 : Water Chemistry [6 Hrs]

Specifications for water, Impurities in water (Suspended, Biological & Dissolved chemical), Water quality parameters, Analysis of water : alkalinity, hardness(boiler feed water), chloride content, methods & problems, DO, BOD, COD, ion transport, conductivity , Treatment of water and waste water-membrane filtration, RO

Unit 6: Green Chemistry [6 Hrs]

12 principles of green chemistry **,**Synthesis of chemicals by green chemistry routes**,** 3Rs-Reduce,Reuse and Recycle, disposal of plastics, Biodegradable polymers-need, constituents required, factors ,properties, applications

Text Books

1. A textbook of Engineering Chemistry: Jain and Jain, Dhanpatrai Publication.
2. A textbook of Engineering Chemistry: S. S. Dara, S. Chand Publication 2010 edn.
3. A textbook of Engineering Chemistry: Shashi Chawla, Dhanpatrai Publication.

Reference Books

1. Polymer Science: V.R.Gowariker, New Age International Publication
2. Introduction to Nanotechnology: Charles P. Poole, Frank J. Owens.
3. Fuel Cells- Shripad Revankar, Pradeep Majumdar
4. Fuel Cell Fundamentals-Ryan O'Hayre, Suk-Won Cha,John wiley & Sons
5. Recent trends in Fuel Cell Science and Technology-Suddhasatwa Basu,Anamaya Publishers, New Delhi

6. Instrumental Methods of Chemical analysis, Willard Dean, Merrittee, Tata MacGrow Hill Limited.

[CH-19002] BSC- Applied Chemistry Laboratory

Teaching Scheme:
2hrs/week

Evaluation Scheme: Practical:
Total Marks: 100 M

CCE: 70M, ESE: 30M

Course Outcomes(COs):

Student will be able to

CO1: Apply the theoretical knowledge to practical use and solve engineering problems
CO2: Select suitable chemicals, apparatus and appropriate techniques for experimental analysis
CO3: Design and carry out scientific experiments, accurately record and analyze the results of experiments

1. Preparation and Standardization of Analytical Reagents (importance of distilled water)
2. Determination of chloride content of water by Mohr's method
3. Estimation of copper from brass by iodometry
4. pH-metric titration of Acid/Base
5. Colorimetric determination of concentration of given inorganic sample.
6. Preparation of a polymer
7. Determination of molecular weight of a polymer using Ostwald's viscometer
8. Determination of temporary and permanent hardness of water sample by EDTA method.
9. Determination of total alkalinity of water sample.
10. Preparation of a nanomaterial
11. Preparation of a chemical compound using green chemistry pathway

[AS19001] BSC- Applied Chemistry Laboratory

Teaching Scheme: **Evaluation Scheme: Practical: 2hrs/week**

Total Marks: 100 M

CCE: 70M, ESE: 30M

1. Preparation and Standardization of Analytical Reagents (importance of distilled water)
2. Determination of chloride content of water by Mohr's method
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11. Preparation of a chemical compound using green chemistry pathway

College of Engineering, Pune
Biology For Engineers (CT16002)
Second Year B. Tech. Program

Teaching Scheme	**Examination Scheme**
Lectures : 3 lectures/week	T1-**20** (Classroom activity),T2-**20** (Assignment/s) Semester End Examination-**60**

Objectives: To make students conversant with basic Biology regarding the life processes. To impart knowledge about the common corridors of biology and engineering as biologically inspired technologies like designs in nature, bioenergetics, bioprocesses, biomaterials, biomechanics, bioimaging, bioinformatics, bioinstrumentation etc. To introduce recent trends in biology viz. genetic & tissue engineering, stem cell engineering, bio and nanotechnology etc. with the objective of appreciating engineering principles in biological systems.

Course Education Objectives

1. To introduce an interdisciplinary approach of biology and engineering
2. To understand biologically inspired technologies
3. To pursue the studies in engineering having application in biological, medical, environmental & agricultural fields

Course Outcomes:-

Students would be able to

1. correlate basic biological and engineering principles in the organizational structure of living systems at molecular, cellular and system level
2. appreciate the applications of energy transformations in biological systems in view of solving energy conservation targets
3. analyze information processing in biological systems
4. evaluate basic biological processes of transport, communication and defense mechanism with engineering perspectives
5. apply the modern developments in biology and engineering for society, human health and environmental sustainability

Unit I: **(06 Hrs)**

Biomolecules and biopolymers: Structure and Function Organic and inorganic molecules; Unique Properties of water, Vitamins and Minerals, Carbohydrates, Lipids, Amino Acids and proteins, Nucleic Acids (DNA and RNA)

Unit II: **(06 Hrs)**

Levels of organization of life: Cell as a basic unit of life, prokaryotic and eukaryotic cells, microbes, plant and animal cells; Cell organelles – structure and function; Cell membrane Levels of organization: cells, tissues, organs, systems & organism

Unit III: **(06 Hrs)**

Energy transformations in Chloroplast: Photosynthesis (photochemical & biochemical phase) and ATP generation, Aerobic and anaerobic systems Energy transformations in Mitochondria: Cellular respiration (glycolysis and Kreb cycle) and ATP generation Bioenergetics: Thermodynamic principles applied to biology, negative entropy changes in biological systems, Free Energy, Chemical Equilibrium

Unit IV: **(06 Hrs)**

Expression and Transmission of Genetic Information: DNA replication, Enzyme driven process of DNA cloning, Protein synthesis- Transcription & translation Techniques for optimization: a. At molecular level: Recombinant DNA Technology, DNA hybridization, PCR, DNA microarray

Unit V: **(06 Hrs)**

Transport Phenomena in Biological Systems: Membrane channels and ion channels; Fluid flow and mass transfer (nutrients & ions); In plants: Xylem and Phloem; In animals: Blood and Lymph Transport of gases: Oxygen and Carbon dioxide Heat Transport - Body temperature regulation. Communication: Cell junctions, Cell-cell communications – cell signaling, Hormones, Pheromones and cell behavior Defense mechanisms: In plants: Herbivory, secondary metabolites In animals: Innate and Adaptive immune systems

Unit VI: **(06 Hrs)**

Engineering perspectives of biological sciences: Biology and engineering crosstalk – At cell level: Hybridoma technology At tissue level: Plant Tissue Culture, Animal Tissue Culture; Tissue Engineering: Principles, methods and applications Introduction to Biomimetics and Biomimicry, nanobiotechnology

References:

1. Lodish H, Berk A, Zipursky SL, et al. (2000) Molecular Cell Biology. W. H. Freeman.
2. Lehninger, A. L., Nelson, D. L., & Cox, M. M. (2000). *Lehninger principles of biochemistry*. New York: Worth Publishers.
3. Rao CNR, et.al. Chemistry of Nanomaterials: Synthesis, Properties and Applications.
4. Eggins BR. (2006) Biosensors: An Introduction. John Wiley & Sons Publishers.
5. Palsson B.O. and Bhatia S.N. (2009) Tissue Engineering. Pearson.
6. Yoseph Bar-Cohen (2005). Biomimetics- Biologically Inspired Technologies
7. Joseph D. Bronzino, John Enderle, Susan M. Blanchard (1999) Introduction to Biomedical Engineering.

8. Routledge Taylor and Francis group (2012). Introduction to Bio-medical Engineeering technologies

Additional topics to be discussed with students (in branch-wise manner based on BM 600:Introduction to Biomedical Engineeringof the IITB syllabus)

Understanding various diseases/ disorders with respect to the physiology, diagnosis, therapeutics (biomaterials and instrumentation) and medical procedures e.g. Cardiovascular, Renal, Aurthopedicetc

Disease/ Disorder	**Physiology**	**Diagnosis**	**Therapeutics**		**Medical procedure**
			Biomaterials	**Instrumentation**	
Cardiovascular disease	Heart – electrical stimulation and mechanical pumping	ECG, Angiography	Stents for angioplasty	Heart lung machines	Angioplasty, By-pass surgery
Bone/skull injuries	Biomechanics of musculo-skeletal system	Medical imaging technologies Arthroscopy	Prosthetics	Arthroscope Biomechanics Prosthetics	Joint replacement Total hip replacementre habilitati-on engg
Kidney disorders	Functioning of Kidney	Medical imaging technologies	Filtration membranes	Dialyser	Dialysis

Effective Communication Skills(HSMC 19001)

Teaching Scheme: **Evaluation Scheme:**

Practicals: 2 hrs / week **4 Assignments**

(90M: Assignments)

(10M: attendance)

Course Outcomes (COs):

After successful completion of the course, students will be able to - 1. Recall basic language skills – listening, speaking, reading and writing and attempt tasks by using functional grammar and vocabulary effectively2. Reproduce their understanding of concepts / principles of communication skills3. Analyze aspects of effective communication and its usage in various fields4. Develop the knack for structured conversation to make their points of view clear to the audience5. Portray their learning well in front of large audience on a variety of relevant situations like group communication, discussion or presentation

Unit 1: Foundation of Language **[6 Hrs]**

Effective communication, grammaticality and acceptability, accuracy and appropriateness, common errors, vocabulary enhancement

Unit 2: Listening **[6 Hrs]**

Stages of listening (pre, while and post), strategies to develop listening skills, listening comprehension, problematic sounds

Unit 3: Speaking **[6 Hrs]**

Oral communication, pronunciation, stress, connected speech, intonation and pauses, formal and informal expressions, conversation skills, group discussion, presentations

Unit 4: Reading and Writing **[6 Hrs]**

Types of reading, techniques of reading, reading comprehension, reading manuals, formal emails, letters etc. Stages of writing (pre, while and post), 7 Cs of technical communication, drafting, editing, summarizing, letter / email writing

Reference Books

1. Communication Skills for Engineers by S. Mishra & C. Muralikrishna (Pearson)
2. Communication Skills for Technical Students by T.M. Farhathullah (Orient Longman)
3. Written Communication in English by Saran Freeman (Orient Longman)
4. Essential English Grammar (Elementary & Intermediate) Raymond Murphy (CUP)
5. Communication for Business: A Practical Approach by Shirley Tailor (Longman)
6. Developing Communication Skills by Krishna Mohan & Meera Banerji (Macmillan)
7. Business Correspondence and Report Writing, R. C. Sharma & Krishna Mohan (Tata McGraw Hill)

[HS-19002] Design Thinking

Teaching Scheme:

Practical: 2hrs/week

Evaluation Scheme:

Total Marks: 100 M

CCE: 50M, ESE: 50M

Course Outcomes (CO):

Student will able to

1. Compare and classify the various learning styles and memory techniques and Apply them in their engineering education
2. Analyze emotional experience and Inspect emotional expressions to better understand users while designing innovative products
3. Develop new ways of creative thinking and Learn the innovation cycle of Design Thinking process for developing innovative products
4. Propose real-time innovative engineering product designs and Choose appropriate frameworks, strategies, techniques during prototype development
5. Perceive individual differences and its impact on everyday decisions and further Create a better customer experience

Unit 1: An Insight to Learning

Understanding the Learning Process, Kolb's Learning Styles, Assessing and Interpreting

Unit 2: Remembering Memory

Understanding the Memory process, Problems in retention, Memory enhancement techniques

Unit 3: Emotions: Experience & Expression

Understanding Emotions: Experience & Expression, Assessing Empathy, Application with Peers

Unit 4: Basics of Design Thinking

Definition of Design Thinking, Need for Design Thinking, Objective of Design Thinking, Concepts & Brainstorming, Stages of Design Thinking Process (explain with examples) – **Empathize, Define, Ideate, Prototype, Test**

Unit 5: Being Ingenious & Fixing Problem

Understanding Creative thinking process, Understanding Problem Solving, Testing Creative Problem Solving,

Unit 6: Process of Product Design

Process of Engineering Product Design, Design Thinking Approach, Stages of Product Design, Examples of best product designs and functions, **Assignment – Engineering Product Design**

Unit 7: Prototyping & Testing

What is Prototype? Why Prototype? Rapid Prototype Development process, Testing, **Sample Example,** Test Group Marketing

Unit 8: Celebrating the Difference

Understanding Individual differences & Uniqueness

Group Discussion and Activities to encourage the understanding, acceptance and appreciation of Individual differences

Unit 9: Design Thinking & Customer Centricity

Practical Examples of Customer Challenges, Use of Design Thinking to Enhance Customer Experience, Parameters of Product experience, Alignment of Customer Expectations with Product Design

Unit 10: Feedback, Re-Design & Re-Create

Feedback loop, Focus on User Experience, Address "ergonomic challenges, User focused design, rapid prototyping & testing, final product, **Final Presentation – *"Solving Practical Engineering Problem through Innovative Product Design & Creative Solution"***

MLC– Professional Laws, Ethics, Values and Harmony
S .Y. B. Tech

Credit - 0
Audit Course

Teaching Scheme:-

Lectures: 1 hr/week

Evaluation Scheme-
Total - 100 Marks
Continuous evaluation-
Assignments /
Presentations/Test

Course Outcomes

Student will be able to

CO1. Comprehend the need and importance of Law - for individuals, Companies , society and the nation;

CO2. Relate laws like The Contract Law, Workplace Law , IPR… to the Engineering Profession;

CO3. Appraise the importance of being a law-abiding person by understanding the correlation between Rights, Duties and Responsibilities;

CO4. Self-explore by using different techniques to live in harmony at various levels

CO5. Analyze themselves and understand their position with respect to the moral and ethical character needed for a successful and satisfactory work life…

Unit 1 **(02 hrs)**

Significance of Law

Concept, need, framework of law;
Types of laws for individuals and companies;
Importance of law to the citizens, business , society and the nation;
Law of Torts and the basics to protect oneself and the company;

Unit 2 **(03 hrs)**

Law for Engineers

Relevance of law to the Engineers;
Engineering profession, business and Contract Law.

Law affecting the Workplace

Responsibilities / Duties of Employers / Employees;
Hiring Practices

Introduction to Intellectual Property Law (IPR)

Unit 3 **(01 hr)**

Code of conduct

Professional Code of Conduct for Engineers**;**
Correlation between Rights, Duties and Responsibilities;
Relationship between Law and Ethics.

Unit 4 **(02 hrs)**

Self Awareness

Understanding oneself and others; Johari Window- Concept, explanation, implementation

Unit 5 **(02 hrs)**

Needs & Self

Needs and its importance; Creating goals and managing needs to systematical actualization

Unit 6 **(02 hrs)**

Ethics and values

Professional ethics and their importance for students; Understanding the importance of values & their application in everyday life

References

- Business Law- By Saroj Kumar
- Law of Contract- By Avtar Singh
- Business Law- By G K Kapoor
- Business & Commercial Laws – By Sen & Mitra
- Business Law for Engineers- by Calvin Frank Allen
- Hilgard, E. R.; Atkinson, R. C. & Atkinson, R.L. (1975). *Introduction to Psychology*. 6th Edition. New Delhi: Oxford and IBH Publishing Co. Pvt. Ltd.
- Govindarajan, M; Natarajan, G. M. & Senthilkumar, V.S. (2013). *Professional Ethics & Human Values*. Prentice Hall: New Delhi
- Gogate, S. B. (2011). Human Values & Professional Ethics. Vikas Publishing: New Delhi.
- Jayshree Suresh, Raghavan B.S.(2016). Human Values & Professional Ethics: S Chand & Company.Pvt.Ltd: New Delhi.

[ML-21002] Environmental Studies

(Adopted from the 'Ability Enhancement of Compulsory Courses: Environmental Studies' as prescribed by the Expert Committee of University Grants Commission as per directives of Hon'ble Supreme Court)

Teaching scheme
Lectures: 1 Session/week
Assignments: 2 hours/week

Evaluation scheme
Periodic Assignments & Tests

Course Outcomes:

At the end of the course, students will demonstrate the ability to:

- Comprehend Sustainable Development Goals for present generation
- Appreciate environmental resources, functioning of an ecosystem, significance of biodiversity and environmental challenges
- Analyze the current status of environment with respect to precautionary mechanisms and control measures
- Appreciate the role of an engineer for better tomorrow

Unit 1 **[2 Hrs]**

Multidisciplinary nature of environmental studies
Definition, scope and importance
Need for public awareness.

Unit 2 **[8 Hrs]**

Natural Resources
Renewable and non-renewable resources:
Natural resources and associated problems .
Forest resources : Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. Water resources : Use and over-utilization of surface and ground water,floods, drought, conflicts over water, dams-benefits and problems. Mineral resources: Use and exploitation, environmental effects of extractingand using mineral resources, case studies. Food resources : World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, waterlogging, salinity, case studies. Energy resources : Growing energy needs, renewable and non renewableenergy sources, use of alternate energy sources. Case studies. Land resources : Land as a resource, land degradation, man inducedlandslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

Unit 3 **[6 Hrs]**

Ecosystems
Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids, Introduction, types, characteristic features, structure and function of the following ecosystem :-Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit 4 **[8 Hrs]**

Biodiversity and its conservation

Introduction – Definition : genetic, species and ecosystem diversity, Bio geographical classification of India, Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values, Biodiversity at global, National and local levels, India as a mega-diversity nation, Hot-sports of biodiversity, Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India, Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

Unit 5 **[8 Hrs]**

Environmental Pollution

Definition, Cause, effects and control measures of :-Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards, Solid waste Management : Causes, effects and control measures of urban andindustrial wastes, Role of an individual in prevention of pollution, Pollution case studies, Disaster management : floods, earthquake, cyclone and landslides.

Unit 6 **[7 Hrs]**

Social Issues and the Environment

From Unsustainable to Sustainable development, Urban problems related to energy, Water conservation, rain water harvesting, watershed management, Resettlement and rehabilitation of people; its problems and concerns. Case Studies, Environmental ethics : Issues and possible solutions, Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies, Wasteland reclamation, Consumerism and waste products. Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, Public awareness.

Unit 7

[6 Hrs]

Human Population and the Environment

Population growth, variation among nations, Population explosion – Family Welfare Programme, Environment and human health, Human Rights, Value Education, HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environment and human health, Case Studies.

Unit 8 **[5 Hrs]**

Field work

Visit to a local area to document environmental assets river/forest/grassland/hill/mountain Visit to a local polluted site-Urban/Rural/Industrial/Agricultural, Study of common plants, insects, birds, Study of simple ecosystems-pond, river, hill slopes, etc.

Reference Books

- Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
- Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd.,Ahmedabad – 380 013, India, Email:mapin@icenet.net (R)
- Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
- Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
- Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001,
- Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
- De A.K., Environmental Chemistry, Wiley Eastern Ltd.
- Down to Earth, Centre for Science and Environment (R)
- Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
- Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society,

Bombay (R)
- Heywood, V.H & Waston, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
- Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
- Mckinney, M.L. & School, R.M. 1996. Environmental Science systems &Solutions, Web enhanced edition. 639p.
- Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)
- Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
- Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
- Rao M N. & Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p.
- Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut
- Survey of the Environment, The Hindu (M)
- Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science (TB)

(ML-21001)–CONSTITUTION OF INDIA

Teaching Scheme:-

Lectures: 1 hr/week

Evaluation Scheme

Continuous evaluation
Assignments/Presentations/
Test

Course Outcomes

Student will be able to understand

CO1 the basis of Law ,the concept 'Constitution' and the fact that our Constitution is a blend of the positive aspects of other Constitutions.
CO2 the interpretation of the Preamble.
CO3 the basis of governance of the nation.
CO4 the aspects covered under the different important Articles.
CO5 the important amendments which took place and their effects.
CO6 the Union and the State Executive.
CO7 the basic that along with enjoying the rights one needs to fulfill one's duties.
CO8 gain confidence on our Constitution by knowing it better.

Unit 1 **(02 hrs)**
Understanding the concept 'Rule of Law '
Meaning and history of Constitution.
Understanding the concept of Human Rights and Fundamental Rights.

Unit 2 **(03 hrs)**
Introduction to The Constitution of India, understanding its objects. Preamble to the constitution of India.

Unit 3 **(02hrs)**
Fundamental rights under Part – III, exercise of the Rights, limitations and important cases.

Unit 4 **(02hrs)**
Fundamental duties & their significance.
Relevance of Directive principles of State Policy.

Unit 5 **(02hrs)**
Legislative, Executive & Judiciary (Union and State Level)
Prerogative Writs.

Unit 6 **(02hrs)**
Constitutional Provisions for Scheduled Castes, Scheduled Tribes, & Backward

classes.
Constitutional Provisions for Women & Children

Unit 7 **(02hrs)**

Emergency Provisions.
Electoral procedure in India
Amendment procedure and few important Constitutional Amendments

Text Books

- Introduction to the Constitution of India by Durga Das Basu (Students Edn.) Prentice – Hall EEE, 19th/20th Edn..
- Engineering Ethics by Charles E.Haries, Michael. S.Pritchard and Michael J.Robins Thompson Asia,.

Reference Books

- An Introduction to Constitution of India by M.V. Pylee, Vikas Publishing.

[AS (ILE)-17010] Engineering Economics-II

Teaching Scheme:
Lectures: 2Hrs/week

Examination Scheme:
Field Work/Assignment: 40
End Semester Exam: 60

Course Outcomes:
Students will be able to-

1. understand how managerial decisions are based on economics
2. learn about capital budgeting and planning
3. understand the importance balance trade, monetary policies and exchange rates
4. understand the importance of day to day budgeting and personal finances at early stage
5. learn about start-up culture and economics
6. get to know funding rounds which would help them to run their own start-ups

Unit I: Managerial Economic **[10 Hrs]**

Nature and scope of Managerial Decisions, Objectives of firms, Techniques of analyses with special reference to econometric method, Analysis of demand pattern, demand forecasting, Production function and production planning, cost and product relationships, cost function, Break-even-point analysis, Pricing and price related policies, Labour productivities and wages, Optimization problems,Introductory aspects of capital budgeting, Selected case studies under Indian conditions.

Unit II: International Economics **[7 Hrs]**

Balance of Trade and Balance of Payments, Barriers to Trade, Benefits of Trade/Comparative Advantage, Foreign Currency Markets/Exchange Rates, Monetary, Fiscal and Exchange rate policies, Economic Development.

Unit III: Personal Economics **[5 Hrs]**

Compound Interest and Credit, Financial Markets, Human Capital and Insurance, Money Management/ Budgeting, Risk and Return, Saving and Investing

Unit IV: **Start-up Economics** **[6 Hrs]**

Introduction to Start-up Finance, Introduction to Financial Terms, Financial Ratios, Capital Funding, VC's Funding Rounds, Series A, B.

Textbooks:

- Carton, D. and J.Perloff. Modern Industrial Organization (Reading, Massachusetts: Addison-Wesley), 1999.
- Hay, Donald A. and Derek J. Morris. Industrial Economics and Organization: Theory and Evidence, 2nd Edition (Oxford: Oxford University Press), 1991.
- Lall, Sanjaya. Competitiveness, Technology and Skills (Cheltenham: Edward Elgar), 2001.
- Scherer, F. M. and D. Ross. Industrial Market Structure and Economic Performance, 3rd Edition (Houghton: Mifflin), 1990.

Reference Books:

- Schmalensee, R., Inter-industry studies of Structure and Performance, in Schmalensee, R. and R. D. Willig (eds.): Handbook of Industrial Organization [Amsterdam: North-Holland] Vols. 2 Chapter 16, pp. 951-1009, 1989.

Siddharthan, N. S. and Y.S. Rajan. Global Business, Technology and Knowledge Sharing:Lessons for Developing Country Enterprises (New Delhi: Macmillan), 2002

[AS (ILE)-17003] Engineering Economics-I

Teaching Scheme:
Lectures: 2 Hrs/week

Examination Scheme:
Field Work/Assignment: 40
End Semester Exam: 60

Course Outcomes:

Students will be able to-

1. Understand the nature of markets and competition
2. Learn about Basic Concepts of Economics, Micro and Macro
3. Understand the importance of how industries behave
4. Understand the basis in our day to day life to gain personal financial control
5. Learn about start-up culture and economics
6. Get to know finance generation and funding rounds

Unit I: Basic Concepts of Economics **[6 Hrs]**

Definitions, Overview of Micro and Macro Economics, Explanation of theories of demand, supply and market equilibrium and Economics Basics – Cost, efficiency and scarcity**,** Opportunity Cost

Unit II: Micro Economics **[8 Hrs]**

Differences and Comparison, Theories of Utility and Consumers Choice, Competition and Market Structures, Markets and Prices, Market Failures, Income Distribution and Role of Government

Unit III: Macro Economics **[6 Hrs]**

Aggregate Demand and Supply, Economic Growth and Business Cycles, The role of the Nation in economic activity, New Economic Policy in India, Fiscal Policy, GDP and Inflation, Consumption, savings and investments, Commercial and Central banking

Unit IV: **Industrial Economics** **[8 Hrs]**

Behaviour of firms: Strategies with regard to entry, pricing, advertising, and R & D and innovation. The development of Firms and Market and Industrial Structure: Stochastic models of firm growth, and market structure, inter-industry differences in growth rate variance, economies of scale, technical change, mergers and market concentration. Development of Competitive capabilities: Role of Technology and Skills, FDI and Technology Transfer, Technological Spillovers, Globalization and Technology Intermediation.

Textbooks:

- Baumol, William J., Economic Theory and Operations Analysis, [Prentice Hall India Ltd.] Fourth Edition, 1985.
- Sloman, John H., Economics [Prentice Hall India Ltd.] Second Edition, 1994.
- Varian, Hal, ` Intermediate Microeconomics: A Modern Approach, Fifth Edition [Norton, 1999].
- P.A. Samuelson & W.D. Nordhaus, Economics, McGraw Hill, New York, 1995.
- Koutsoyiannis, Modern Microeconomics, Macmillan, 1975.
- R. Pindyck and D.L. Rubinfeld, Microeconomics, Macmillan Publishing Company, New York, 1989.

Reference Books:

- R.J. Gordon, Macroeconomics 4th Edition, Little Brown & Co., Boston, 1987.
- William F. Shughart II, The Organization of Industry, Richard D. Irwin, Illinois, 1990. (Chapter 3).

[AS (ILE)-17001] English Proficiency-I

Teaching Scheme:
Lectures: 1 hr/week
Practical: 4 Hrs/week

Examination Scheme:
T1 & T2: 25 Marks each
End-Sem Exam: 50 Marks

Course Outcomes:

Students will be able to-

1. Communicate well using meaningful sentences for conversation or speech.
2. Reproduce their understanding of concepts of communicating using English language
3. Read and comprehend communication well and write an effectively and enhance formal communication
4. Better Presentation skills and participate in healthy discussions both formal and informal among peers
5. Become more confident in facing interviews, acquiring professional skills and will be industry ready

Unit I: **[3 Hrs]**

Communication as a skill: Review of the basic understanding of communication as a skill and its need for effective business communication for Engineers

Unit II: **[3 Hrs]**

Conversational Skill Development: Formal and informal expressions, general discussions, Vocabulary Building

Unit III: **[4 Hrs]**

Business Communication: Letter Writing, Note making, Minutes, Summarizing

Unit IV: **[3 Hrs]**

Business Etiquette: Basic Mannerisms and Grooming required for professionals

Textbooks:

- Communication Skills for Technical Students by T.M. Farhathullah (Orient Longman)
- Communication for Business: A Practical Approach by Shirley Tailor (Longman)

Reference Books:

- Communication Skills for Engineers by S. Mishra & C. Muralikrishna (Pearson)
- Written Communication in English by Saran Freeman (Orient Longman)
- Essential English Grammar (Elementary & Intermediate) Raymond Murphy (CUP)
- Enhancing Employability at Soft Skills by Shalini Varma (Pearson)

[AS (ILE)-17008] English Proficiency-II

Teaching Scheme:
Lectures: 1 hr/week
Practical: 4 Hrs/week

Evaluation Scheme:
T1 & T2: 25 Marks each
End-Sem Exam: 50 Marks

Course Outcomes:

Students will be able to-

1. Communicate well using meaningful sentences for conversation or speech.
2. Reproduce their understanding of concepts of communicating using english language
3. Read and comprehend communication well and write an effectively and enhance formal communication
4. Better presentation skills and participate in healthy discussions both formal and informal among n peers
5. Be more confident in facing interviews, acquiring professional skills and will be industry ready

Unit I: **[3 Hrs]**
Linguistic Competence Building: Enhancement of Word Power, Formal and Group Discussions

Unit II: **[3 Hrs]**
Presentation Skills Development: Oral and Written Presentations

Unit III: **[4 Hrs]**
Business Writing: Business Reports, CV, Resume, Statement of Purpose

Unit IV: **[4 Hrs]**
Job Readiness: Interview Skills and Mock Interviews

Textbooks:

- Communication Skills for Technical Students by T. M. Farhathullah (Orient Longman)
- Communication for Business: A Practical Approach by Shirley Tailor (Longman)

Reference Books:

- Corporate Communication by Jaishri Jethwaney (Oxford University Press)
- Written Communication in English by Saran Freeman (Orient Longman)
- Business Correspondence and Report Writing, R. C. Sharma & Krishna Mohan (Tata McGraw Hill)

(AS (ILE)-17002) Finance for Engineers –I

Teaching Scheme:
Lectures: 2 Hrs/week

Examination Scheme:
T1 (Assignment): 20 marks
T2 (Written Test): 20 marks
End Semester Exam: 60 marks

Course Outcomes:

Students will be able to-

1. To understand the importance of financial literacy.
2. To understand the basics of accounting & accounting principles.
3. To analyze & solve the problems based on the above concepts.

Unit I: Accounting, Cost accounting & Management accounting, Various types of business entities, Accounting principles, postulates & meaning of accounting standards, Accounting cycle, Capital and revenue, Revenue, Expenses, Gains & Losses, Types of accounts & their rules, Journal Entries

Unit II: Create ledger, Preparation of Trial Balance, Finalizations, Preparation of Trading & Profit & Loss account, Understanding of Assets & Liabilities, Concept of Balance Sheet, Preparation of Balance sheet

Textbooks:

- "Financial Accounting", Dr. Kaustubh Sontakke [Himalaya Publishing House]

Reference Books:

- Accounting Theory & Practice Prof Jawahar Lal [Himalaya Publishing House]

[AS (ILE)-17003] Engineering Economics-I

Teaching Scheme:
Lectures: 2 Hrs/week

Examination Scheme:
Field Work/Assignment: 40
End Semester Exam: 60

Course Outcomes:

Students will be able to-

1. Understand the nature of markets and competition
2. Learn about Basic Concepts of Economics, Micro and Macro
3. Understand the importance of how industries behave
4. Understand the basis in our day to day life to gain personal financial control
5. Learn about start-up culture and economics
6. Get to know finance generation and funding rounds

Unit I: Basic Concepts of Economics **[6 Hrs]**

Definitions, Overview of Micro and Macro Economics, Explanation of theories of demand, supply and market equilibrium and Economics Basics – Cost, efficiency and scarcity**,** Opportunity Cost

Unit II: Micro Economics **[8 Hrs]**

Differences and Comparison, Theories of Utility and Consumers Choice, Competition and Market Structures, Markets and Prices, Market Failures, Income Distribution and Role of Government

Unit III: Macro Economics **[6 Hrs]**

Aggregate Demand and Supply, Economic Growth and Business Cycles, The role of the Nation in economic activity, New Economic Policy in India, Fiscal Policy, GDP and Inflation, Consumption, savings and investments, Commercial and Central banking

Unit IV: **Industrial Economics** **[8 Hrs]**

Behaviour of firms: Strategies with regard to entry, pricing, advertising, and R & D and innovation. The development of Firms and Market and Industrial Structure: Stochastic models of firm growth, and market structure, inter-industry differences in growth rate variance, economies of scale, technical change, mergers and market concentration. Development of Competitive capabilities: Role of Technology and Skills, FDI and Technology Transfer, Technological Spillovers, Globalization and Technology Intermediation.

Textbooks:

- Baumol, William J., Economic Theory and Operations Analysis, [Prentice Hall India Ltd.] Fourth Edition, 1985.
- Sloman, John H., Economics [Prentice Hall India Ltd.] Second Edition, 1994.
- Varian, Hal, ` Intermediate Microeconomics: A Modern Approach, Fifth Edition [Norton, 1999].
- P.A. Samuelson & W.D. Nordhaus, Economics, McGraw Hill, New York, 1995.
- Koutsoyiannis, Modern Microeconomics, Macmillan, 1975.
- R. Pindyck and D.L. Rubinfeld, Microeconomics, Macmillan Publishing Company, New York, 1989.

Reference Books:

- R.J. Gordon, Macroeconomics 4th Edition, Little Brown & Co., Boston, 1987.
- William F. Shughart II, The Organization of Industry, Richard D. Irwin, Illinois, 1990. (Chapter 3).

[AS (ILE)-17009] Finance for Engineers –II

Teaching Scheme:
Lectures: 2 Hrs/week

Examination Scheme:
T1 (Assignment): 20 marks
T2 (Written Test): 20 marks
End Semester Exam: 60 marks

Course Outcomes:
Students will be able to-

1. To understand the importance of financial literacy.
2. To understand the basics of accounting & accounting principles.
3. To analyze & solve the problems based on the above concepts.

Unit I: Introduction, Corporate Financial Objectives Ownership Structure and Control

Unit II: Financial Statement Analysis – Ratio Analysis

Unit III: Preparation of Cash Flow statement

Unit IV: Introduction to Break even analysis – Decision Making

Unit V: Return and Risk, Time Value of Money, Annuities and Accumulation, Discounted Payback period, Net Present Value, IRR

Textbooks:
Chandra, Prasanna (2004). Financial Management: Theory and Practice. New Delhi: TATA McGraw Hill

Reference Books:
Brearley, Richard A. and Myers, Stewart C. (1988). “Principles of Corporate Finance”, New Delhi: McGraw-Hill

[AS (ILE)-17007] German Language-I

Teaching Scheme:
2 Hrs/week

Examination Scheme:
Oral Exam: 20 Marks
Written Exam: 80 Marks

Course Outcomes:

Students will be able to-

1. Know the basic information of Germany
2. Be familiar with the pronunciation of German letters and greetings
3. Count till 100
4. Introduce themselves
5. Form basic questions
6. to read city maps

Unit I: Start auf Deutsch (Begin in German) **[8 Hrs]**
Deutschland, Deutsch sehen und hören, erste Kontakte, Texte: Lied, Postkarte, Wortfelder: Internationale Wörter, deutsche Namen

Unit II: Café: (Café): **[6 Hrs]**
Gespräche im Café, Texte: Getränkekarte, Telefonbuch, Rechnungen, Wortfelder: Gespräche im Café, Zahlen bis 100, Strukturwörter

Unit III: Städte, Länder, Sprachen (Cities, Countries, Languages) **[5 Hrs]**
Sehenswürdigkeiten in Europa, Sprachen in Europa, Nachbarsprachen, Texte: Landkarten, ein Statistik, Wortfelder: Himmelsrichtungen, Sprachen

Unit IV: Menschen und Haüser (People and Houses) **[5 Hrs]**
Wohnwelten, Texte: Möbelkatalog, E-Mail, Wohnungsgrundriss, Wortfelder: Räume und Möbel, Wohnformen

Textbooks:

- Funk, Kuhn, & Demme. Studio d A1. Deutsch als Fremdsprache. 2011. Goyal Publishers & Distributors Pvt. Ltd. Delhi, India

[AS (ILE)-17014] German Language -II

Teaching Scheme:
2 Hrs/week

Evaluation Scheme:
Oral Exam: 20 Marks
Written Exam: 80 Marks

Course Outcomes:

Students will be able to-

1. Understand conversations of time and appointments
2. Get familiar with the place orientation and directions
3. Converse about professions and schedules at work
4. Get familiar with the tourism and culture of German

Unit I: Termine (Appointments) **[7 Hrs]**

Termine und Verabredungen,Pünktlichkeit interkulturell,Texte: Meldebestätigung Veranstaltungsangebote Arztchild, Gedicht, Wortfelder: UHrzeiten, Wochentage, Tageszeiten

Unit II: Orientierung: (Orientation): **[6 Hrs]**

Orientierung am Arbeitsplatz, Der Weg zur Arbeit, Die Stadt Leipzig/ Quiz online, Texte: Stadtplan, Etagenplan, Terminkalender, Prospekt, Wortfelder: Stadt, VerkeHrsmittel, Büro und Computer

Unit III: Berufe: (Professions): **[5 Hrs]**

Beruf und Alltag, Texte: Visitenkarten, Wörterbuchauszüge, Wortfelder: Berufe und Tätigkeiten

Unit IV: Berlin sehen: (To see Berlin): **[6 Hrs]**

Eine Exkursion durch Berlin, Orientierung in der Stadt, Projekt "Internetrally'', Texte: Busplan, Stadtplan, Postkarte, Exkursionsprogramm, Wortfelder: Tourismus, Kultur

Textbooks:

- Funk, Kuhn & Demme. Studio d A1. Deutsch als Fremdsprache. 2011. Goyal Publishers & Distributors Pvt. Ltd. Delhi, India

[AS (ILE)-17004] Industrial Psychology-I

Teaching Scheme:
Lectures: 2 Hrs/week

Examination Scheme:
Field Work/Assignment: 40
End Semester Exam: 60

Course Outcomes:

Students will be able to-

1. Understand the nature, scope, challenges and role of technology in Industrial Psychology
2. Learn about major psychological factors that influence individual differences in behaviour at work
3. Understand the importance of motivation and involvement in determining satisfaction at work
4. Understand the elements of psychometric testing and develop skills to face the same in future
5. Learn about physical and psychological aspects related to workplace in terms of environmental conditions, safety and health
6. Get to know the stressors of work and learn coping strategies to strike work-life balance
7. Understand the role of human factors, especially sensory systems and cognitive abilities, in designs that promote man-machine harmony
8. Demonstrate the knowledge gained through practical implementation

Unit I: Introduction to Industrial Psychology **[6 Hrs]**

Nature and Development of Industrial/Work Psychology Historical background- Time and Motion Study, Hawthorne Studies, World War I & II, Scope & Challenges: Current status, Role of Technology

Unit II: People at Work **[8 Hrs]**

Individual Differences: Personality, Intelligence, Emotional Intelligence, Creativity & Innovation, Perception & Attitudes, Motivation- N-Ach, Expectancy Theory & Equity Theory, Modern Approach to Motivation; Job Satisfaction- Job Diagnostic Model, Measuring Job Satisfaction, Psychometric Testing at Work- Cognitive Abilities, Personality, Emotional Intelligence

Unit III: Characteristics of Workplace **[6 Hrs]**

Working Conditions- Physical (e.g. Work Schedule, etc.) & Psychological (E.g. Fatigue, Boredom, etc.), Safety & Health Practices at Workplace- Accidents, Violence, Harassment, Alcoholism & Drug, Stress at Workplace- Individual Responses to Stress; 3 Cs of Stress- Causes, Consequences & Coping with Work Stress

Unit IV: Engineering Psychology-I **[6 Hrs]**

Brief History and Scope, Person-Machine Systems- Basic Human Factors: Sensory systems- Visual (light, colour, night vision, depth perception), Auditory (sound, alarms, noise) Tactile & Vestibular senses; Cognition & Decision Making, Displays: Visual & Auditory Control

Textbooks:

- Schultz, D. & Schultz, S. E. (2013). *Psychology and Work Today: An Introduction to Industrial and Organizational Psychology*. 7th Edition. Pearson Education: New Delhi.
- Matthewman, L., Rose, A. & Hetherington, A. (2009). *Work Psychology*. Oxford University Press: India.
- Wickens, C. D.; Lee, J. D., Liu, Y. & Gordon Becker, S. E. (2015). *An Introduction to Human Factors Engineering*. 2nd Edition. Pearson Education: New Delhi.

Reference Books:

- Landy, F. J. & Conte, J. M. (2010). *Work in the 21st Century: An Introduction to Industrial and Organizational Psychology*. 2nd Edition. Wiley India: New Delhi.
- Schultz, D. & Schultz, S. E. (2002). *Psychology and Work Today*. Pearson Education: New Delhi.

[AS (ILE)-17011] Industrial Psychology-II

Teaching Scheme:
Lectures: 2Hrs/week

Examination Scheme:
Field Work/Assignment: 40
End Semester Exam: 60

Course Outcomes:

Students will be able to-

1. Learn about major psychological factors involved in the process of employment
2. Acquire psychological skills required to sustain employability
3. Understand the elements of organizational culture for enhancing group/team behavior
4. Understand the role of diversity in workforce and acknowledge the multicultural factors influencing workplace behaviour
5. Learn to apply the concepts of engineering psychology with respect to their disciplines
6. Learn about the impact of psychological factors in consumer behaviour and role of conscious efforts needed in designing products
7. Demonstrate the knowledge gained through practical implementation

Unit I: Managing People at Work: [8 Hrs]

Employee Selection- Techniques, Fair Employment Practices, Biographical Information, Interviews, References & Letters of Recommendation, Job Analysis- Types; Newer Developments, Performance Assessment: Evaluation & Appraisal- Objective & Subjective Techniques, Bias, Post Appraisal Interviews, Organizational Training- Types of Training, Psychological Issues; Career Development & Planning

Unit II: Groups at Work [6 Hrs]

Relationships- At workplace, Issues, Developing Effective Relationships, Groups & Teams- Stages of Group Development, Group Behaviour, Social Identity Theory, Leadership- New Approaches- Leader-Member Exchange, Transactional, Transformational & Charismatic Leaderships, Diversity at Workplace Cultural Differences (Multiculturalism, Psychometric Testing, Motivation, Work-related Attitude, Leadership, Team work, etc.)

Unit III: Engineering Psychology-II [8 Hrs]

Workspace Designs- General Principles, Design of Standing & Seating Work Areas; Human Anthropometry- Structural & Functional Data, Use of Anthropometric Data in Design, Human Computer Interaction- Software Design Cycle, System & User Characteristics, Principles & Guidelines for Design, Automation- Problems, Function Allocation; Transportation- Visibility, Hazards & Collisions, Characteristics of Impaired Driver, Safety Improvements, Industrial Robots

Unit IV: Consumer Psychology [6 Hrs]

Scope and Research Methods- Surveys, Public Opinion Polls, Focus Groups, Observations of Shopping Behavior, Neuromarketing , Advertising- Nature, Scope & Types, Consumer Behavior & Motivation- Buying Habits, Product Pricing, Targeted Advertising, Visual Merchandising- Psychological Perspective-

Techniques, Impulse Buying, Online Visual Merchandising .

Textbooks:

- Schultz, D. & Schultz, S. E. (2013). Psychology and Work Today: An Introduction to Industrial and Organizational Psychology. 7th Edition. Pearson Education: New Delhi.
- Matthewman, L., Rose, A. & Hetherington, A. (2009). Work Psychology. Oxford University Press: India.
- Wickens, C. D.; Lee, J. D., Liu, Y. & Gordon Becker, S. E. (2015). An Introduction to Human Factors Engineering. 2nd Edition. Pearson Education: New Delhi.

Reference Books:

- Landy, F. J. & Conte, J. M. (2010). Work in the 21st Century: An Introduction to Industrial and Organizational Psychology. 2nd Edition. Wiley India: New Delhi.
- Schultz, D. & Schultz, S. E. (2002). Psychology and Work Today. Pearson Education: New

[AS (ILE)-17006] Japanese Language-I

Teaching Scheme:
2 Hrs/week

Examination Scheme:
Oral Exam: 20 Marks
Written Exam: 80 Marks

Course Outcomes:
Students will be able to-

1. Know the basic information of Japan
2. Be familiar with the pronunciation, Accent, Intonation and Japanese writing System Hiragana, Katakana and Kanji
3. Speak daily greetings
4. Count the numerals
5. Introduce themselves, Family members
6. Form basic questions
7. Understand Colors, Years ,Months and Days, Time expressions, Directions to read the city map

Unit I: **[6 Hrs]**
Introduction to Japanese Syllables (phonetic alphabet), greetings & Self introduction, Identifying things, point objects and listen to their names, Listen to things and places etc.; Creating shopping lists

Unit II: **[6 Hrs]**
Introduction to Time, day of the week, simple inquiries on telephone, Means of transport, Basic conversations of everyday life

Unit III: **[6 Hrs]**
Frame questions in Japanese. Vocabulary of giving and receiving objects, Stating impressions/things surrounding us, Expressing likes and dislikes, good/bad, possessions, Talking about the country, town and the environment

Unit IV: **[6 Hrs]**

Quantity, number of people, time, period etc., Stating thoughts and impressions, Conveying movement (e.g. go / come)

Textbooks:

- Minnano no Nihongo 1-1.Goyal Publishers& Distributors Pvt. Ltd. Delhi, India

[AS(ILE)-17013] Japanese Language-II

Teaching Scheme:
2 Hrs/week

Evaluation Scheme:
Oral Exam: 20 Marks
Written Exam: 80 Marks

Course Outcomes:

Students will be able to-

1. Acquire target phrases and expressions
2. Master elementary Japanese grammar
3. Converse about professions at work
4. Get familiar with the customs, work culture & society of japan

Unit I: **[6 Hrs]**

Formation of requests, asking for permission/prohibition, speaking conversations of everyday life.

Unit II: **[6 Hrs]**

Rules and prohibitions, expressing potential and hobbies, sharing experiences.

Unit III: **[6 Hrs]**

Informal Conversations with friends, Expression of opinions, expectations, Utilization of modifying forms.

Unit IV: **[6 Hrs]**

Vocabulary of Machines, Directions, Forms of verbs (give/take/receive), Description of condition and coming to decision.

Textbooks:

- Minnano no Nihongo 1-2.Goyal Publishers& Distributors Pvt. Ltd. Delhi, India

[AS (ILE)-17005] Personnel Psychology-I

Teaching Scheme:
2 lectures/week

Examination Scheme:
3 Assignments for 60 marks
End semester of 40 marks

Course Outcomes:

Students will be able to-

1. Have understanding of organizational concepts and behavior.
2. Have understanding about their own personality for corporate world.
3. Understand importance of groups and its dynamics.
4. Understand the importance of self-management and development.

Unit I: Introduction **[2 Hrs]**

Basic concepts in organizational set up and its importance

Unit II: Personality and corporate world **[8 Hrs]**

Know and accept you, preparing for corporate world, approaches towards work

Unit III: Group behavior and leadership **[8 Hrs]**

Group behavior and effectiveness, effective Leadership and management principles

Unit IV: Self-management & development **[4 Hrs]**

Efficient working habits, self-training and self-development

Textbooks:

- Khana S.S.- (2016) Organizational Behaviour(Text and Cases) Chand and company Pvt. Ltd. Delhi.
- Rae Andr'e :- (2008) organizational behavior. Dorling Kindersley (India) Pvt. Ltd.
- Wallace Hand Masters L.- (2008) Personality development. C-engage Learning India Pvt. Ltd.

Reference books:

- Robbins S, Judge A, Vohra N:- (2013)Organizational behavior.(15th ed.) Pearson Education, Inc.
- Singh Kavita:- (2010) Organizational behavior-Text and cases. Dorling Kindersley (India) Pvt. Ltd.

ML-17001–CONSTITUTION OF INDIA

Teaching Scheme:-
Lectures: 1 hr/week

Evaluation Scheme-
Continuous evaluation-
Assignments/Presentations/
Test

Course Outcomes

Student will be able to understand

a. how India has come up with a Constitution which is the combination of the positive aspects of other Constitutions.
b. the interpretation of the Preamble.
c. the basics of governance of our nation.
d. the different aspects covered under the different important Articles.
e. the basic law and its interpretation. Understand the important amendments which took place and their effects.
f. our Union and State Executive better.
g. the basic that along with enjoying the rights one needs to fulfill one's duties.
h. and gain confidence on our Constitution by knowing it better.

Unit 1 **(02 hrs)**

Understanding the concept 'Rule of Law '
Meaning and history of Constitution.
Understanding the concept of Human Rights and Fundamental Rights.

Unit 2 **(03 hrs)**

Introduction to The Constitution of India, understanding its objects. Preamble to the constitution of India.

Unit 3 **(02hrs)**

Fundamental rights under Part – III, exercise of the Rights, limitations and important cases.

Unit 4 **(02hrs)**

Fundamental duties & their significance.
Relevance of Directive principles of State Policy.

Unit 5 **(02hrs)**

Legislative, Executive & Judiciary (Union and State Level)
Prerogative Writs.

Unit 6 **(02hrs)**

Constitutional Provisions for Scheduled Castes, Scheduled Tribes, & Backward classes.
Constitutional Provisions for Women & Children

Unit 7 **(02hrs)**

Emergency Provisions.
Electoral procedure in India
Amendment procedure and few important Constitutional Amendments

Text Books

- Introduction to the Constitution of India by Durga Das Basu (Students Edn.) Prentice – Hall EEE, 19th/20th Edn..
- Engineering Ethics by Charles E.Haries, Michael. S.Pritchard and Michael J.Robins Thompson Asia,.

Reference Books

- An Introduction to Constitution of India by M.V. Pylee, Vikas Publishing.

(ML – 18001)- INTELLECTUAL PROPERTY RIGHTS

Teaching Scheme:-

Lectures: 1 hr/week

Evaluation Scheme-

Continuous evaluation-

Assignments/Presentations/Test

Course Outcomes (CO):

Student will be able to

CO1 Infer that tomorrow's world will be ruled by ideas, concept, and creativity.

CO2 Gather knowledge about Intellectual Property Rights which is important for students of engineering in particular as they are tomorrow's technocrats and creator of new technology.

CO3 Discover how IPR are regarded as a source of national wealth and mark of an economic leadership in context of global market scenario.

CO4 Study the national & International IP system.

CO5 Summarize that it is an incentive for further research work and investment in R & D, leading to creation of new and better products and generation of economic and social benefits.

Unit 1 **(02)**

Introduction to the concepts Property and Intellectual Property

Nature and Importance of Intellectual Property Rights

Objectives of understanding Intellectual Property Rights

IPR and IITs

Unit 2 **(04)**

Understanding the types of Intellectual Property Rights: -

Patents, Designs, Trademarks (Registered and unregistered trademarks)

Copyright, Traditional Knowledge, Geographical Indications, Trade Secrets,

Idea Patenting, (Case Studies)

Unit 3 **(03)**

New Developments in IPR

Process of Patenting and Development: technological research, innovation, patenting, development….

International Scenario:

WIPO, TRIPs

Unit 4 **(03)**

Indian Patent Office and its Administration

Administration of Patent System –

Patenting under Indian Patent Act

Patenting under PCT

Unit 5 **(03)**

Patent Rights and its Scope, Licensing and transfer of technology,

Patent information and database.

Provisional and Non Provisional Patent Application and Specification

References

- Resisting Intellectual Property by Halbert ,Taylor & Francis Ltd ,2007
- Industrial Design by Mayall, Mc Graw Hill
- Product Design by Niebel, Mc Graw Hill
- Introduction to Design by Asimov, Prentice Hall
- Intellectual Property in New Technological Age by Robert P. Merges, Peter S. Menell, Mark A. Lemley
- Intellectual Property Rights under WTO by T. Ramappa, S. Chand.

[AS-19001] BSc-Applied Chemistry

Teaching Scheme: **Evaluation Scheme:**

Lectures: 3hrs / week **T1-20M, T2-20M**

End-SemExam:60M

Course Outcomes(COs):

Student will able to

CO1: Appreciate material properties and their engineering applications
CO2:Analyse and select the most appropriate engineering material
CO3: Perform experiments to establish suitability of various chemicals, materials and techniques
CO4: Develop problem solving ability to justify choice of chemicals and materials
CO5: Acknowledge the current developments in the field of nanotechnology, energy storage systems and green chemistry for sustainable development

Unit 1: Material Chemistry **[9 Hrs]**

(A) Introduction to the basics of chemistry ,Relevance of Chemistry to different Engineering specializations, Classification of Materials: Metals and alloys, Ceramics and glasses, refractories, cement ,polymers, composites, nanomaterials etc. and their properties.

(B) Corrosion and corrosion control

Electrochemistry of corrosion**,** Mechanism of dry corrosion& wet corrosion ,Factors affecting corrosion, Testing of corrosion- Weight-loss and weight-gain method, Microscopic exam, Methods of prevention of Corrosion- cathodic (Sacrificial, impressed current) and anodic protection, Proper selection of materials, Protective coatings- 2 examples of Metallic coatings, 2 examples of non-metallic coatings, paints

Unit 2: Polymer Chemistry **[7Hrs]**

Introduction, Classification of polymers, Use and disposal of polymers, Polymer terminologies, commercially important polymers with synthesis and applications (plastics, fibres, adhesives, elastomers, conducting polymers), properties of polymers- Solubility, Molecular Weight, Crystallinity, Glass transition temperature, Role of additives in polymers, Reinforced plastics .

Unit 3: Instrumental methods of Chemical Analysis [7Hrs]

Qualitative and quantitative analysis, Conventional methods of analysis: Titrimetry, gravimetry, Modern analytical techniques: an overview, electro-analytical, chromatography, thermo-analytical, Spectroscopy, XRD, TEM,SEM, nephlometry, turbidimetry, **Spectroscopy**: Principle, Basic instrumentation, Ultraviolet-Visible spectroscopy, Infra-Red Spectroscopy, Spectroscopy as an analytical tool, Accuracy, Precision, Reliability of Analytical data, confidence limits

Unit 4: Energy Storage systems [7Hrs]

Introduction and overview, Basic principles &electrochemistry, batteries- characteristics, Li ion batteries
Fuel cells- Principle of Fuel Cell, , Components of fuel cell. Various types of Fuel cell AFC, PEMFC, methanol based fuel cell and their applications. Hydrogen production; Hydrogen storage system

Unit 5 : Water Chemistry [6 Hrs]

Specifications for water, Impurities in water (Suspended, Biological & Dissolved chemical), Water quality parameters, Analysis of water : alkalinity, hardness(boiler feed water), chloride content, methods & problems, DO, BOD, COD, ion transport, conductivity , Treatment of water and waste water-membrane filtration, RO

Unit 6: Green Chemistry [6 Hrs]

12 principles of green chemistry **,**Synthesis of chemicals by green chemistry routes**,** 3Rs-Reduce,Reuse and Recycle, disposal of plastics, Biodegradable polymers-need, constituents required, factors ,properties, applications

Text Books

1. A textbook of Engineering Chemistry: Jain and Jain, Dhanpatrai Publication.
2. A textbook of Engineering Chemistry: S. S. Dara, S. Chand Publication 2010 edn.
3. A textbook of Engineering Chemistry: Shashi Chawla, Dhanpatrai Publication.

Reference Books

1. Polymer Science: V.R.Gowariker, New Age International Publication
2. Introduction to Nanotechnology: Charles P. Poole, Frank J. Owens.
3. Fuel Cells- Shripad Revankar, Pradeep Majumdar
4. Fuel Cell Fundamentals-Ryan O'Hayre, Suk-Won Cha,John wiley & Sons
5. Recent trends in Fuel Cell Science and Technology-Suddhasatwa Basu,Anamaya Publishers, New Delhi

6. Instrumental Methods of Chemical analysis, Willard Dean, Merrittee, Tata MacGrow Hill Limited.

[CH-19002] BSC- Applied Chemistry Laboratory

Teaching Scheme:
2hrs/week

Evaluation Scheme: Practical:
Total Marks: 100 M

CCE: 70M, ESE: 30M

Course Outcomes(COs):

Student will be able to

CO1: Apply the theoretical knowledge to practical use and solve engineering problems
CO2: Select suitable chemicals, apparatus and appropriate techniques for experimental analysis
CO3: Design and carry out scientific experiments, accurately record and analyze the results of experiments

1. Preparation and Standardization of Analytical Reagents (importance of distilled water)
2. Determination of chloride content of water by Mohr's method
3. Estimation of copper from brass by iodometry
4. pH-metric titration of Acid/Base
5. Colorimetric determination of concentration of given inorganic sample.
6. Preparation of a polymer
7. Determination of molecular weight of a polymer using Ostwald's viscometer
8. Determination of temporary and permanent hardness of water sample by EDTA method.
9. Determination of total alkalinity of water sample.
10. Preparation of a nanomaterial
11. Preparation of a chemical compound using green chemistry pathway

[AS19001] BSC- Applied Chemistry Laboratory

Teaching Scheme: **Evaluation Scheme: Practical: 2hrs/week**

Total Marks: 100 M

CCE: 70M, ESE: 30M

1. Preparation and Standardization of Analytical Reagents (importance of distilled water)
2. Determination of chloride content of water by Mohr's method
3. Estimation of copper from brass by iodometry
4. pH-metric titration of Acid/Base
5. Colorimetric determination of concentration of given inorganic sample.
6. Preparation of a polymer
7. Determination of molecular weight of a polymer using Ostwald's viscometer
8. Determination of temporary and permanent hardness of water sample by EDTA method.
9. Determination of total alkalinity of water sample.
10. Preparation of a nanomaterial
11. Preparation of a chemical compound using green chemistry pathway

College of Engineering, Pune
Biology For Engineers (CT16002)
Second Year B. Tech. Program

Teaching Scheme	**Examination Scheme**
Lectures : 3 lectures/week	T1-**20** (Classroom activity),T2-**20** (Assignment/s) Semester End Examination-**60**

Objectives: To make students conversant with basic Biology regarding the life processes. To impart knowledge about the common corridors of biology and engineering as biologically inspired technologies like designs in nature, bioenergetics, bioprocesses, biomaterials, biomechanics, bioimaging, bioinformatics, bioinstrumentation etc. To introduce recent trends in biology viz. genetic & tissue engineering, stem cell engineering, bio and nanotechnology etc. with the objective of appreciating engineering principles in biological systems.

Course Education Objectives

1. To introduce an interdisciplinary approach of biology and engineering
2. To understand biologically inspired technologies
3. To pursue the studies in engineering having application in biological, medical, environmental & agricultural fields

Course Outcomes:-

Students would be able to

1. correlate basic biological and engineering principles in the organizational structure of living systems at molecular, cellular and system level
2. appreciate the applications of energy transformations in biological systems in view of solving energy conservation targets
3. analyze information processing in biological systems
4. evaluate basic biological processes of transport, communication and defense mechanism with engineering perspectives
5. apply the modern developments in biology and engineering for society, human health and environmental sustainability

Unit I: **(06 Hrs)**

Biomolecules and biopolymers: Structure and Function Organic and inorganic molecules; Unique Properties of water, Vitamins and Minerals, Carbohydrates, Lipids, Amino Acids and proteins, Nucleic Acids (DNA and RNA)

Unit II: **(06 Hrs)**

Levels of organization of life: Cell as a basic unit of life, prokaryotic and eukaryotic cells, microbes, plant and animal cells; Cell organelles – structure and function; Cell membrane Levels of organization: cells, tissues, organs, systems & organism

Unit III: **(06 Hrs)**

Energy transformations in Chloroplast: Photosynthesis (photochemical & biochemical phase) and ATP generation, Aerobic and anaerobic systems Energy transformations in Mitochondria: Cellular respiration (glycolysis and Kreb cycle) and ATP generation Bioenergetics: Thermodynamic principles applied to biology, negative entropy changes in biological systems, Free Energy, Chemical Equilibrium

Unit IV: **(06 Hrs)**

Expression and Transmission of Genetic Information: DNA replication, Enzyme driven process of DNA cloning, Protein synthesis- Transcription & translation Techniques for optimization: a. At molecular level: Recombinant DNA Technology, DNA hybridization, PCR, DNA microarray

Unit V: **(06 Hrs)**

Transport Phenomena in Biological Systems: Membrane channels and ion channels; Fluid flow and mass transfer (nutrients & ions); In plants: Xylem and Phloem; In animals: Blood and Lymph Transport of gases: Oxygen and Carbon dioxide Heat Transport - Body temperature regulation. Communication: Cell junctions, Cell-cell communications – cell signaling, Hormones, Pheromones and cell behavior Defense mechanisms: In plants: Herbivory, secondary metabolites In animals: Innate and Adaptive immune systems

Unit VI: **(06 Hrs)**

Engineering perspectives of biological sciences: Biology and engineering crosstalk – At cell level: Hybridoma technology At tissue level: Plant Tissue Culture, Animal Tissue Culture; Tissue Engineering: Principles, methods and applications Introduction to Biomimetics and Biomimicry, nanobiotechnology

References:

1. Lodish H, Berk A, Zipursky SL, et al. (2000) Molecular Cell Biology. W. H. Freeman.
2. Lehninger, A. L., Nelson, D. L., & Cox, M. M. (2000). *Lehninger principles of biochemistry*. New York: Worth Publishers.
3. Rao CNR, et.al. Chemistry of Nanomaterials: Synthesis, Properties and Applications.
4. Eggins BR. (2006) Biosensors: An Introduction. John Wiley & Sons Publishers.
5. Palsson B.O. and Bhatia S.N. (2009) Tissue Engineering. Pearson.
6. Yoseph Bar-Cohen (2005). Biomimetics- Biologically Inspired Technologies
7. Joseph D. Bronzino, John Enderle, Susan M. Blanchard (1999) Introduction to Biomedical Engineering.

8. Routledge Taylor and Francis group (2012). Introduction to Bio-medical Engineeering technologies

Additional topics to be discussed with students (in branch-wise manner based on BM 600:Introduction to Biomedical Engineeringof the IITB syllabus)

Understanding various diseases/ disorders with respect to the physiology, diagnosis, therapeutics (biomaterials and instrumentation) and medical procedures e.g. Cardiovascular, Renal, Aurthopedicetc

Disease/ Disorder	**Physiology**	**Diagnosis**	**Therapeutics**		**Medical procedure**
			Biomaterials	**Instrumentation**	
Cardiovascular disease	Heart – electrical stimulation and mechanical pumping	ECG, Angiography	Stents for angioplasty	Heart lung machines	Angioplasty, By-pass surgery
Bone/skull injuries	Biomechanics of musculo-skeletal system	Medical imaging technologies Arthroscopy	Prosthetics	Arthroscope Biomechanics Prosthetics	Joint replacement Total hip replacementre habilitati-on engg
Kidney disorders	Functioning of Kidney	Medical imaging technologies	Filtration membranes	Dialyser	Dialysis

Effective Communication Skills(HSMC 19001)

Teaching Scheme: **Evaluation Scheme:**

Practicals: 2 hrs / week **4 Assignments**

(90M: Assignments)

(10M: attendance)

Course Outcomes (COs):

After successful completion of the course, students will be able to - 1. Recall basic language skills – listening, speaking, reading and writing and attempt tasks by using functional grammar and vocabulary effectively2. Reproduce their understanding of concepts / principles of communication skills3. Analyze aspects of effective communication and its usage in various fields4. Develop the knack for structured conversation to make their points of view clear to the audience5. Portray their learning well in front of large audience on a variety of relevant situations like group communication, discussion or presentation

Unit 1: Foundation of Language **[6 Hrs]**

Effective communication, grammaticality and acceptability, accuracy and appropriateness, common errors, vocabulary enhancement

Unit 2: Listening **[6 Hrs]**

Stages of listening (pre, while and post), strategies to develop listening skills, listening comprehension, problematic sounds

Unit 3: Speaking **[6 Hrs]**

Oral communication, pronunciation, stress, connected speech, intonation and pauses, formal and informal expressions, conversation skills, group discussion, presentations

Unit 4: Reading and Writing **[6 Hrs]**

Types of reading, techniques of reading, reading comprehension, reading manuals, formal emails, letters etc. Stages of writing (pre, while and post), 7 Cs of technical communication, drafting, editing, summarizing, letter / email writing

Reference Books

1. Communication Skills for Engineers by S. Mishra & C. Muralikrishna (Pearson)
2. Communication Skills for Technical Students by T.M. Farhathullah (Orient Longman)
3. Written Communication in English by Saran Freeman (Orient Longman)
4. Essential English Grammar (Elementary & Intermediate) Raymond Murphy (CUP)
5. Communication for Business: A Practical Approach by Shirley Tailor (Longman)
6. Developing Communication Skills by Krishna Mohan & Meera Banerji (Macmillan)
7. Business Correspondence and Report Writing, R. C. Sharma & Krishna Mohan (Tata McGraw Hill)

[HS-19002] Design Thinking

Teaching Scheme:

Practical: 2hrs/week

Evaluation Scheme:

Total Marks: 100 M

CCE: 50M, ESE: 50M

Course Outcomes (CO):

Student will able to

1. Compare and classify the various learning styles and memory techniques and Apply them in their engineering education
2. Analyze emotional experience and Inspect emotional expressions to better understand users while designing innovative products
3. Develop new ways of creative thinking and Learn the innovation cycle of Design Thinking process for developing innovative products
4. Propose real-time innovative engineering product designs and Choose appropriate frameworks, strategies, techniques during prototype development
5. Perceive individual differences and its impact on everyday decisions and further Create a better customer experience

Unit 1: An Insight to Learning

Understanding the Learning Process, Kolb's Learning Styles, Assessing and Interpreting

Unit 2: Remembering Memory

Understanding the Memory process, Problems in retention, Memory enhancement techniques

Unit 3: Emotions: Experience & Expression

Understanding Emotions: Experience & Expression, Assessing Empathy, Application with Peers

Unit 4: Basics of Design Thinking

Definition of Design Thinking, Need for Design Thinking, Objective of Design Thinking, Concepts & Brainstorming, Stages of Design Thinking Process (explain with examples) – **Empathize, Define, Ideate, Prototype, Test**

Unit 5: Being Ingenious & Fixing Problem

Understanding Creative thinking process, Understanding Problem Solving, Testing Creative Problem Solving,

Unit 6: Process of Product Design

Process of Engineering Product Design, Design Thinking Approach, Stages of Product Design, Examples of best product designs and functions, **Assignment – Engineering Product Design**

Unit 7: Prototyping & Testing

What is Prototype? Why Prototype? Rapid Prototype Development process, Testing, **Sample Example,** Test Group Marketing

Unit 8: Celebrating the Difference

Understanding Individual differences & Uniqueness

Group Discussion and Activities to encourage the understanding, acceptance and appreciation of Individual differences

Unit 9: Design Thinking & Customer Centricity

Practical Examples of Customer Challenges, Use of Design Thinking to Enhance Customer Experience, Parameters of Product experience, Alignment of Customer Expectations with Product Design

Unit 10: Feedback, Re-Design & Re-Create

Feedback loop, Focus on User Experience, Address "ergonomic challenges, User focused design, rapid prototyping & testing, final product, **Final Presentation – *"Solving Practical Engineering Problem through Innovative Product Design & Creative Solution"***

MLC– Professional Laws, Ethics, Values and Harmony
S .Y. B. Tech

Credit - 0
Audit Course

Teaching Scheme:-

Lectures: 1 hr/week

Evaluation Scheme-
Total - 100 Marks
Continuous evaluation-
Assignments /
Presentations/Test

Course Outcomes

Student will be able to

CO1. Comprehend the need and importance of Law - for individuals, Companies , society and the nation;

CO2. Relate laws like The Contract Law, Workplace Law , IPR… to the Engineering Profession;

CO3. Appraise the importance of being a law-abiding person by understanding the correlation between Rights, Duties and Responsibilities;

CO4. Self-explore by using different techniques to live in harmony at various levels

CO5. Analyze themselves and understand their position with respect to the moral and ethical character needed for a successful and satisfactory work life…

Unit 1 **(02 hrs)**

Significance of Law

Concept, need, framework of law;
Types of laws for individuals and companies;
Importance of law to the citizens, business , society and the nation;
Law of Torts and the basics to protect oneself and the company;

Unit 2 **(03 hrs)**

Law for Engineers

Relevance of law to the Engineers;
Engineering profession, business and Contract Law.

Law affecting the Workplace

Responsibilities / Duties of Employers / Employees;
Hiring Practices

Introduction to Intellectual Property Law (IPR)

Unit 3 **(01 hr)**

Code of conduct

Professional Code of Conduct for Engineers**;**
Correlation between Rights, Duties and Responsibilities;
Relationship between Law and Ethics.

Unit 4 **(02 hrs)**

Self Awareness

Understanding oneself and others; Johari Window- Concept, explanation, implementation

Unit 5 **(02 hrs)**

Needs & Self

Needs and its importance; Creating goals and managing needs to systematical actualization

Unit 6 **(02 hrs)**

Ethics and values

Professional ethics and their importance for students; Understanding the importance of values & their application in everyday life

References

- Business Law- By Saroj Kumar
- Law of Contract- By Avtar Singh
- Business Law- By G K Kapoor
- Business & Commercial Laws – By Sen & Mitra
- Business Law for Engineers- by Calvin Frank Allen
- Hilgard, E. R.; Atkinson, R. C. & Atkinson, R.L. (1975). *Introduction to Psychology*. 6th Edition. New Delhi: Oxford and IBH Publishing Co. Pvt. Ltd.
- Govindarajan, M; Natarajan, G. M. & Senthilkumar, V.S. (2013). *Professional Ethics & Human Values*. Prentice Hall: New Delhi
- Gogate, S. B. (2011). Human Values & Professional Ethics. Vikas Publishing: New Delhi.
- Jayshree Suresh, Raghavan B.S.(2016). Human Values & Professional Ethics: S Chand & Company.Pvt.Ltd: New Delhi.

[ML-21002] Environmental Studies

(Adopted from the 'Ability Enhancement of Compulsory Courses: Environmental Studies' as prescribed by the Expert Committee of University Grants Commission as per directives of Hon'ble Supreme Court)

Teaching scheme
Lectures: 1 Session/week
Assignments: 2 hours/week

Evaluation scheme
Periodic Assignments & Tests

Course Outcomes:

At the end of the course, students will demonstrate the ability to:

- Comprehend Sustainable Development Goals for present generation
- Appreciate environmental resources, functioning of an ecosystem, significance of biodiversity and environmental challenges
- Analyze the current status of environment with respect to precautionary mechanisms and control measures
- Appreciate the role of an engineer for better tomorrow

Unit 1 **[2 Hrs]**

Multidisciplinary nature of environmental studies
Definition, scope and importance
Need for public awareness.

Unit 2 **[8 Hrs]**

Natural Resources
Renewable and non-renewable resources:
Natural resources and associated problems .
Forest resources : Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. Water resources : Use and over-utilization of surface and ground water,floods, drought, conflicts over water, dams-benefits and problems. Mineral resources: Use and exploitation, environmental effects of extractingand using mineral resources, case studies. Food resources : World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, waterlogging, salinity, case studies. Energy resources : Growing energy needs, renewable and non renewableenergy sources, use of alternate energy sources. Case studies. Land resources : Land as a resource, land degradation, man inducedlandslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

Unit 3 **[6 Hrs]**

Ecosystems
Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids, Introduction, types, characteristic features, structure and function of the following ecosystem :-Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit 4 **[8 Hrs]**

Biodiversity and its conservation

Introduction – Definition : genetic, species and ecosystem diversity, Bio geographical classification of India, Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values, Biodiversity at global, National and local levels, India as a mega-diversity nation, Hot-sports of biodiversity, Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India, Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

Unit 5 **[8 Hrs]**

Environmental Pollution

Definition, Cause, effects and control measures of :-Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards, Solid waste Management : Causes, effects and control measures of urban andindustrial wastes, Role of an individual in prevention of pollution, Pollution case studies, Disaster management : floods, earthquake, cyclone and landslides.

Unit 6 **[7 Hrs]**

Social Issues and the Environment

From Unsustainable to Sustainable development, Urban problems related to energy, Water conservation, rain water harvesting, watershed management, Resettlement and rehabilitation of people; its problems and concerns. Case Studies, Environmental ethics : Issues and possible solutions, Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies, Wasteland reclamation, Consumerism and waste products. Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, Public awareness.

Unit 7

[6 Hrs]

Human Population and the Environment

Population growth, variation among nations, Population explosion – Family Welfare Programme, Environment and human health, Human Rights, Value Education, HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environment and human health, Case Studies.

Unit 8 **[5 Hrs]**

Field work

Visit to a local area to document environmental assets river/forest/grassland/hill/mountain Visit to a local polluted site-Urban/Rural/Industrial/Agricultural, Study of common plants, insects, birds, Study of simple ecosystems-pond, river, hill slopes, etc.

Reference Books

- Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
- Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd.,Ahmedabad – 380 013, India, Email:mapin@icenet.net (R)
- Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
- Clark R.S., Marine Pollution, Clanderson Press Oxford (TB)
- Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001,
- Environmental Encyclopedia, Jaico Publ. House, Mumabai, 1196p
- De A.K., Environmental Chemistry, Wiley Eastern Ltd.
- Down to Earth, Centre for Science and Environment (R)
- Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford Univ. Press. 473p
- Hawkins R.E., Encyclopedia of Indian Natural History, Bombay Natural History Society,

Bombay (R)
- Heywood, V.H & Waston, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140p.
- Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284 p.
- Mckinney, M.L. & School, R.M. 1996. Environmental Science systems &Solutions, Web enhanced edition. 639p.
- Mhaskar A.K., Matter Hazardous, Techno-Science Publication (TB)
- Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
- Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p
- Rao M N. & Datta, A.K. 1987. Waste Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p.
- Sharma B.K., 2001. Environmental Chemistry. Geol Publ. House, Meerut
- Survey of the Environment, The Hindu (M)
- Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science (TB)

(ML-21001)–CONSTITUTION OF INDIA

Teaching Scheme:-

Lectures: 1 hr/week

Evaluation Scheme

Continuous evaluation
Assignments/Presentations/
Test

Course Outcomes

Student will be able to understand

CO1 the basis of Law ,the concept 'Constitution' and the fact that our Constitution is a blend of the positive aspects of other Constitutions.
CO2 the interpretation of the Preamble.
CO3 the basis of governance of the nation.
CO4 the aspects covered under the different important Articles.
CO5 the important amendments which took place and their effects.
CO6 the Union and the State Executive.
CO7 the basic that along with enjoying the rights one needs to fulfill one's duties.
CO8 gain confidence on our Constitution by knowing it better.

Unit 1 **(02 hrs)**
Understanding the concept 'Rule of Law '
Meaning and history of Constitution.
Understanding the concept of Human Rights and Fundamental Rights.

Unit 2 **(03 hrs)**
Introduction to The Constitution of India, understanding its objects. Preamble to the constitution of India.

Unit 3 **(02hrs)**
Fundamental rights under Part – III, exercise of the Rights, limitations and important cases.

Unit 4 **(02hrs)**
Fundamental duties & their significance.
Relevance of Directive principles of State Policy.

Unit 5 **(02hrs)**
Legislative, Executive & Judiciary (Union and State Level)
Prerogative Writs.

Unit 6 **(02hrs)**
Constitutional Provisions for Scheduled Castes, Scheduled Tribes, & Backward

classes.
Constitutional Provisions for Women & Children

Unit 7 **(02hrs)**

Emergency Provisions.
Electoral procedure in India
Amendment procedure and few important Constitutional Amendments

Text Books

- Introduction to the Constitution of India by Durga Das Basu (Students Edn.) Prentice – Hall EEE, 19th/20th Edn..
- Engineering Ethics by Charles E.Haries, Michael. S.Pritchard and Michael J.Robins Thompson Asia,.

Reference Books

- An Introduction to Constitution of India by M.V. Pylee, Vikas Publishing.

[AS (ILE)-17010] Engineering Economics-II

Teaching Scheme:
Lectures: 2Hrs/week

Examination Scheme:
Field Work/Assignment: 40
End Semester Exam: 60

Course Outcomes:
Students will be able to-

1. understand how managerial decisions are based on economics
2. learn about capital budgeting and planning
3. understand the importance balance trade, monetary policies and exchange rates
4. understand the importance of day to day budgeting and personal finances at early stage
5. learn about start-up culture and economics
6. get to know funding rounds which would help them to run their own start-ups

Unit I: Managerial Economic **[10 Hrs]**

Nature and scope of Managerial Decisions, Objectives of firms, Techniques of analyses with special reference to econometric method, Analysis of demand pattern, demand forecasting, Production function and production planning, cost and product relationships, cost function, Break-even-point analysis, Pricing and price related policies, Labour productivities and wages, Optimization problems,Introductory aspects of capital budgeting, Selected case studies under Indian conditions.

Unit II: International Economics **[7 Hrs]**

Balance of Trade and Balance of Payments, Barriers to Trade, Benefits of Trade/Comparative Advantage, Foreign Currency Markets/Exchange Rates, Monetary, Fiscal and Exchange rate policies, Economic Development.

Unit III: Personal Economics **[5 Hrs]**

Compound Interest and Credit, Financial Markets, Human Capital and Insurance, Money Management/ Budgeting, Risk and Return, Saving and Investing

Unit IV: **Start-up Economics** **[6 Hrs]**

Introduction to Start-up Finance, Introduction to Financial Terms, Financial Ratios, Capital Funding, VC's Funding Rounds, Series A, B.

Textbooks:

- Carton, D. and J.Perloff. Modern Industrial Organization (Reading, Massachusetts: Addison-Wesley), 1999.
- Hay, Donald A. and Derek J. Morris. Industrial Economics and Organization: Theory and Evidence, 2nd Edition (Oxford: Oxford University Press), 1991.
- Lall, Sanjaya. Competitiveness, Technology and Skills (Cheltenham: Edward Elgar), 2001.
- Scherer, F. M. and D. Ross. Industrial Market Structure and Economic Performance, 3rd Edition (Houghton: Mifflin), 1990.

Reference Books:

- Schmalensee, R., Inter-industry studies of Structure and Performance, in Schmalensee, R. and R. D. Willig (eds.): Handbook of Industrial Organization [Amsterdam: North-Holland] Vols. 2 Chapter 16, pp. 951-1009, 1989.

Siddharthan, N. S. and Y.S. Rajan. Global Business, Technology and Knowledge Sharing:Lessons for Developing Country Enterprises (New Delhi: Macmillan), 2002

[AS (ILE)-17003] Engineering Economics-I

Teaching Scheme:
Lectures: 2 Hrs/week

Examination Scheme:
Field Work/Assignment: 40
End Semester Exam: 60

Course Outcomes:

Students will be able to-

1. Understand the nature of markets and competition
2. Learn about Basic Concepts of Economics, Micro and Macro
3. Understand the importance of how industries behave
4. Understand the basis in our day to day life to gain personal financial control
5. Learn about start-up culture and economics
6. Get to know finance generation and funding rounds

Unit I: Basic Concepts of Economics **[6 Hrs]**

Definitions, Overview of Micro and Macro Economics, Explanation of theories of demand, supply and market equilibrium and Economics Basics – Cost, efficiency and scarcity**,** Opportunity Cost

Unit II: Micro Economics **[8 Hrs]**

Differences and Comparison, Theories of Utility and Consumers Choice, Competition and Market Structures, Markets and Prices, Market Failures, Income Distribution and Role of Government

Unit III: Macro Economics **[6 Hrs]**

Aggregate Demand and Supply, Economic Growth and Business Cycles, The role of the Nation in economic activity, New Economic Policy in India, Fiscal Policy, GDP and Inflation, Consumption, savings and investments, Commercial and Central banking

Unit IV: **Industrial Economics** **[8 Hrs]**

Behaviour of firms: Strategies with regard to entry, pricing, advertising, and R & D and innovation. The development of Firms and Market and Industrial Structure: Stochastic models of firm growth, and market structure, inter-industry differences in growth rate variance, economies of scale, technical change, mergers and market concentration. Development of Competitive capabilities: Role of Technology and Skills, FDI and Technology Transfer, Technological Spillovers, Globalization and Technology Intermediation.

Textbooks:

- Baumol, William J., Economic Theory and Operations Analysis, [Prentice Hall India Ltd.] Fourth Edition, 1985.
- Sloman, John H., Economics [Prentice Hall India Ltd.] Second Edition, 1994.
- Varian, Hal, ` Intermediate Microeconomics: A Modern Approach, Fifth Edition [Norton, 1999].
- P.A. Samuelson & W.D. Nordhaus, Economics, McGraw Hill, New York, 1995.
- Koutsoyiannis, Modern Microeconomics, Macmillan, 1975.
- R. Pindyck and D.L. Rubinfeld, Microeconomics, Macmillan Publishing Company, New York, 1989.

Reference Books:

- R.J. Gordon, Macroeconomics 4th Edition, Little Brown & Co., Boston, 1987.
- William F. Shughart II, The Organization of Industry, Richard D. Irwin, Illinois, 1990. (Chapter 3).

[AS (ILE)-17001] English Proficiency-I

Teaching Scheme:
Lectures: 1 hr/week
Practical: 4 Hrs/week

Examination Scheme:
T1 & T2: 25 Marks each
End-Sem Exam: 50 Marks

Course Outcomes:

Students will be able to-

1. Communicate well using meaningful sentences for conversation or speech.
2. Reproduce their understanding of concepts of communicating using English language
3. Read and comprehend communication well and write an effectively and enhance formal communication
4. Better Presentation skills and participate in healthy discussions both formal and informal among peers
5. Become more confident in facing interviews, acquiring professional skills and will be industry ready

Unit I: **[3 Hrs]**

Communication as a skill: Review of the basic understanding of communication as a skill and its need for effective business communication for Engineers

Unit II: **[3 Hrs]**

Conversational Skill Development: Formal and informal expressions, general discussions, Vocabulary Building

Unit III: **[4 Hrs]**

Business Communication: Letter Writing, Note making, Minutes, Summarizing

Unit IV: **[3 Hrs]**

Business Etiquette: Basic Mannerisms and Grooming required for professionals

Textbooks:

- Communication Skills for Technical Students by T.M. Farhathullah (Orient Longman)
- Communication for Business: A Practical Approach by Shirley Tailor (Longman)

Reference Books:

- Communication Skills for Engineers by S. Mishra & C. Muralikrishna (Pearson)
- Written Communication in English by Saran Freeman (Orient Longman)
- Essential English Grammar (Elementary & Intermediate) Raymond Murphy (CUP)
- Enhancing Employability at Soft Skills by Shalini Varma (Pearson)

[AS (ILE)-17008] English Proficiency-II

Teaching Scheme:
Lectures: 1 hr/week
Practical: 4 Hrs/week

Evaluation Scheme:
T1 & T2: 25 Marks each
End-Sem Exam: 50 Marks

Course Outcomes:

Students will be able to-

1. Communicate well using meaningful sentences for conversation or speech.
2. Reproduce their understanding of concepts of communicating using english language
3. Read and comprehend communication well and write an effectively and enhance formal communication
4. Better presentation skills and participate in healthy discussions both formal and informal among n peers
5. Be more confident in facing interviews, acquiring professional skills and will be industry ready

Unit I: **[3 Hrs]**
Linguistic Competence Building: Enhancement of Word Power, Formal and Group Discussions

Unit II: **[3 Hrs]**
Presentation Skills Development: Oral and Written Presentations

Unit III: **[4 Hrs]**
Business Writing: Business Reports, CV, Resume, Statement of Purpose

Unit IV: **[4 Hrs]**
Job Readiness: Interview Skills and Mock Interviews

Textbooks:

- Communication Skills for Technical Students by T. M. Farhathullah (Orient Longman)
- Communication for Business: A Practical Approach by Shirley Tailor (Longman)

Reference Books:

- Corporate Communication by Jaishri Jethwaney (Oxford University Press)
- Written Communication in English by Saran Freeman (Orient Longman)
- Business Correspondence and Report Writing, R. C. Sharma & Krishna Mohan (Tata McGraw Hill)

(AS (ILE)-17002) Finance for Engineers –I

Teaching Scheme:
Lectures: 2 Hrs/week

Examination Scheme:
T1 (Assignment): 20 marks
T2 (Written Test): 20 marks
End Semester Exam: 60 marks

Course Outcomes:

Students will be able to-

1. To understand the importance of financial literacy.
2. To understand the basics of accounting & accounting principles.
3. To analyze & solve the problems based on the above concepts.

Unit I: Accounting, Cost accounting & Management accounting, Various types of business entities, Accounting principles, postulates & meaning of accounting standards, Accounting cycle, Capital and revenue, Revenue, Expenses, Gains & Losses, Types of accounts & their rules, Journal Entries

Unit II: Create ledger, Preparation of Trial Balance, Finalizations, Preparation of Trading & Profit & Loss account, Understanding of Assets & Liabilities, Concept of Balance Sheet, Preparation of Balance sheet

Textbooks:

- "Financial Accounting", Dr. Kaustubh Sontakke [Himalaya Publishing House]

Reference Books:

- Accounting Theory & Practice Prof Jawahar Lal [Himalaya Publishing House]

[AS (ILE)-17003] Engineering Economics-I

Teaching Scheme:
Lectures: 2 Hrs/week

Examination Scheme:
Field Work/Assignment: 40
End Semester Exam: 60

Course Outcomes:

Students will be able to-

1. Understand the nature of markets and competition
2. Learn about Basic Concepts of Economics, Micro and Macro
3. Understand the importance of how industries behave
4. Understand the basis in our day to day life to gain personal financial control
5. Learn about start-up culture and economics
6. Get to know finance generation and funding rounds

Unit I: Basic Concepts of Economics **[6 Hrs]**

Definitions, Overview of Micro and Macro Economics, Explanation of theories of demand, supply and market equilibrium and Economics Basics – Cost, efficiency and scarcity**,** Opportunity Cost

Unit II: Micro Economics **[8 Hrs]**

Differences and Comparison, Theories of Utility and Consumers Choice, Competition and Market Structures, Markets and Prices, Market Failures, Income Distribution and Role of Government

Unit III: Macro Economics **[6 Hrs]**

Aggregate Demand and Supply, Economic Growth and Business Cycles, The role of the Nation in economic activity, New Economic Policy in India, Fiscal Policy, GDP and Inflation, Consumption, savings and investments, Commercial and Central banking

Unit IV: **Industrial Economics** **[8 Hrs]**

Behaviour of firms: Strategies with regard to entry, pricing, advertising, and R & D and innovation. The development of Firms and Market and Industrial Structure: Stochastic models of firm growth, and market structure, inter-industry differences in growth rate variance, economies of scale, technical change, mergers and market concentration. Development of Competitive capabilities: Role of Technology and Skills, FDI and Technology Transfer, Technological Spillovers, Globalization and Technology Intermediation.

Textbooks:

- Baumol, William J., Economic Theory and Operations Analysis, [Prentice Hall India Ltd.] Fourth Edition, 1985.
- Sloman, John H., Economics [Prentice Hall India Ltd.] Second Edition, 1994.
- Varian, Hal, ` Intermediate Microeconomics: A Modern Approach, Fifth Edition [Norton, 1999].
- P.A. Samuelson & W.D. Nordhaus, Economics, McGraw Hill, New York, 1995.
- Koutsoyiannis, Modern Microeconomics, Macmillan, 1975.
- R. Pindyck and D.L. Rubinfeld, Microeconomics, Macmillan Publishing Company, New York, 1989.

Reference Books:

- R.J. Gordon, Macroeconomics 4th Edition, Little Brown & Co., Boston, 1987.
- William F. Shughart II, The Organization of Industry, Richard D. Irwin, Illinois, 1990. (Chapter 3).

[AS (ILE)-17009] Finance for Engineers –II

Teaching Scheme:
Lectures: 2 Hrs/week

Examination Scheme:
T1 (Assignment): 20 marks
T2 (Written Test): 20 marks
End Semester Exam: 60 marks

Course Outcomes:
Students will be able to-

1. To understand the importance of financial literacy.
2. To understand the basics of accounting & accounting principles.
3. To analyze & solve the problems based on the above concepts.

Unit I: Introduction, Corporate Financial Objectives Ownership Structure and Control

Unit II: Financial Statement Analysis – Ratio Analysis

Unit III: Preparation of Cash Flow statement

Unit IV: Introduction to Break even analysis – Decision Making

Unit V: Return and Risk, Time Value of Money, Annuities and Accumulation, Discounted Payback period, Net Present Value, IRR

Textbooks:
Chandra, Prasanna (2004). Financial Management: Theory and Practice. New Delhi: TATA McGraw Hill

Reference Books:
Brearley, Richard A. and Myers, Stewart C. (1988). “Principles of Corporate Finance”, New Delhi: McGraw-Hill

[AS (ILE)-17007] German Language-I

Teaching Scheme:
2 Hrs/week

Examination Scheme:
Oral Exam: 20 Marks
Written Exam: 80 Marks

Course Outcomes:

Students will be able to-

1. Know the basic information of Germany
2. Be familiar with the pronunciation of German letters and greetings
3. Count till 100
4. Introduce themselves
5. Form basic questions
6. to read city maps

Unit I: Start auf Deutsch (Begin in German) **[8 Hrs]**
Deutschland, Deutsch sehen und hören, erste Kontakte, Texte: Lied, Postkarte, Wortfelder: Internationale Wörter, deutsche Namen

Unit II: Café: (Café): **[6 Hrs]**
Gespräche im Café, Texte: Getränkekarte, Telefonbuch, Rechnungen, Wortfelder: Gespräche im Café, Zahlen bis 100, Strukturwörter

Unit III: Städte, Länder, Sprachen (Cities, Countries, Languages) **[5 Hrs]**
Sehenswürdigkeiten in Europa, Sprachen in Europa, Nachbarsprachen, Texte: Landkarten, ein Statistik, Wortfelder: Himmelsrichtungen, Sprachen

Unit IV: Menschen und Haüser (People and Houses) **[5 Hrs]**
Wohnwelten, Texte: Möbelkatalog, E-Mail, Wohnungsgrundriss, Wortfelder: Räume und Möbel, Wohnformen

Textbooks:

- Funk, Kuhn, & Demme. Studio d A1. Deutsch als Fremdsprache. 2011. Goyal Publishers & Distributors Pvt. Ltd. Delhi, India

[AS (ILE)-17014] German Language -II

Teaching Scheme:
2 Hrs/week

Evaluation Scheme:
Oral Exam: 20 Marks
Written Exam: 80 Marks

Course Outcomes:

Students will be able to-

1. Understand conversations of time and appointments
2. Get familiar with the place orientation and directions
3. Converse about professions and schedules at work
4. Get familiar with the tourism and culture of German

Unit I: Termine (Appointments) **[7 Hrs]**

Termine und Verabredungen,Pünktlichkeit interkulturell,Texte: Meldebestätigung Veranstaltungsangebote Arztchild, Gedicht, Wortfelder: UHrzeiten, Wochentage, Tageszeiten

Unit II: Orientierung: (Orientation): **[6 Hrs]**

Orientierung am Arbeitsplatz, Der Weg zur Arbeit, Die Stadt Leipzig/ Quiz online, Texte: Stadtplan, Etagenplan, Terminkalender, Prospekt, Wortfelder: Stadt, VerkeHrsmittel, Büro und Computer

Unit III: Berufe: (Professions): **[5 Hrs]**

Beruf und Alltag, Texte: Visitenkarten, Wörterbuchauszüge, Wortfelder: Berufe und Tätigkeiten

Unit IV: Berlin sehen: (To see Berlin): **[6 Hrs]**

Eine Exkursion durch Berlin, Orientierung in der Stadt, Projekt "Internetrally'', Texte: Busplan, Stadtplan, Postkarte, Exkursionsprogramm, Wortfelder: Tourismus, Kultur

Textbooks:

- Funk, Kuhn & Demme. Studio d A1. Deutsch als Fremdsprache. 2011. Goyal Publishers & Distributors Pvt. Ltd. Delhi, India

[AS (ILE)-17004] Industrial Psychology-I

Teaching Scheme:
Lectures: 2 Hrs/week

Examination Scheme:
Field Work/Assignment: 40
End Semester Exam: 60

Course Outcomes:

Students will be able to-

1. Understand the nature, scope, challenges and role of technology in Industrial Psychology
2. Learn about major psychological factors that influence individual differences in behaviour at work
3. Understand the importance of motivation and involvement in determining satisfaction at work
4. Understand the elements of psychometric testing and develop skills to face the same in future
5. Learn about physical and psychological aspects related to workplace in terms of environmental conditions, safety and health
6. Get to know the stressors of work and learn coping strategies to strike work-life balance
7. Understand the role of human factors, especially sensory systems and cognitive abilities, in designs that promote man-machine harmony
8. Demonstrate the knowledge gained through practical implementation

Unit I: Introduction to Industrial Psychology **[6 Hrs]**

Nature and Development of Industrial/Work Psychology Historical background- Time and Motion Study, Hawthorne Studies, World War I & II, Scope & Challenges: Current status, Role of Technology

Unit II: People at Work **[8 Hrs]**

Individual Differences: Personality, Intelligence, Emotional Intelligence, Creativity & Innovation, Perception & Attitudes, Motivation- N-Ach, Expectancy Theory & Equity Theory, Modern Approach to Motivation; Job Satisfaction- Job Diagnostic Model, Measuring Job Satisfaction, Psychometric Testing at Work- Cognitive Abilities, Personality, Emotional Intelligence

Unit III: Characteristics of Workplace **[6 Hrs]**

Working Conditions- Physical (e.g. Work Schedule, etc.) & Psychological (E.g. Fatigue, Boredom, etc.), Safety & Health Practices at Workplace- Accidents, Violence, Harassment, Alcoholism & Drug, Stress at Workplace- Individual Responses to Stress; 3 Cs of Stress- Causes, Consequences & Coping with Work Stress

Unit IV: Engineering Psychology-I **[6 Hrs]**

Brief History and Scope, Person-Machine Systems- Basic Human Factors: Sensory systems- Visual (light, colour, night vision, depth perception), Auditory (sound, alarms, noise) Tactile & Vestibular senses; Cognition & Decision Making, Displays: Visual & Auditory Control

Textbooks:

- Schultz, D. & Schultz, S. E. (2013). *Psychology and Work Today: An Introduction to Industrial and Organizational Psychology*. 7th Edition. Pearson Education: New Delhi.
- Matthewman, L., Rose, A. & Hetherington, A. (2009). *Work Psychology*. Oxford University Press: India.
- Wickens, C. D.; Lee, J. D., Liu, Y. & Gordon Becker, S. E. (2015). *An Introduction to Human Factors Engineering*. 2nd Edition. Pearson Education: New Delhi.

Reference Books:

- Landy, F. J. & Conte, J. M. (2010). *Work in the 21st Century: An Introduction to Industrial and Organizational Psychology*. 2nd Edition. Wiley India: New Delhi.
- Schultz, D. & Schultz, S. E. (2002). *Psychology and Work Today*. Pearson Education: New Delhi.

[AS (ILE)-17011] Industrial Psychology-II

Teaching Scheme:
Lectures: 2Hrs/week

Examination Scheme:
Field Work/Assignment: 40
End Semester Exam: 60

Course Outcomes:

Students will be able to-

1. Learn about major psychological factors involved in the process of employment
2. Acquire psychological skills required to sustain employability
3. Understand the elements of organizational culture for enhancing group/team behavior
4. Understand the role of diversity in workforce and acknowledge the multicultural factors influencing workplace behaviour
5. Learn to apply the concepts of engineering psychology with respect to their disciplines
6. Learn about the impact of psychological factors in consumer behaviour and role of conscious efforts needed in designing products
7. Demonstrate the knowledge gained through practical implementation

Unit I: Managing People at Work: [8 Hrs]

Employee Selection- Techniques, Fair Employment Practices, Biographical Information, Interviews, References & Letters of Recommendation, Job Analysis- Types; Newer Developments, Performance Assessment: Evaluation & Appraisal- Objective & Subjective Techniques, Bias, Post Appraisal Interviews, Organizational Training- Types of Training, Psychological Issues; Career Development & Planning

Unit II: Groups at Work [6 Hrs]

Relationships- At workplace, Issues, Developing Effective Relationships, Groups & Teams- Stages of Group Development, Group Behaviour, Social Identity Theory, Leadership- New Approaches- Leader-Member Exchange, Transactional, Transformational & Charismatic Leaderships, Diversity at Workplace Cultural Differences (Multiculturalism, Psychometric Testing, Motivation, Work-related Attitude, Leadership, Team work, etc.)

Unit III: Engineering Psychology-II [8 Hrs]

Workspace Designs- General Principles, Design of Standing & Seating Work Areas; Human Anthropometry- Structural & Functional Data, Use of Anthropometric Data in Design, Human Computer Interaction- Software Design Cycle, System & User Characteristics, Principles & Guidelines for Design, Automation- Problems, Function Allocation; Transportation- Visibility, Hazards & Collisions, Characteristics of Impaired Driver, Safety Improvements, Industrial Robots

Unit IV: Consumer Psychology [6 Hrs]

Scope and Research Methods- Surveys, Public Opinion Polls, Focus Groups, Observations of Shopping Behavior, Neuromarketing , Advertising- Nature, Scope & Types, Consumer Behavior & Motivation- Buying Habits, Product Pricing, Targeted Advertising, Visual Merchandising- Psychological Perspective-

Techniques, Impulse Buying, Online Visual Merchandising .

Textbooks:

- Schultz, D. & Schultz, S. E. (2013). Psychology and Work Today: An Introduction to Industrial and Organizational Psychology. 7th Edition. Pearson Education: New Delhi.
- Matthewman, L., Rose, A. & Hetherington, A. (2009). Work Psychology. Oxford University Press: India.
- Wickens, C. D.; Lee, J. D., Liu, Y. & Gordon Becker, S. E. (2015). An Introduction to Human Factors Engineering. 2nd Edition. Pearson Education: New Delhi.

Reference Books:

- Landy, F. J. & Conte, J. M. (2010). Work in the 21st Century: An Introduction to Industrial and Organizational Psychology. 2nd Edition. Wiley India: New Delhi.
- Schultz, D. & Schultz, S. E. (2002). Psychology and Work Today. Pearson Education: New

[AS (ILE)-17006] Japanese Language-I

Teaching Scheme:
2 Hrs/week

Examination Scheme:
Oral Exam: 20 Marks
Written Exam: 80 Marks

Course Outcomes:
Students will be able to-

1. Know the basic information of Japan
2. Be familiar with the pronunciation, Accent, Intonation and Japanese writing System Hiragana, Katakana and Kanji
3. Speak daily greetings
4. Count the numerals
5. Introduce themselves, Family members
6. Form basic questions
7. Understand Colors, Years ,Months and Days, Time expressions, Directions to read the city map

Unit I: **[6 Hrs]**
Introduction to Japanese Syllables (phonetic alphabet), greetings & Self introduction, Identifying things, point objects and listen to their names, Listen to things and places etc.; Creating shopping lists

Unit II: **[6 Hrs]**
Introduction to Time, day of the week, simple inquiries on telephone, Means of transport, Basic conversations of everyday life

Unit III: **[6 Hrs]**
Frame questions in Japanese. Vocabulary of giving and receiving objects, Stating impressions/things surrounding us, Expressing likes and dislikes, good/bad, possessions, Talking about the country, town and the environment

Unit IV: **[6 Hrs]**

Quantity, number of people, time, period etc., Stating thoughts and impressions, Conveying movement (e.g. go / come)

Textbooks:

- Minnano no Nihongo 1-1.Goyal Publishers& Distributors Pvt. Ltd. Delhi, India

[AS(ILE)-17013] Japanese Language-II

Teaching Scheme:
2 Hrs/week

Evaluation Scheme:
Oral Exam: 20 Marks
Written Exam: 80 Marks

Course Outcomes:

Students will be able to-

1. Acquire target phrases and expressions
2. Master elementary Japanese grammar
3. Converse about professions at work
4. Get familiar with the customs, work culture & society of japan

Unit I: **[6 Hrs]**

Formation of requests, asking for permission/prohibition, speaking conversations of everyday life.

Unit II: **[6 Hrs]**

Rules and prohibitions, expressing potential and hobbies, sharing experiences.

Unit III: **[6 Hrs]**

Informal Conversations with friends, Expression of opinions, expectations, Utilization of modifying forms.

Unit IV: **[6 Hrs]**

Vocabulary of Machines, Directions, Forms of verbs (give/take/receive), Description of condition and coming to decision.

Textbooks:

- Minnano no Nihongo 1-2.Goyal Publishers& Distributors Pvt. Ltd. Delhi, India

[AS (ILE)-17005] Personnel Psychology-I

Teaching Scheme:
2 lectures/week

Examination Scheme:
3 Assignments for 60 marks
End semester of 40 marks

Course Outcomes:

Students will be able to-

1. Have understanding of organizational concepts and behavior.
2. Have understanding about their own personality for corporate world.
3. Understand importance of groups and its dynamics.
4. Understand the importance of self-management and development.

Unit I: Introduction **[2 Hrs]**

Basic concepts in organizational set up and its importance

Unit II: Personality and corporate world **[8 Hrs]**

Know and accept you, preparing for corporate world, approaches towards work

Unit III: Group behavior and leadership **[8 Hrs]**

Group behavior and effectiveness, effective Leadership and management principles

Unit IV: Self-management & development **[4 Hrs]**

Efficient working habits, self-training and self-development

Textbooks:

- Khana S.S.- (2016) Organizational Behaviour(Text and Cases) Chand and company Pvt. Ltd. Delhi.
- Rae Andr'e :- (2008) organizational behavior. Dorling Kindersley (India) Pvt. Ltd.
- Wallace Hand Masters L.- (2008) Personality development. C-engage Learning India Pvt. Ltd.

Reference books:

- Robbins S, Judge A, Vohra N:- (2013)Organizational behavior.(15th ed.) Pearson Education, Inc.
- Singh Kavita:- (2010) Organizational behavior-Text and cases. Dorling Kindersley (India) Pvt. Ltd.

COURSE TITLE: ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)

MODULE OVERVIEW:

Environmental Management Systems is a module specially designed for the postgraduate students to introduce theoretical information and practical experience of designing environmental management systems for industries. Other than classroom sessions, it also involves working in association with an industry client organization. Students are encouraged to have participatory learning than traditional lecture-based classes.

LEARNING OUTCOMES

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

a) Understand the concept, need, development and current status of EMS and environmental standardization
b) Describe the structure, requirements and documented information in accordance with environmental management systems ISO 14001 (International Organization for Standardization) and EMAS (eco-management and audit scheme),
c) Explain basic concepts and terminology of project management, project planning and implementation from a system perspective,
d) Propose how an environmental management system can be implemented in a given organization and briefly describe how an environmental audit is conducted

Unit	Details	Lect.
1.	**Industry/Corporate and Environment:** Sustainable Development Goals, Role of an Industry/ Corporate, Concepts in sustainability, Environmental policy and legislation, Brief history of environmental management theories/approaches	06 L
2.	**Introduction to EMS and identification skills:** Principles, basic elements / steps (Plan-Do-Check-Act cycle, Life Cycle Analysis) relevant policies, other environmental management tools, international and national framework of standards and legal compliances	06 L
3.	**EMS investigation and development:** To explore the relation between an enterprises and a sustainable society, assessment of different environmental management standards - ISO 14001 and EMAS	06 L
4.	**Introduction and Implementation of ISO 14001:** The introduction and implementation of ISO 14001: environmental policy, planning, implementation and operation, checking, management review, etc.	06 L
5.	**Certification audits:** Identify and define environmental problems and apply appropriate knowledge and skills to selected case studies or real life situations,	06 L

	Demonstrate ability to collect, record, process, interpret and present data using different qualitative and quantitative techniques.	
6.	**Introduction to Environmental Auditing:** Category "A" & "B" types of projects. Procedures and Guidelines to conduct Environmental Audit Effective communication of EMS in several forms, coherent project reports with case studies. Applications EMS in terms of Process flow chart, effluent Generation, composition and treatment of effluents from following industries – sugar, pulp and paper, electroplating, dairy, oil refineries, etc.	06 L

TEACHING - LEARNING AND EVALUATION METHODS

Teaching methods: • Lectures • Discussion and feedback sessions • Case study workshop • Student presentations • Industrial site visits
Evaluation: T1 (20 marks); T2 (20 marks) and SEM (60 Marks)

INDICATIVE READING:

- ISO 14001; 2004;. Environmental Management Systems - specification with guidance for use; British Standards Institute.
- Sheldon, C. and Yoxon, M. 2008. Environmental Management Systems: A Step-by-Step Guide to Implementation and Maintenance. (Third edition) Earthscan Publications.
- Christopher Sheldon and Mark Yoxon, "Installing Environmental management Systems – a step by step guide" Earthscan Publications Ltd, London, 1999.
- ISO 14001/14004: Environmental management systems – Requirements and Guidelines – International Organization for Standardization, 2004
- ISO 19011: 2002, "Guidelines for quality and/or Environmental Management System auditing, Bureau of Indian Standards, New Delhi, 2002 Paul L Bishop 'Pollution Prevention: Fundamentals and Practice', McGraw- Hill international, Boston, 2000.
- Environmental Management Systems: An Implementation Guide for Small and Medium-Sized Organizations, Second Edition, NSF International, Ann Arbor, Michigan, January 2001
- Vijay Kulkarni and Ramachandra T.V., 2006. Environmental Management, Commonwealth Of Learning, Canada and Indian Institute of Science, Bangalore.

College of Engineering, Pune
Shivajinagar, Pune

B.Tech. ILOE
Syllabus of 'Polymer Technology ILE)'
(ILOE offered by Applied Science dept)

Teaching Scheme	Examination Scheme
Lectures: 3/week	**Test 1: 20 marks, Test 1 hr duration** **Test 2: 20 marks, (presentation)** **ESE: 60 Marks, (3 hrs duration)**

Course Outcomes:

a. **Able to classify between various polymer mechanisms , polymerization techniques**
b. **Identify relation between structure property and application of polymers in different fields of Engineering.**
c. **Students will be familiar with composites, specialty polymers, photo luminescent polymers, high strength high thermal stability polymers**
d. **Appreciating impact of development in polymers on environment and remedies .**

Unit – I: Introduction (3Hrs)

Polymer & macro molecule, monomer, functionality, copolymer, polymer blend, plastic and resin, natural polymers. Classification of polymers: based on source, structure, applications, thermal behavior, mode of polymerization..

Unit-II: Properties of polymers (6 Hrs)

Crystalline and amorphous status, melting and glass transition temperatures and their determination, effect of polymer structure on mechanical, physical, chemical, and thermal properties. Thermodynamics of polymer dissolution.

Unit –III: Mechanisms of Polymerization and polymerization techniques (9 Hrs)

Condensation, and Addition polymerization; a) free radical addition polymerization,
Mass or Bulk polymerization process, solution, suspension polymerization process and emulsion polymerization method comparison of merits and demerits of these methods. brief description of : i) Compression and transfer molding ii) Injection molding iii) Extrusion iv) Blow molding v) Calendaring vi) Laminating and pultrusion

Unit-IV: **Commercially important polymers (7 Hrs)**

Synthesis, properties and application of some important polymers; i) Polyethylene (HDPE&LDPE), ii) Teflon iii) Photo luminescent polymers viii) Silicones ix) conducting x)Kevlar (aramid) x) polystyrene foam xi) Inorganic polymers xii) polymer composites

Unit-V: Polymer additives (7 Hrs)

Role of the following additives in the polymers: i) Fillers and reinforcing fillers ii) Plasticizers iii) Lubricants iv) Antioxidants and UV stabilizers v) Blowing agents vi)Coupling agents vii)Flame retardants viii) Inhibitors Compounding of polymer resins,

Unit VI :

Polymer Degradation techniques, Bio compatibility, Polymer Waste Management (4 Hrs)

Textbook & Reference:

Text book of polymer science by Billmeyer, F.W. Jr., Wiely & sons
Polymer Science by Gowarikar

Lecture Unit 1-1	**Introduction:** Introduction, Terminology, classification of polymers basis for classification: source, Organic/Inorganic, Thermal behavior,	V R Gowarikar
2	Classification based on end use Application , classes of polymers like fiber, foam, rubber, resin, composites and their classification	
3	Modes of Polymerization	
Unit 2- 4	**Properties of polymers** : Comparison of properties of polymers with all other material classes basis: Molecular Wt, Crystallinity,	
5	dissolution, Phase transformations, Structure property relations with reference to mechanical properties	
6	Physical and Chemical properties, Thermal behavior of different polymers	
7	Thermodynamics of Polymer dissolution	
8,9	Structure property correlation with appropriate examples	T1 - 20 marks
Unit 3- 10	**Mechanisms of Polymerization and polymerization techniques** What is mechanism of Condensation polymerization and different types with the help of suitable examples: dicarboxylic acid with Diamine to give polyamide, dihydric alcohol and di carboxylic acid to give polyester,	
11	Condensation amino acid to poly lactone, PF resin , epoxy resin, synthetic rubber	
12	free radical addition polymerization **Polyethylene**	
13	Mass or Bulk polymerization process,	
14	suspension polymerization process and emulsion polymerization	
15	Solution polymerization , method comparison of merits and demerits of these methods.	
16	Compression and transfer molding , injection molding ,	
17	Extrusion , Blow molding,	
18	Calendaring vi) Laminating and pultrusion	

Unit 4- 19	**Commercially important polymers** **Synthesis, properties and application of some important polymers**	T2 - presentations
20	i) Polyethylene (HDPE&LDPE), ii) Teflon iii) polycarbonate	Gr 1,2,3
21	iv) conducting polymers, v)Photo luminescent polymers	4,5
22	vi) Polystyrene foam, polymer composites	6,7
23	v) Silicones, Inorganic polymers	8,9
24	vi) Kevlar , carbon fiber	10, 11
Unit 5 -25	**Polymer additives: Compounding of plastics ,**role of additives, limitations of polymers	
26	i) Fillers and reinforcing fillers ii) Plasticizers	
27	iii) Lubricants iv) Antioxidants and UV stabilizers	
28	v) Blowing agents vi)Coupling agents	
29	vii)Flame retardants viii) Inhibitors Compounding of polymer resins	
30	Highlight role of additives for improvement of properties of plastics, examples	
Unit 6 -31	**Polymer degradation techniques- ill effects of polymers and plastics on environment, policy decision on plastic ban**	
32	Polymer degradation techniques - chemical, physical, mechanical	
33	Bio degradable polymers, Polymer Bio degradation methods	
34	Plastic waste recycle techniques	
35	Bio compatible polymers	
36	Overview polymer waste management	

(ML-19011) INTELLECTUAL PROPERTY RIGHTS

Teaching Scheme
Lectures: 1 hr/week

Evaluation Scheme
Continuous evaluation
Assignments/Presentation/Quiz/Test

Course Outcomes (CO):

Students will be able to

- CO1 Infer that tomorrow's world will be ruled by ideas, concept, and creativity.
- CO2 Gather knowledge about Intellectual Property Rights which is important for students of engineering in particular as they are tomorrow's technocrats and creators of new technology.
- CO3 Discover how IPR are regarded as a source of national wealth and mark of an economic leadership in context of global market scenario.
- CO4 Study the national & International IP system.
- CO5 Summarize that it is an incentive for further research work and investment in R & D, leading to creation of new and better products and generation of economic and social benefits.

Unit 1 **(03 Hrs)**

Introduction to the concepts Property and Intellectual Property, Nature and Importance of Intellectual Property Rights, Objectives and Importance of understanding Intellectual Property Rights

Unit 2 **(07 Hrs)**

Understanding the types of Intellectual Property Rights: -
Patents-Indian Patent Office and its Administration, Administration of Patent System – Patenting under Indian Patent Act , Patent Rights and its Scope, Licensing and transfer of technology, Patent information and database. Provisional and Non Provisional Patent Application and Specification, Plant Patenting, Idea Patenting, Integrated Circuits, Industrial Designs, Trademarks (Registered and unregistered trademarks), Copyrights, Traditional Knowledge, Geographical Indications, Trade Secrets, Case Studies

Unit 3 **(04 Hrs)**

New Developments in IPR, Process of Patenting and Development: technological research, innovation, patenting, development,
International Scenario: WIPO, TRIPs, Patenting under PCT

References:

- Aswani Kumar Bansal : Law of Trademarks in India
- B L Wadehra : Law Relating to Patents, Trademarks, Copyright, Designs and Geographical Indications.
- G.V.G Krishnamurthy : The Law of Trademarks, Copyright, Patents and Design .
- Satyawrat Ponkse: The Management of Intellectual Property.
- S K Roy Chaudhary & H K Saharay : The Law of Trademarks, Copyright, Patents
- Intellectual Property Rights under WTO by T. Ramappa, S. Chand.
- Manual of Patent Office Practice and Procedure
- WIPO : WIPO Guide To Using Patent Information
- Resisting Intellectual Property by Halbert ,Taylor & Francis
- Industrial Design by Mayall, Mc Graw Hill
- Product Design by Niebel, Mc Graw Hill
- Introduction to Design by Asimov, Prentice Hall
- Intellectual Property in New Technological Age by Robert P. Merges, Peter S. Menell, Mark A. Lemley

Effective Technical Communication ML19012

FYMTech

Teaching Scheme: **Evaluation Scheme:**

Lectures: 1hr / week **3 Assignments**

Course Outcomes (COs):

After successful completion of the course, students will be able - 1. To produce effective dialogue for business related situations 2. To use listening, speaking, reading and writing skills for communication purposes and attempt tasks by using functional grammar and vocabulary effectively3. To analize critically different concepts / principles of communication skills4. To demonstrate productive skills and have a knack for structured conversations5. To appreciate, analyze, evaluate business reports and research papers

Unit 1: Fundamentals of Communication [4 Hrs]

7 Cs of communication, common errors in English, enriching vocabulary, styles and registers

Unit 2: Aural-Oral Communication [4 Hrs]

The art of listening, stress and intonation, group discussion, oral presentation skills

Unit 3: Reading and Writing [4 Hrs]

Types of reading, effective writing, business correspondence, interpretation of technical reports

and research papers

Reference Books

1. Raman Sharma, "Technical Communication", Oxford University Press.2. Raymond Murphy "Essential English Grammar" (Elementary & Intermediate) Cambridge University Press.3. Mark Hancock "English Pronunciation in Use" Cambridge University Press.4. Shirley Taylor, "Model Business Letters, Emails and Other Business Documents" (seventh edition), Prentise Hall5. Thomas Huckin, Leslie Olsen "Technical writing and Professional Communications for Non-native speakers of English", McGraw Hill.

LIBERAL LEARNING COURSE (LLC)

LLC Music (Instrumental) LL- 18055

B. Tech. & M. Tech 2018-19

Teaching Scheme	**Examination Scheme**
Lecture/Demonstration/Tutorial:	Project/Presentation/Written Exams:
1 hr/Week	100 Marks

Course Education Objectives (CEO)

1. To introduce the basics of non-engineering disciplines in engineering
2. To understand the functionality of non-engineering disciplines and appreciate their scope in the 21st century
3. To learn and apply the basics of non-engineering disciplines with a collaborative inter-disciplinary approach at work and elsewhere

Course Outcomes (CO)

1. Students will be able to name the parts of instruments, namely, accordion and synthesizer
2. Students will be able to understand theories of music and concept of Major Scale, Minor scale, cm Scale, and staff notation.
3. Students will be able to apply Appreggios and practice them hands-on
4. Students will be able to play some songs hands-on

Syllabus

Lecture No. 1-- Introduction of Piano Accordion. Information of key board, couplers, bellows, bass buttons, bass couplers of Accordion. Demonstration by playing few songs.

Lecture No.2-- Information of bass buttons and its applications. Arrangement of chords on bass board. Demonstration of use of bass chords while playing a song. Plying Rhythm using bass chords.Handling of Accordion by students to get the feel of the instrument.

Lecture No.3--Theory of Accoustic Piano and electronic key board. Concept of Major Scale. Major chord equation. Exercise of 12 Major chords.

Lecture No.4-- Application of Major scale. Song in CM Scale.Use of left hand chords while playing song. Simple song playing as Happy Birthday To You.

Lecture No.5-- Practice of playing another song as National Anthem using left hand chords.

Lecture No.6--Introduction of Rhythm playing by using left hand chords. Playing one more song in Major Scale.

Lecture No.7-- Theory of music.Various terms used in music, their definitions and applications. Demonstration of each term.

Lecture No.8--Use of Arpeggios in music playing. Demonstration of Arpeggios. Practice by students.

Lecture No.9-- Writing music.Concept of Staff Notation. Reading of staff notation.

Lecture No.10-- Introduction to Cm Scale. Equation for Minor chords. Exercise of 12 minor chords.

Lecture No.11-- Playing song in Cm Scale. Selection of a song in Cm for playing, using left hand chords. Practice for betterment.

Lecture No.12-- Practice of songs learned so far using left hand chords. Practice of their own songs by students who already know to play songs by applying left hand cords. Preparation for final exam.

LLC Music Instrumental Advanced Syllabus- by Prof. K.R. Mahajan

1. Study of 12 Major chords. Right hand and Left hand fingering while playing the chords.
2. Study of 12 minor chords. Right hand and Left hand fingering while playing the chords.
3. Chords representation in CM scale. Left hand chord representation to the Right hand note.
4. Application of Rhythm in chord playing. Study of march rhythm and waltz rhythm.
5. Song in CM Scale in march rhythm, 4/4 timing.
6. Song in Cm Scale in march rhythm, 4/4 timing.
7. Song in CM Scale in waltz rhythm, 3/4 timing.
8. Song in Cm Scale in waltz rhythm, 3/4 timing.
9. Study of Tango, Mambo, Rumba rhythms with Demonstration.
10. Application of various Piano Techniques as Double Grip,Arpeggios, Right hand chords, Clutch etc. in song playing.
11. Study of Broken Chords and its application in song. Study of 6th chords, 7th chords, suspended chords, and Diminished chords.
12. Practice and preparation of songs for final examination.

LIBERAL LEARNING COURSE (LLC)

LLC Photography LL- 18058

B. Tech. 2018-19

Teaching Scheme	**Examination Scheme**
Lecture/Demonstration/Tutorial:	Project/Presentation/WrittenExams:
1 hr/Week	100 Marks

Course Education Objectives (CEO)

1. To introduce the basics of non-engineering disciplines in engineering
2. To understand the functionality of non-engineering disciplines and appreciate their scope in the 21st century
3. To learn and apply the basics of non-engineering disciplines with a collaborative inter-disciplinary approach at work and elsewhere

Course Outcomes (CO)

1. The students will be able to make use of a DLSR camera confidently.
2. The students will be able analyze and adapt to the changes in lighting conditions.
3. The students will become better in selecting the correct camera parameters while taking photographs.

Course outline:
Total 12 lectures.

Breakdown:
1. General introduction and information about course
2. History of Photography
3. Introduction to camera
4. Understanding Aperture
5. Practical on Aperture
6. Understanding Shutter-Speed
7. Practical on Shutter-Speed
8. Understanding Focal Length
9. Practical on Focal Length
10. Understanding other aspects of the camera
11. Practice
12. Addressing queries and doing some practice

LIBERAL LEARNING COURSE (LLC)

LL- 18045 (Corporate Culture)

B. Tech. 2018-19

Teaching Scheme	**Examination Scheme**
Lecture/Demonstration/Tutorial:	Project/Presentation/Written Exams:
1 hr/Week	100 Marks

Course Education Objectives (CEO)

1. To introduce the basics of non-engineering disciplines in engineering
2. To understand the functionality of non-engineering disciplines and appreciate their scope in the 21st century
3. To learn and apply the basics of non-engineering disciplines with a collaborative inter-disciplinary approach at work and elsewhere

Course Outcomes (CO)

1. Students will be able to define a structure of Corporate Culture to distinguish the calculations of their rights of fringe benefits along with their in-job roles.
2. Students will be able to formulate the tips to cope up the Corporate Stress and relate to the world of opportunities.
3. Students will be able to design the modern technologies offered by Google for data Management.
4. Students will be able to utilize all the hierarchies to contact to in various situations.

Syllabus

Sr. No.	Topic
Session 1	Introduction to Corporate Culture:- IJP, OJT, Planning, Execution, Innovation
Session 2	Introduction to Corporate culture continues:- Effective Management, Attritio
Session 3	Rights and Responsibilities:- Various Allowances, PF, Gratuity, Incentives, Bo

Session 4	Rights and Responsibilities continue:- Term Insurance, Accidental Insurance, Safety for females, Right to Information, Salary Account and other benefits
Session 5	Management of Corporate Stress and Effective Management of Time:- Ident Techniques of Time Management as a leader.
Session 6	Life Cycle Opportunities and Effective Leadership
Session 7	Taxation and its impact on salary calculations:- Understanding various sectio
Session 8	Corporate MIS Management:- Usage for advanced formulas of MS-Excel to investing minimal time.
Session 9	Google Utilities:- Google Forms for data collection, survey, online exams, fee
Session 10	Google Utilities continues:- Google Calendar for corporate Management of options.
Session 11	Moral Ethics and Values along with HR Policies
Session 12	Revision and session as per the requirements of participants and corporate
Exam	Online Examination of 100 marks

LIBERAL LEARNING COURSE (LLC)

LLC French LL- 18048

B. Tech. & M. Tech. 2018-19

Teaching Scheme	**Examination Scheme**
Lecture/Demonstration/Tutorial:	Project/Presentation/Written Exams:
1 hr/Week	100 Marks

Course Education Objectives (CEO)

1. Introducing oneself and others in French
2. Talking about oneself, one's likes and dislikes and one's hobbies
3. Introducing one's family and describing them (physical traits and personality)
4. Understanding time and numbers
5. Basic understanding of France: geography, francophone countries, heritage and icons
6. Talking about the weather

Course Outcomes (CO)

1. Students will be able to read simple French texts
2. Students will be able to introduce themselves and others
3. Students will be able to talk about their likes and dislikes and their hobbies
4. Students will be able to use affirmative, negative, and interrogative sentences
5. Students will be able to provide directions to move around in the city
6. Students will be able to talk about the basic components of French culture and society
7. Students will be able to describe the weather in French

The unit-wise lesson plan has been given in the following pages. Each unit will be completed in 1 lesson. The last lesson (lesson number 11) will be kept for revision, clearing of doubts and a sample test to be solved in class.

In addition to this, homework will be given at the end of each lesson. The students shall be required to submit the completed homework during the next lesson and marks will be reserved for attendance and homework completion.

UNIT-WISE LESSON PLAN

	Communication	Grammar	Vocabulary	Writing	Culture
Unit 1 **Se présenter, Présenter quelqu'un**	➢ Introduce oneself ; ask someone to introduce themselves	➢ Present tense of the verb ***s'appeler***	➢ Surname, name, nationality, address, town etc.	➢ The alphabet ➢ Basic sentence	➢ What is France for you? ➢ When does one use 'tu' and 'vous' ➢ Saying hello and good bye in French and using the correct gestures/actions with them.
Unit 2 **Tools for use in class**	➢ Communicating with the teacher and one's classmates	➢ Subject pronouns ➢ Simple sentences (structure)	➢ Asking the teacher to repeat ➢ Explaining that one hasn't understood etc.	➢ Writing appropriate descriptions for situations in class	➢ Etiquettes in class – dos and don'ts
Unit 3 **Parler de safamille**	➢ Talking of one's family	➢ Introduction of the verbs 'être', 'avoir', 'aimer', 'détester' and 1st category verbs	➢ Family relations ➢ Elder/ younger etc.	➢ Making one's own family tree	➢ Different relations in French families ➢ Types of families

		➢ Possessive adjectives			

<u>Unit 4</u> **Nombres :0 à 100**	➢ Using numbers for various purposes	➢ Interrogation ➢ Est-ce que vs. Qu'est-ce que ➢ Combien de ➢ Il y a	➢ STD codes, area codes, pin code, vehicle registration number, landline and mobile numbers	➢ Preparing one's visiting card	➢ Distance: Paris and other French cities ➢ Multifaceted France and its heritage
<u>Unit 5</u> **L'Heure**	➢ Time : formal and informal structures	➢ Negative sentence structures	➢ Talking about one'sschedule	➢ Writing an informal letter describing one's schedule	➢ Punctuality and its importance in French society ➢ Breaks in schedule: for chatting, going out, shopping etc.
<u>Unit 6</u> **S'orienter**	➢ Moving around in a city: asking for directions	➢ Prepositions	➢ Directions ➢ Landmarks	➢ Preparing a dialogue in pairs giving the direction to a certain place	➢ France and its neighbours ➢ Francophone countries
<u>Unit 7</u> **Se déplacer à Paris**	➢ Moving around in Paris and other towns: means of transport	➢ Prepositions and adverbs of place	➢ Types of transport ➢ Parisian transport system	➢ Dialogue describing how to go from one station to the other	➢ Reading the metro map of Paris and looking at other means of transport in the city and suburbs

<u>Unit 8</u> **Les Sports et les loisirs**	➢ Sports and other hobbies	➢ Present tense of the verbs 'faire', 'jouer' etc. ➢ Introduction to 2nd category verbs	➢ Vocabulary of different sports	➢ Writing a dialogue discussing different hobbies and activities	➢ Sports and French Society ➢ Hobbies and the French
<u>Unit 9</u> **La géographie de la France**	➢ Giving a brief description of the physical features of France	➢ Adjectives and their agreement with nouns	➢ Introducing colours ➢ Rivers, mountains etc.	➢ Writing an informal letter describing a region in France	➢ Looking at the map of France
<u>Unit 10</u> **Le Temps**	➢ Describing the weather	➢ The verb 'faire' ➢ Expressions	➢ Different weather elements ➢ Seasons ➢ Festivals	➢ Writing a paragraph about one's favorite season	➢ The weather: an important French and European preoccupation
<u>Lesson 11</u>	➢ Revision ➢ Clearing doubts ➢ Sample Test				

<u>BOOKS</u>: Extracts taken from various French as Foreign Language Course Books and Grammar books:

1) Forum 1, Méthode de Français, Hachette
2) Alter Ego A1, Méthode de Français, Hachette
3) Exercices de Grammaire Française, Didier
4) Online resources

LIBERAL LEARNING COURSE (LLC)

LLC Interior Design LL- 18063

B. Tech. & M.Tech. 2018-19

Teaching Scheme
Lecture/Demonstration/Tutorial:
1 hr/Week

Examination Scheme
Project/Presentation/Written Exams:
100 Marks

Evaluation Scheme:
Presentation: 40 Marks
Printed submission: 60 Marks

Course Education Objectives (CEO)

1. Introduction to Interior design as a field
2. Understanding case studies
3. Exposure to fundamentals of design in an interior
4. Exposure to materials and finishes
5. Design a small/fun interior project

Course Outcomes (CO)

a) Students would be introduced to a popular "design field"
b) Students would understand the fundamentals of a case study
c) Students would be able to approach a project not just from a technical but an aesthetic stand point
d) Students would be able to identify basic fundamentals and materials in an interior project
e) Students will *"Design and Present a very basic Interior Design Project "*

Session-wise Lesson-Plan

1. **Knowledge**

Class I –Introduction to interior design as a field and freeze on the Project eg Café

2. **Comprehension**

Class 2- students will discuss the basic observations that they saw at the Café and thus will be introduced to the basics of how and why a case study is done. Inferences and details will be drawn from the same and a list of basic design requirements for a café will be frozen

3. **Application**

Class 3- Revision of the frozen requirements and introduction of fundamentals of interior design in correlation with the frozen requirements
Class 4-Introduction of materials and finishes specific to the project (café)

4. **Analysis**

Class 5- Freeze the exact café dimensions and details to be designed by the students

5. **Synthesis**

Class 6- Students (group) start designing the project in the class in the faculty's presence
Class 7- Students (group) continue designing the project in the class in the faculty's presence
Class 8- Students (group) continue designing the project in the class in the faculty's presence
Class 9- Students (group) continue designing the project in the class in the faculty's presence
Class IO- Students (group) finish designing the project in the class in the faculty's presence

6. **Evaluation**

Class I I- Students (group) present the design
Class 12- students will submit the design in a printed portfolio format

College of Engineering, Pune
Applied Science Department
LL-18053
Japanese Language
2021-2022

Teaching Scheme	Evaluation Scheme
2 Credits	**Total Marks : 100 Marks**
Lectures : 60 Minutes / week	**Test 1 : 20 Marks**
	Assignment : 20 Marks
	End Sem Exam : 60 Marks

Course Outcomes (CO)

a) Students would know the basic information of Japan

b) Students would be familiar with the pronunciation, Accent, Intonation and Japanese writing System Hiragana, Katakana and Kanji

c) Students would be able to speak daily greetings

d) Students would be able to count the numerals

e) Students would be able to introduce themselves, Family members

f) Students would be able to form basic questions

g) Students would be able to understand Colors, Years, Months and Days, Time expressions, Directions to read the city map

h) Students would be able to learn Engineering Terminology and Japanese work culture Such as Monozukuri, 5S, Kaizen, 3M, 5W1H etc.

Unit 1 : Introduction to Japanese Language (Nihongo)

1.1 Recognizeze Japanese Characters Hiragana. Can read /write Hiragana script.

1.2 Use basic classroom expressions.

1.3 Exchange greetings Can thank someone or apologize someone.

Unit 2: Japanese Syllabary

2.1 Recognize Japanese Character Katakana Can read /write Katakana script.

2.2 Can ask someone to say something again if you don't really understand.

Unit 3 : About Me

3.1 Give simple self introduction Can ask and answer where you live and your age.

3.2 Can write your name, nationality, date of birth and occupation in Japanese.

3.3 Recognizeze the parts of a business card

3.4 Talk someone briefly about your family using a family photo and answer simple questions such as who is that? Number of family members.

Unit 4: Food

4.1 Talk about your favorite foods you like and dislike. Talk about your breakfast.

4.2 Can respond when offered a drink. For example saying what you want to drink.

4.3 Can look at menu in a fast food restaurant and understand what is available.

4.4 Can look at different restaurants' signboards and understand what each place is.

Unit 5 : Home

5.1 Say what kind of house you live in. Say what you have in your home.

5.2 Write an e mail inviting someone to your home. Visit/ Welcome a friend.

5.3 Ask /say where to put things in the room. Can read the buttons on an electric appliance.

5.4 Can listen to a simple explanation when being shown around a room and understand the layout.

5.5 Recognize the name and address on signs.

Unit 6: Daily life

6.1 Talk about your daily routine. Say the time you do something. .

6.2 Talk about your schedule at work for the week.

6.3 Can listen to short and simple instructions at work and understand what to do.

6.4 Can read a simple, handwritten note at work and understand the instructions.

6.5 Can ask someone to lend you something at work.

Unit 7: Holidays and Days off 1

7.1 Can give a simple answer when asked about your hobbies & favorite things to do.

7.2 Talk about what you do on your days off.

7.3 Can read an event poster and find the important information such as the date,time and place.

7.4 Can ask and answer questions about whether you are going to an event etc.

7.5 Can say when you are available, when you are inviting someone to something or being invited.

Unit 8: Towns

8.1 Recognize station and Taxi signs.

8.2 How to get to particular destination using a map.

8.3 Can say how you go to work and how long it takes.

8.4 Describe places in town and location.

8.5 Can look at common signs in a station and understand what they mean.

Unit 9: Shopping

9.1 Talk about what you want to buy.

9.2 Can ask staff in a shopping center etc. Where to go for a certain item and understand the answer.

9.3 Can look at discount signs and read the prices.

9.4 Make a brief comment on things in a shop.

Unit 10 : Holidays and Days off 2

10.1 Can read a short blog / simple e mail

10.2 Can talk in simple terms about impressions of the holiday/trip.

10.3 Can write a simple post for social media etc. About what you did in holiday.

Unit 11 : Business Japanese

11.1 Business Email terminologies

11.2 Kaizen, 5'S, 3'M and 5W1H

Unit 12 : Engineering Terminologies in Japanese

12.1 Useful work terminologies used necessary for Japanese Companies.

12.2 Horenso, Monozukuri

References :

Marugoto A1 Katsudo Starter Coursebook for Communicative Language Activities.
Marugoto A1 Rikai Starter Coursebook for Communicative Language Competences
The Japan Foundation

Teaching & Assessment Scheme

Teaching Scheme	**Lectures : 2 Hours/week**	**Marks**
Theory based Test on Moodle	Test 1	20
Assignment based on Japanese work culture	Test 2	20
Theory based on entire syllabus	End Semester Exam	60
Total Marks		100

LIBERAL LEARNING COURSE (LLC)

LLC Painting LL- 18065

B. Tech. 2018-19

Teaching Scheme	**Examination Scheme**
Lecture/Demonstration/Tutorial:	Project/Presentation/Written Exams:
1 hr/Week	100 Marks

Course Objectives

1- Introduction of different patterns : landscape, portrait, abstract etc.

2- Introduction of different mediums : water , acrylic, poster, pencil.

3- Introduction of different styles and textures

4- Study of perspective and composition in Paintings

5- Introduction for expression through Painting .

Course Outcomes :

1- Students will be aware of Demonstration of different mediums and illustrations.

2- Students would relate logically and technically with their inner creativity and think accordingly.

3- Tell yourself to think out of the box and express through Art.

4- Influence of Society and Surroundings will seen in their artwork.

5- Purpose :-This art will act as stress reliever from their routine, hectic schedule and will help them concentrate to achieve their main goal.

LLC Painting Syllabus

1- Introduction to the art (painting.) Depiction of emotions, thoughts, ideas through the medium of paintings.

2- Sketching demonstration and it's techniques

3- Demonstration of colour application- various mediums (water,poster, acrylic,pencil etc) it's properties and tools needed for painting.

4- Light and Shade - The major role of light and Shade in Paintings. Balance of colour during keeping in mind the light and Shade.

5- Perspective drawing and proportion - distance and colour perspective

6- Composition of forms,shapes, figures in a painting keeping in mind it's correct proportion.

7- Demonstration of Landscape

8- Demonstration of Abstract / Portrait

9- Various styles of paintings and how to read a painting.

10- Submission and suggestions on students work.

11- Discussion will be conducted and will give suggestions to students regarding their current work and for future progress and prospects.

Marks distribution

Final exm---20

- submission s 20/20/20

Attendance- 10

Interest towards Subject and Development - 10

Total --100

LIBERAL LEARNING COURSE (LLC)

LLC Political Science LL- 18015

B. Tech. 2018-19

Teaching Scheme	**Examination Scheme**
Lecture/Demonstration/Tutorial:	Project/Presentation/Written Exams:
1 hr/Week	100 Marks

1. Introduction to the Constitution of India
2. Basic Structure of Indian Government
3. Election Commission in India
4. Party System in India

Course Outcomes (CO)

a) Students would be able to understand the basic features of Indian Constitution of India.
b) Students would be able to analyze the meaning of equality with reference of India.
c) Students would be able to compare between Socialism & Communism.
d) Students would be able to identify Fundamental Rights of the citizen.
e) Students would be able to know the importance and need of Federal structure of India
f) Students would be able to differentiate between Parliamentary and Presidential system.
g) Students would be able to recognize the basic features of Federal structure.
h) Students would be able to know the concept of Socialism, Communism & Industrial revolution.
i) Students would be able to assess Party system in India. And they would also understand the changes in Party System of India.
j) Students would be able to appreciate or comprehend an Election Commission of India.
k) Students would be able to discuss on the issue of Simultaneous elections.

Syllabus

Class 1-Basics of Indian Constitution --- Liberty, Equality, Justice, Sovereign, democratic, Republican,
Class 2- Socialism, Communism

Class 3- Fundamental Rights,
Class 4- Directive Principles
Class 5- Parliamentary & Presidential system,
Class 6- Federal System
Class 7- - Election Commission
Class 8- Adult Franchise, Majority Vote System, Simultaneous elections
Class 9 - Political party. Party system.
Class 10 - Indian Party System.
Class 11- Indian Democracy. Diversity and democracy in India
Class 12 - Challenges to Indian Democracy and solutions.
Class 13- End of Semester- Written test- Two hours - 60 marks- Tentative Date – 15 Nov

LIBERAL LEARNING COURSE (LLC)

LLC Dance LL- 18062

B. Tech. 2018-19

Teaching Scheme	**Examination Scheme**
Lecture/Demonstration/Tutorial:	Project/Presentation/Written Exams:
1 hr/Week	100 Marks

Course objectives

Dance LLC course syllabus is subject to the interest area of the present group of students. There are 5 different ways to explore information and develop skills in given timeframe. Apart from enjoyment and exercise, dance has benefits for health and personality. all this will be taken in account while designing the course.

Following are the five streams in which the objectives can be achieved.

- Practical performance based on basic Kathak dance skills.
  We develop good body posture, balancing skills, eye focus and graceful body movements.
- Knowledge of related concepts.
  E.g. Types of dances, musical instruments, Rhythm etc.
- Watching and reviewing a live dance performance.
- Creating a performance
- Developing technical support for dance and music with electronic instruments and apps.

Course outcomes

By the end of term 1 of academic year 2018-2019, dance LLC students should be able to remember a structured dance sequence. Demonstrate it in a group and individually. Relate it with different concepts from contemporary times.

Students will watch a live performance and evaluate its presentation. They will apply the information to design their own performance at the end of the semester. They will improve their performance for the final assessment according to the suggestions by their batch mates and teacher.

These outcomes focus on team efforts, developing muscle memory and think in relation with contemporary time.

Detailed Syllabus description

- Introduction to origin and development of different types of dances and improvisational activity
- Dance of palms.
- Basic introduction to Kathak, practical training of the same.
- Basic introduction toBharatanatyam, practical training of the same.
- Basic introduction to contemporary dance, practical training of the same.
- Basic introduction to folk dances, practical training of the same.
- Basic introduction and practical of any dance style of student's choice.
- Solo presentation
- Duet or trio presentation
- Group dance presentation
- Innovative concept presentation
- Theory exam
- Practical exam

Dance is all about energy, innovation and expressions. So every session will have creative activities that will provoke students to experiment with concepts movements. If students wish explore more in one particular style like Kathak or Bharatanatyam, this approach is also appreciated in LLC classes. And accordingly plan is made. Some of the students have taken LLC for second time. Their level of intricacy will be higher than that of first timers.

Prof. Sonal Pendse

Mob. No. 9689615339

LIBERAL LEARNING COURSE (LLC)

LLC Holistic Health LL- 18051

B. Tech. 2018-19

Teaching Scheme	**Examination Scheme**
Lecture/Demonstration/Tutorial: 1 hr/Week	Project/Presentation/Written Exams: 100 Marks

Course Outcomes

1. At the end of the semester students will know what it takes to experience Complete Health at any given point
2. They will understand importance of the Emotional Status of an individual in development of any disease as well as in the process of recovery
3. They will be able to apply the knowledge gathered during the course for their well being

Syllabus

1. Holistic Health Perspective
2. Diet
3. Exercise
4. Sleep as a healer
5. Bodies, Chakras, Elements
6. MBM concept
7. Alternative Therapies
8. Three main streams of medicine in India
9. First Aid, Home Remedies
10. One ailment... Different Approach
11. Lifestyle management
12. Stress... What does it mean?

LIBERAL LEARNING COURSE (LLC)

LLC Modern Computerized Film Making LL-18054

B. Tech. 2018-19

Teaching Scheme	**Examination Scheme**
Lecture/Demonstration/Tutorial:	Project/Presentation/Written Exams:
1 hr/Week	100 Marks

Lecture No	***Syllabus/Topics to be covered***
1	• Films as a mode of entertainment for people and 4th dimension of human life nowadays . • Impact and Reach of Films • Introduction to Filmindustry (India and Worldwide) • Introduction to Sub verticals of the Industry : AVGC verticals : Animation, Visual Effects, Gaming and Comics . • Industry projections, Demos on sub verticals with particular reference to PFW work in stereo conversion, visual effects (DN) and Digital Intermediate work for Bollywood **(to carry 30 paper anaglyphs)**
2	• Basic introduction to how the Film Industry Evolved, History of Films in India . Evolution of Marathi films and other regions, Hindi films and American Cinema . Notable people in the industry . • Its inception in India, First Film's, Camera Technology Then and Now, etc (Meaning of 16 mm, 35 mm , 70 mm , perforations)and DCP format and the future. • Brief on Film / digital shooting . Advantages and Disadvantages
3	• Video as a medium of communication. • The changing nature of video production, • Stages and types of production, Functional and practical factors of production, Production planning, Technical and aesthetic elements of video production • 5Cs of Cinematography . Visual arts (Rule of 1/3, 180 deg rule etc)
4	• Making budget for feature film and television serials, making story board for shot selection and division, scheduling process and practical problems. • Coordination process among crew members for functioning of video production, Short Film Production Process. • ***Exercise for Students*** :**Study of Opening and Closing credits of a films which you have seen . Identify different people and write your own interpretation of job roles .**
5	• Basic of Shots and their Composition, • Types of Camera and their Features, Specific Use of Various Types of Camera, Working Principle of a Video Camera. Various Camera Movements and Angles • Types of Cuts and transitions.
6	• Sound in the video production, basic principles of acoustics and types of sound, • dB scale and physics and typical sound levels . • Microphone characteristics, Camera mounted microphones, external microphones, standardized recording procedures, monitoring sound. • Equalizing and filtering to improve sound quality, constructing the audio

	portion of the sound. • enhanncing sound Quality by removing noise , folley recording ,lip synchro
7	• Animation types and 12 principles of animation • Production line for 2d and 3D animation • Other types of Animation (Demos through Videos) • History of animation films (Japnese Vs. American)
8	• Photoshop –I • What we can do with photoshop • Layer based vs node based • Illustration of commands
9	• Photoshop –II • Demo on clean plate and compositing • Extraction of images from a video in VLC . • VFx as an essential tool . Typical Before and after VFx and Vfx breakdown . • Softwares used in the industry for visual effects, sample demonstrations of Vfx breakdown of selected shots from recent films. (
10	• **RECENT TRENDS :-**Web Series, Short Films. • The Digital Domain to showcase Film Making Talent and earning money thru you tube . • Walter Murch principles on video editing
11	• Gaming 2D and 3d pipeline . • Computer science / IT for Media and Entertainment Industry. • Film Promotion and Mktg in India . What are the problems and how do we overcome it . Regional films problems of getting screen . • Clarification of doubts , What we do at PFAMES . distribution of brochures and course details.

LIBERAL LEARNING COURSE (LLC)

Agriculture (LL-18042)

B. Tech. 2018-19

Teaching Scheme	**Examination Scheme**
Lecture/Demonstration/Tutorial:	Project/Presentation/Written Exams:
1 hr/Week	100 Marks

Course Education Objectives (CEO)

1. To introduce the basics of non-engineering disciplines in engineering
2. To understand the functionality of non-engineering disciplines and appreciate their scope in the 21st century
3. To learn and apply the basics of non-engineering disciplines with a collaborative inter-disciplinary approach at work and elsewhere

Course Outcomes (CO)

1. Students will be able to define basic problems/ constrains in agriculture.
2. Students will be able to interpret and summarize the various technology in agriculture with the help acquired knowledge.
3. Students will be able to solve the problems by developing new models and techniques .
4. Students will be able to conclude merits and demerits of old and new technologies in agriculture and suggest solutions or recommendations for improvement in agriculture so as to improve the yield and farmers income,.

SYLLABUS

1) RECENT ADVANCES IN AGRICULTURE.

2) 2) ORGANIC FARMING ; PRINCIPLES,GOOD AGRICULTURE PRACTICES .SCOPE AND IMPORTANCE ,LIMITATIONS .

3) 3) SUSTAINABLE AGRICULTUREAND ITS ROLE IN IMPROVING YIELD AND FARMERS INCOME

4) 4)PLANT NUTRITATION ;ESSANTIAL ELEMENTS FOR NORMAL GROWTH AND DEVELOPMENT,MACRO AND MICRO ELEMENTS,THER ROLES/FUNCTIONS ,DEFICIENCY SYMPTOMS

5) BIOFERTILIZERS ,TYPES ,SCOPE AND IMPORTANCE

6) TISSUE CULTURE TECHNIQUE

7) GREEN HOUSE TECHNOLOGY

8) CLIMATE CHANGE AND ITS IMPACT ON AGRICULTURE

9) ADVANCED METHODS OF IRRIGATION ;DRIP SPINKLERS MICROTUBES USE OF MOISTURE SENSORS ,FERTIGATION AND FOLIAR NUTRITION

10) TECHINIQUES OF SOIL IMPROVEMENT

11) CULTIVATION OF MEDICINAL PLANTS;AGROTECHNIQUES ,HARVESTING PROCESSING AND MARKETING

12) PROCESSING ,TECHINQUES

13) POST HARVEST TECHNOLOGY, STORAGE LIFE /SHELF LIFE.

14) VALUE ADDITION

15) ROLE OF BIOTECHNOLOGY IN AGRICULTURE ,GENITICALLY MODIFIED ORGANISIMS(GMOs)

16) ROLE OF NANOTECHNOLOGY IN AGRICULTURE.

17) USE OF ROBOTICS, A I., COMPUTERS AND DRONE TECHNOLOGY IN AGRICULTURE .

LIBERAL LEARNING COURSE (LLC)

Business (LL-18024)

B. Tech. 2021-22

Teaching Scheme	**Examination Scheme**
Lecture/Demonstration/Tutorial:	Project/Presentation/Written Exams:
1 hr/Week	100 Marks

Course Education Objectives (CEO)

1. To introduce the basics of non-engineering disciplines in engineering
2. To understand the functionality of non-engineering disciplines and appreciate their scope in the 21st century
3. To learn and apply the basics of non-engineering disciplines with a collaborative inter-disciplinary approach at work and elsewhere

Course Outcomes (CO)

At the end of the course, student will be able to

1. discover, develop, and assess different types of Entrepreneurial ventures and opportunities
2. learn about opportunity and risk analysis
3. use the strategies for valuing your own company, and how venture capitalist and angel investors use valuations in negotiating milestones, influence and control
4. pick correct marketing mix and how to position the company in the market by using analytical tools
5. learn how to sell themselves and the product/service and to handle objections
6. know how organizations operates, their process matrices, start new ventures, write business plans

SYLLABUS

Unit I: Market Research **(1 hr)**

Introduction to Entrepreneurship, Profile of the Entrepreneur, Market Gap / Opportunity Analysis, Market Research Methods, Defining the Focal Market: Market Segmentation, Industry analyzing – Research / Competitive Analysis

Unit II: Types of Companies and Organizations **(1hr)**

Company/ Organization Types, Legal Aspects, Taxation, Government Liaison, Building the

Team, Mergers and Acquisitions

Unit III: Business Finance (2hrs)

Shares and Stakes, Valuation, Finance Creation (Investors / Financers), Revenue Plans and Projections, Financial Ratios, Business Lifecycle, Break Even

Unit IV: Marketing & Digital Marketing (2hrs)

Marketing Basics, Marketing Strategy and Brand Positioning, Plans and Execution Techniques, Marketing Analytics, Online Marketing

Unit V: Sales (2hrs)

Understanding Sales, Pitching Techniques, Sales strategies, Inside Sales v/s Outside Sales, RFP

Unit VI: Operations Management (1hr)

Operational Basics, Process Analysis, Productivity, Quality

Unit VII: Start-ups (2hrs)

Start-up Basics, Terms, Start-up Financing, Start-up Incubation, Start-upIncubation, Getting Listed

LIBERAL LEARNING COURSE (LLC)

Clay Art & Pottery (LL-18061)

B. Tech. & M.Tech. 2018-19

Teaching Scheme	**Examination Scheme**
Lecture/Demonstration/Tutorial:	Project/Presentation/Written Exams:
1 hr/Week	100 Marks

Course Education Objectives (CEO)

1. To introduce the basics of non-engineering disciplines in engineering
2. To understand the functionality of non-engineering disciplines and appreciate their scope in the 21st century
3. To learn and apply the basics of non-engineering disciplines with a collaborative inter-disciplinary approach at work and elsewhere

Course Outcomes (CO)

1. Students will be able to increase their ability to focus while they learn centering the clay on wheel
2. Students will be able to adapt to a new material and translate their thoughts to clay as a medium of expression
3. Students will be able to value art through their own creation
4. Students will be able to create objects literally by using their hands as tools

SYLLABUS

1. Understanding terms important in Clay art and Potter
2. Learning basics of hand built pottery using pinching, coiling and slab
3. understanding how to use the potters wheel and construct a variety of vessels such as cylinders, bowls, and cups
4. Introduction to glazing and other decorating techniques to complete successful designs in clay
5. study examples of ceramic works and will gain an understanding of the tools and vocabulary used in the ceramic arts

LIBERAL LEARNING COURSE (LLC)

DEFENCE (LL-18047)

M. Tech & B. Tech. 2018-19

Teaching Scheme	**Examination Scheme**
Lecture/Demonstration/Tutorial:	Project/Presentation/Written Exams:
1 hr/Week	100 Marks

Course Education Objectives (CEO)

1. Introduce the basics of non-engineering disciplines in engineering
2. Understand the functionality of non-engineering disciplines and appreciate their scope in the 21st century
3. Learn and apply basics of non-engineering disciplines with a collaborative inter-disciplinary approach at work and elsewhere

Course Outcomes (CO)

The course will enable students to get a detailed understanding of the following in the context of the Armed Forces of India :-

1. Macro organisations and hierarchy of the Indian Armed Forces as obtained in the public domain
2. Operational environment relating to border management.
3. Historical perspective and sequential conduct of major wars fought by India and their historic and strategic implications.
4. Equipment profile of the Indian Armed Forces to include the Army, Navy and Airforce.
5. Detailed operational analysis of chosen anti-terrorist operations and connected legal implications

SYLLABUS :- The following subjects will be covered as lecture-presentations and discussions :-

Ser No	Subject
1	The Indian Armed Forces : An Introduction
2	Fighting Arms,Support Services And Major Weapon Systems
3	Rank Structure And Man-Management in the Armed Forces
4	Border Deployment and Border Management
5	Armed Forces Special Powers Act (AFSPA)
6	1948 Indo-Pak War
7	Indian Navy
8	Mumbai Terrorist Attack 2008
9	Indian Airforce
10	Pathankot Terrorist Attack 2016

Ser No	Subject
1 1	1962 India-China War
12	1965 Indo-Pak War
13	1971 Liberation of Bangla Desh
14	1999 Kargil War
15	India-China Doklam Standoff
18	Surgical Strike in Pakistan
19	Central Police Forces and Organisations

LIBERAL LEARNING COURSE (LLC)

Geography (LL-18049)

B. Tech. 2018-19

Teaching Scheme	**Examination Scheme**
Lecture/Demonstration/Tutorial:	Project/Presentation/Written Exams:
1 hr/Week	100 Marks

Course Education Objectives (CEO)

1. To introduce the basics of non-engineering disciplines in engineering
2. To understand the functionality of non-engineering disciplines and appreciate their scope in the 21st century
3. To learn and apply the basics of non-engineering disciplines with a collaborative inter-disciplinary approach at work and elsewhere

Course Outcomes (CO)

1. Students will be able to define earth landforms.
2. Student will be able to explain the physical features of India.
3. Student will be able to identify places and develops an understanding of the importance of places to people.
4. Student will be Identifying, interpreting and analyzing geographic problems and processes.

SYLLABUS

Sr.No	Topics	Contents
1	**Fundamentals of Geography**	➢ Latitudes ➢ Longitudes ➢ Seasons on Earth ➢ Time-zones
2	**Introduction of Physical Geography**	➢ Continental drift ➢ Sea-floor spreading ➢ Plate tectonic theory

3	**India**	➢ Physical features in India ➢ urbanization process in India
4	**Disaster Management**	Introduction on Disaster Different Types of Disaster : ➢ Natural Disaster ➢ Manmade Disaster
5	**Geographical Information System (GIS)**	Introduction to GIS ➢ Basic concepts: Definition and history, Components of GIS, ➢ Recent trends and applications of GIS;

LIBERAL LEARNING COURSE (LLC)

Music Vocal (LL-18056)

B. Tech. 2018-19

Teaching Scheme	**Examination Scheme**
Lecture/Demonstration/Tutorial:	Project/Presentation/Written Exams:
1 hr/Week	100 Marks

Course Education Objectives (CEO)

1. To introduce the basics of non-engineering disciplines in engineering
2. To understand the functionality of non-engineering disciplines and appreciate their scope in the 21st century
3. To learn and apply the basics of non-engineering disciplines with a collaborative inter-disciplinary approach at work and elsewhere

Course Outcomes (CO)

1.
2.

SYLLABUS

LIBERAL LEARNING COURSE (LLC)

Music Vocal (LL-18056)

B. Tech. 2018-19

Teaching Scheme	**Examination Scheme**
Lecture/Demonstration/Tutorial:	Project/Presentation/Written Exams:
1 hr/Week	100 Marks

Course Education Objectives (CEO)

1. To introduce the basics of non-engineering disciplines in engineering
2. To understand the functionality of non-engineering disciplines and appreciate their scope in the 21st century
3. To learn and apply the basics of non-engineering disciplines with a collaborative inter-disciplinary approach at work and elsewhere

Course Outcomes (CO)

1. Students will be able to develop aesthetic sense towards wood and metallic materials
2. Students will be able to make small, useful and beautiful models from wood and metallic materials

SYLLABUS

Syllabus for Wood and Metal Art

Unit 1 Wood Art:

1. Different types of wood

2. Cutting and Carving instruments

3. Joining methods of wood with wood, glass, Plastics and metals

4. Small wood arts

5. Small furniture items

Unit 2- Metal Arts:

1. Different Types of Metals and Alloys

2. Cutting instruments for metallic articles

3. Joining methods for metallic articles.

4. Small metallic articles: examples.

5. Casting and other shaping methods of metals and alloys

LIBERAL LEARNING COURSE (LLC)

Wood and Metal Art

B. Tech. 2018-19

Teaching Scheme	**Examination Scheme**
Lecture/Demonstration/Tutorial:	Project/Presentation/Written Exams:
1 hr/Week	100 Marks

Course Education Objectives (CEO)

1. To introduce the basics of non-engineering disciplines in engineering
2. To understand the functionality of non-engineering disciplines and appreciate their scope in the 21st century
3. To learn and apply the basics of non-engineering disciplines with a collaborative inter-disciplinary approach at work and elsewhere

Course Outcomes (CO)

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SYLLABUS

Syllabus for Wood and Metal Art

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1. Different Types of Metals and Alloys

2. Cutting instruments for metallic articles

3. Joining methods for metallic articles.

4. Small metallic articles: examples.

5. Casting and other shaping methods of metals and alloys