

HU110 ENGLISH

HU110

ENGLISH

3-0-2

COURSE OBJECTIVE:

The objective of this foundational course is to develop the second language learners' ability to use the four fundamental language skills – listening, speaking, writing and reading. The objective of this laboratory is to practice English phonetics through audio & visual aids and computer software. It intends to enable student to speak English correctly with confidence.

COURSE CONTENT:

Unit I

Grammar – Applied Grammar and usage, Parts of Speech, Articles, Tenses, Subject-Verb Agreement, Prepositions, Active and Passive Voice, Reported Speech: Direct and Indirect, Sentence Structure, Punctuations.

Unit II

Vocabulary Development – Using Dictionaries and Thesaurus, Synonyms, Antonyms, Homophones, One Word Substitution, Affixation: Prefixes & Suffixes, Derivation from root words, Jargon, Scientific Jargon.

Unit III

Developing Reading Skills – Reading Comprehension, Process, Active & Passive Reading, Reading Speed Strategies, Benefits of effective reading, note-making, note- taking, Reading comprehension of technical material and SQ3R reading technique

Unit IV

Developing Writing Skills – Planning, Drafting & Editing, Writing with style, right-words selection, writing effective sentences, developing logical paragraphs, art of condensation, précis, essay, technical definition and technical description

Unit V

Business Correspondence – Business Letters, Parts & Layouts of Business Letters, Writing Resume/ Application Calling/ Sending Quotations/ Orders/ Complaints and E-mails

Topics for the Laboratory:

1. Basic Grammar & Vocabulary Practice (Synonyms, Antonyms, Analogies, Sentence Completion, Correctly Spelt Words, Idioms, Proverbs, Common Errors.
2. Phonetic Symbols, Pronunciations
3. Listening Skills – Including Listening Comprehension
4. Extempore and JAM (Just a Minute Session)
5. Role Play – I
6. Role play – II
7. Body Language
8. Debate
9. Oral Presentation – Preparation & Delivery using Audio – Visual Aids with stress on body language and voice modulations. (Topics to be selected by the Instructor)

COURSE OUTCOMES

Student after successful completion of course must possess sound language skills. They must also feel confident in communicating their ideas and feelings. After laboratory exercises, students must possess sound language skills. They must also feel confident in communicating their ideas to others.

EVALUATION

Evaluation will be continuous an integral part of the class as well through external assessment. Laboratory assessment will be based on assignments, presentations, and interview of each candidate.

REFERENCES

A.J. Thomson and A.V. Martinet, A Practical English Grammar, Oxford IBH Pub
Sanjay Kumarm Pushp Lata, English for Effective Communication, Oxford

COURSE OBJECTIVE:

The objective of this course is to help students to acquire reading and writing skills in a self-learning mode.

COURSE CONTENT:

Exercises to be performed by students:

- Reading text selection from the list given below
- To write a book-review

COURSE OUTCOMES

Student after successful completion of course must possess sound comprehension skills. They must also feel confident in writing reviews and comments on the read material.

EVALUATION

Evaluation will be continuous an integral part of the class. Assessment will be based on assignments, presentations, and interview of each candidate.

REFERENCES

1. My Experiments with Truth by Mahatma Gandhi
2. Wings of Fire by Dr. APJ Abdul Kalam
3. History of Everything by Stephen Hawkings
4. A Passage to India by E.M. Forster
5. The Argumentative Indian by Amartya Sen
6. The Old Man and the Sea by Ernest Hemingway
7. Life of Pi by William Dalrymple
8. The Alchemist by Paulo Coelho
9. The Eighth Habit by Stephen Covey
10. The Road Less Travelled by M.Scott Peck

MA110 MATHEMATICS- I

MA110

MATHEMATICS- I

3-1-0

COURSE OBJECTIVE:

The objective of this foundational course is to review mathematical concepts already learnt in higher secondary. This course will also introduce fundamentals of mathematical functions, derivatives and aspects of calculus to students.

COURSE CONTENT:

Unit I

Recapitulation of Mathematics: Basics of Differentiation, Rolle's and Lagranges Theorem, Tangents and Normals, Indefinite Integral (Substitution, Integration using Trigonometric Identity & Integration by Parts & Definite Integral).

Unit II

Ordinary Derivatives & Applications: Expansion of functions by Maclaurin's & Taylor's Theorem (One Variable), Maxima and Minima of functions of two variables, Curvature (Radius, Center & Circle of Curvature for Cartesian Coordinates), Curve Tracing.

Unit III

Partial Derivatives & Applications: Definition, Euler's Theorem for Homogeneous Functions, Differentiation of Implicit Functions, Total Differential Coefficient, Transformations of Independent Variables, Jacobians, Approximation of Errors.

Unit IV

Integral Calculus: Definite Integrals as a Limit of Sum, Application in Summation of series, Beta and Gamma functions (Definitions, Relation between Beta and Gamma functions, Duplication formula, Applications of Beta & Gama Functions).

Unit V

Applications of Integral Calculus: Multiple Integral (Double & Triple Integrals), Change of Variables, Change the Order of Integration, Applications of Multiple Integral in Area, Volume, Surfaces & Volume of Solid of Revolution about X-Axis & Y-Axis.

COURSE OUTCOMES

The curriculum of the Department is designed to satisfy the diverse needs of students. Coursework is designed to provide students the opportunity to learn key concepts of mathematical functions, partial derivatives as well as fundamentals and applications of integral calculus.

EVALUATION

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

REFERENCES

Michael Greenberg, Advanced Engineering Mathematics, Second Edition, Pearson Education, 2002 (Indian Edition).

B.V. Rammana, Higher Engineering Mathematics, Tata McGraw Hill Publishing Company, 2007.

Potter, Goldberg & Edward, Advanced Engineering Mathematics, Oxford University Press.

S. S. Shastry, Engineering Mathematics, PHI Learning

C.B. Gupta, Engineering Mathematics I & II, McGraw Hill India, 2015

MA111 MATHEMATICS- II

MA111

MATHEMATICS- II

3-1-0

COURSE OBJECTIVE:

The objective of this foundational course is to review mathematical concepts already learnt in higher secondary. This course deep understanding of matrix, differential equations as well as a strong sense of how useful the subject can be in other disciplines of learning.

COURSE CONTENT:

Unit I

Matrices & Linear Systems: Rank of a Matrix (By reducing it to Elementary Transformation, Echelon & Normal Forms), Solution of Simultaneous equations by Elementary Transformation Methods, Consistency & Inconsistency of Equations, Eigen Values & Eigen Vectors, Cayley- Hamilton Theorem..

Unit II

Ordinary Differential Equations-I: First-order differential equations (Separable, Exact, Homogeneous, Linear), Linear differential Equations with constant coefficients.

Unit III

Ordinary Differential Equations-II: Homogeneous linear differential equations, Simultaneous linear differential equations. Second-Order Linear Differential Equations with Variable Coefficients: Solution by Method of Undetermined Coefficients, ByS Known Integral, Removal of First Derivative, Change of Independent Variable and Variation of Parameters.

Unit IV

Partial Differential Equations-I: Definition, Formulation, Solution of PDE (By Direct Integration Method & Lagranges Method), Non-Linear Partial Differential Equation of First order {Standard I, II, III & IV}, Charpit's General Method of Solution Partial Differential equations.

Unit V

Partial Differential Equations-II: Partial Differential Equations with Constant Coefficients (Second and Higher Orders Homogeneous and Non- Homogeneous equations), Partial differential Equations Reducible to equations with constant coefficients, The Method of Separation of Variables.

COURSE OUTCOMES

The curriculum of the Department is designed to satisfy the diverse needs of students. Coursework is designed to provide students the opportunity to learn key concepts of matrix, differential equations and their applications.

EVALUATION

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

REFERENCES

- Dean G. Duffy, Advanced Engineering Mathematics with MATLAB, CRC Press, 2013.*
E. Kreyszig, Advanced Engineering Mathematics, John Wiley & Sons Inc.
Michael Greenberg, Advanced Engineering Mathematics, Second Edition, Pearson Education, 2002 (Indian Edition).
B.V. Rammana, Higher Engineering Mathematics, Tata McGraw Hill Publishing Company, 2007.
Shanti Narayan, A Course of Mathematical Analysis. S. Chand & Co. Delhi.
Marwaha, Introduction to Linear Algebra, PHI Learning.

COURSE OBJECTIVE:

This course introduces students to environment concerns. Students are expected to learn about environment, factors affecting it, environmental ethics and its protection through lectures, presentations, documentaries and field visits.

COURSE CONTENT:**Unit I**

Introduction: Domestic and Global Environmental concerns, principles of sustainable development, Sustainable agriculture, organic farming, bio-fuels, Threats for sustainability

Unit II

Environmental Ethics & Legislations: Enforcement of Environment laws in India – The water act, The Air (Prevention and Control of Pollution) Act, 1981, The Environment (Protection) Act, 1986, Environmental Auditing

Unit III

Environmental Pollution: Air Pollution – sources, types of air pollutants, National Ambient Air Quality Standards, Controlling Air Pollution. Water pollution – sources, types of water pollutants, water quality indicators, water quality standards. Soil Pollution - types of soil pollutants: industrial wastes, pesticides, fertilizers and manures, salination of soil, Controlling Soil Pollution.

Unit IV

Environmental Challenges: Local Challenges - Solid Waste – Impact of solid waste on natural resources, Deforestation; Global Challenges - climate change and global warming, Kyoto Protocol, Greenhouse Gases, Ways to reduce Greenhouse gases emissions, Carbon Footprint, ways to reduce carbon footprint, Carbon Trading.

Unit V

Sustainable habitat, industrialisation and urbanization: Concept of Green Building, Volatile Organic Compounds (VOC), GRIHA Rating, LEED Rating, HVAC, Hybrid Car Technology, Industrial ecology, India's renewable energy capacity. *Green Technology & Green Business:* Green Business, Green Computing, E-waste management.

COURSE OUTCOMES

Student after successful completion of course must possess an understanding of environment, eco-system and its consequences of unbalancing the environment. After successful completion of this course, student will earn 2 credits.

EVALUATION

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

REFERENCES

- R. Rajagopalan, Environmental Studies, Oxford IBH Pub, 2011.*
Kogent Learning Solutions Inc., Energy, Environment, Ecology and Society, Dreamtech, 2012.
Rag, R. L, Ramesh, Lekshmi Dinachandran, Introduction to sustainable engineering

COURSE OBJECTIVE:

This course introduces students about the basic fundamentals of Information Technology (IT). Students are expected to learn about applications of IT in communication, multimedia, internet and cloud computing.

COURSE CONTENT:

Unit 1

Data and Information: Introduction, Type of data, Simple model of computer.

Data processing using a computer: Introduction to Operating System, Data storage Media, High capacity network storage media.

Introduction to Database Management System; Database modelling; Relational model; Distributed DBMS; Data warehouse, Data mining; Classification of Language and Applications

Unit 2

IT Application in Communication: Network services-telephone services, Cellular telephone services, Radio and TV broadcasting, Audio-Visual conferencing, Video-on-demand.

Internet Technology: Introduction, Working of internet, Introduction to network protocol and topologies, Types of network: LAN, WAN, Web browser.

Internet Services: E-mail, Telnet, FTP, WWW, HTML, URL.

Unit 3

IT Application in Multimedia: Introduction, Components of multimedia and challenges, Video compression, Video coding technology: JPEG, MPEG, And JBIG.

Introduction to cloud computing: Types, Services, Models, Characteristics, Benefits **and** Challenges, Application, Limitations.

Unit 4

IT Application in E-Commerce and E-Governance: Introduction, Different Types of E- Commerce with examples, Advantages and disadvantages, E-Commerce in India, E-Services, E-Commerce security, Internet security and ethics, Technology issues, Social issues, Introduction to E-Governance, Challenges, Application, advantages, Case study of MP-online and IRCTC

Unit 5

Social impact of information technology: Introduction, Social Uses of World Wide Web,

Social networking Services, Privacy, security and integrity of Information ,Disaster recovery Intellectual property rights, IT Enabled Services and careers, Career in information technology, Case study of NPTEL.

References:

V.Rajaraman, Introduction to Information Technology; PHI
E Balagurusamy, Fundamentals of Computers, TMH
Santiram Kal Basic Electronics, PHI
M.N. Rao Cloud Computing, PHI

COURSE OBJECTIVE:

This course introduces students to environment concerns. Students are expected to learn about environment, factors affecting it, environmental ethics and its protection through lectures, presentations, documentaries and field visits.

COURSE CONTENT:

Unit I

Overview of Civil Engineering, types of Infrastructures, Effect of infrastructure facilities on economy and environment, Role of Civil Engineers in the infrastructural Development Introduction to sub-domains of Civil Engineering, Size of Infrastructure Industry, emerging trends in infra spending through public and public-private partnership (PPP), talent shortage, and global trends in workforce mobility and skill-demands.

Unit II

Stages in the life of construction – Design, Construction, Maintenance, Repair, Demolition/Recycling; an overview of Indian Standards, units and conversion factors for Lengths, Areas, Volumes and Weights; Opportunities and challenge of India's Infrastructure, Interdisciplinary nature of Civil Engineering Projects.

Unit III

Roads: Types of Roads, Nagpur Road Plan, Components of Road and their function; Bridges: Important parts of bridges, classification of bridges; Types of Dams.

Unit IV

Properties and classification of common building materials – Stones, Bricks, Sand, Limes, Cement, Mortar, Concrete, Steel.

Unit V

Overview of Indian Road Congress, National Highway Authority of India (NHAI) and American Society of Civil Engineers (ASCE), Emerging areas and new technologies in the field of civil engineering.

COURSE OUTCOMES

After successful completion of course, Students are expected to possess an in-depth understanding and knowledge about the scope, current and future trends in infrastructure industry, elementary terminologies, learning resources and career-opportunities in the field of civil engineering and its allied domains.

EVALUATION

Evaluation will be continuous an integral part of the class followed by final examination.

REFERENCES

Bhavikatti, S.S., A Textbook on Elements of Civil Engineering and Mechanics, New Age International Publisher, New Delhi, 2015

Prakash M.N. Shesha, Ganesh B., A Textbook on Elements of Civil Engineering and Mechanics, PHI Learning Pvt. Ltd.

COURSE OBJECTIVE:

The primary objective of the course is to introduce concepts in engineering design to students from all the engineering disciplines. This course broadly covers the prerequisites for an innovative design followed by concepts of products design cycle right from planning, designing, manufacturing, distributing and its usage.

COURSE CONTENT:

Unit I

Introduction to engineering Design process: Its importance, types of designs, various ways to think about design like visualization, photography etc, simplified iteration model, design versus scientific method, a problem solving methodology.

Unit II

Considerations of a good design Achievement of performance requirements, Total life cycle, Regulatory and social issues in Indian context

Unit III

Description of Design Process Conceptual Design, Embodiment Design, Detail Design, Planning for Manufacture, Planning for distribution, Planning for Use, Planning for the retirement of the product.

Unit IV

Product Design Cycle, Identification of customer needs and market research essentials, concept generation, technology and market assessment

Unit V

An exposure to various aspects of design including visual, creative and user-centric design (Visual merchandising, trends, materials, technology and techniques). Evolution in Transportation and Communication Technology, Bullock Cart to Lear Jets, Personal messengers to Cell Phones, Fighter planes

Introduction to any one as a case study:

1. Communication Design
2. Industrial Design
3. IT Integrated Design
4. Textile Design
5. Inter disciplinary Design

COURSE OUTCOMES

Student after successful completion of course must possess an understanding of various concepts of design, product design cycle, and significant principles inevitable for design of any engineering product or services.

EVALUATION

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

REFERENCES

George E. Dieter and Linda C. Schmidt, Engineering Design, McGraw Hill Education (India) Pvt. Ltd.
Arvid Eide, Introduction to Engineering Design, McGraw Hill.
Otto. K and Wood, K, Product Design, Pearson Education

COURSE OBJECTIVE:

This course introduces students to mechanical engineering and its sub-domains. Students are expected to learn about scope, current and future trends, jobs, innovations & research opportunities in the field of mechanical engineering. Course content will be covered through lectures, assignments, case-studies, presentations, documentaries and field visits.

COURSE CONTENT:

Unit I

What is Engineering, Who are Mechanical Engineers, Overview of Mechanical Engineering, its domains, scope and its utility in different areas; Specializations available with in mechanical Engineering (thermal, production and design) and job opportunities in mechanical Engineering.

Unit II

Basic definitions of terms related to Thermodynamics, First and Second law of Thermodynamics, Properties of Steam, Introduction to Boilers, Terminology of IC Engines, Two and Four Stroke Petrol and Diesel Cycle.

Unit III

Introduction to mechanical properties, basic manufacturing processes, pattern, type and its use in metal casting, Introduction of welding, brazing and soldering processes

Unit IV

Case study on any topic from Manufacturing Engineering Magazine Published by Society of Manufacturing Engineers (USA), Machinist Magazine, Technorama published by Institution of Engineers (India) and Manufacturing Today and any other magazine related to mechanical engineering..

Unit V

Overview of American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Society of Automotive Engineers, American Society of Mechanical Engineers (ASME); Indian Society of Mechanical Engineers (ISME) etc ; Emerging areas and new technologies in the field of mechanical engineering (3D Printing)

COURSE OUTCOMES

After successful completion of course, Students are expected to possess basic understanding and knowledge about the scope, current and future trends in mechanical engineering. The versatility of the mechanical engineering branch and career-opportunities in this field will enable the students to explore the new avenues in their future endeavours.

EVALUATION

Evaluation will be continuous an integral part of the class followed by final examination.

REFERENCES

Jonathan Wickert, Kemper Lewis, An Introduction to Mechanical Engineering, CENGAGE Learning.
Michael Clifford, Kathy Simmons, Philip Shipway, An Introduction to Mechanical Engineering: Part 1 and Part 2, Taylor and Francis