PROFESSIONAL ETHICS

**First Year** **CORE COURSE I** **Semester I**

## PROGRAMMING IN C AND DATA STRUCTURE

**Code:22SCCAI1** **(Theory)** **Credit:5**

### COURSE OBJECTIVES:

- To know about the basics of C Programming, Control and Looping
- Structures and programming with it.
- To understand Arrays, Pointers and String Processing in C
- language
- To know about the basic concepts in Data Structures.

**UNIT - I:**
Basic of C: History of C and its importance – Structure of a C program – Data Types – Constants and Variables – Operators and Expressions – Order of Precedence, Evaluating of Arithmetic Expressions – Type Conversion- Decision Statements: if, if-else, and nested if statements.

**UNIT - II:**
Loops Structures: For Loop, While, Do-while loop – Arrays: - One Dimensional Array, Two-dimensional Arrays, Character Arrays and Strings – Functions: Function with arrays- Function with decision and looping statements - Recursion.

**UNIT - III:**
Pointers: Introduction – Pointer Expressions – Chain of Pointers Pointers and Arrays – Array of Pointers – Pointers as function arguments – Functions returning Pointers – Pointers to Functions – Function pointer – Structures - declaration, initialization, Array of Structures – Pointer to structures, Structures and functions – Typed of Enumerated data types, Unions.

**UNIT - IV**:
Strings Processing, Standard string library functions – Files: introduction and files functions – Writing and reading in Text mode – Simple application: Display the contents of a file. Write data to a file. Append data to an existing file – File IO – Reading and writing structures.

**UNIT - V**:
Stack: LIFO concept, Stack operations, Array implementation of stack – Queue: FIFO concept, Queue operations, Array implementation of queue – Singly Linked List: concepts, operations – Doubly Linked List: concepts, operations – Trees: General trees, Binary trees.

**UNIT – VI** CURRENT CONTOURS (For continuous internal assessment only):

REFERENCES:

1. E. Balagurusamy, "Programming in ANSI C", Tata McGraw Hill, New Delhi, Seventh Edition, 2016.
2. E. Horowitz, S. Sahni and Susan Anderson Freed, "Fundamental Data Structures in C", 2ed, Orient Black Swan Publisher, 2009.
3. Byron S. Gottfried, "Programming with C", Schaum's Outline Series, Tata- McGraw Hill Edition, New Delhi, 1991.
4. E. Karthikeyan, "A Textbook on C Fundamentals, Data Structures and Problem Solving", Prentice-Hall of India Private Limited, New Delhi, 2008.
5. Yashavant Kanetkar, "Let us C", BPB Publications, Tenth Edition, New Delhi, 2010.
6. Szuhay, Jeff, and Szuhay, Jeff, "Learn C Programming: A Beginner's Guide to Learning C Programming the Easy and Disciplined Way", Packt Publishing, 2020.
7. Jena, Sisir Kumar, and Jena, Sisir Kumar, "C Programming: Learn to Code", CRC Press, 2021.
8. https://www.tutorialspoint.com/cprogramming/index.htm
9. https://www.w3schools.in/data-structures/intro

**COURSE OUTCOMES:**

Upon successful completion of this course the students would be able to:

- Summarize the basic knowledge to develop C programs
- Manipulate Looping, arrays and functions
- Apply and write programs for solving real world problems
- Create open, read, manipulate, write and close files.
- Understand the basic concepts in data structures.

**PROFESSIONAL ETHICS**

**First Year** **CORE PRACTICAL I** **Semester I**

## PROGRAMMING IN C LAB

**Code: 22SCCAI1P** **(Practical)** **Credit : 4**

### COURSE OBJECTIVES:

- To learn the programming knowledge using C language.
- To create derived and user defined data types.
- To demonstrate the functioning of pointers in C.

1. Write a Program
a. To convert temperature from degree Centigrade to Fahrenheit.
b. To find whether the given number is Even or Odd.
c. To find the greatest of three numbers.

2. Write a Program to use the switch statement to display Monday to Sunday.
3. Write a Program to display first Ten Natural Numbers and their sum.
4. Write a Program to find Multiplication of Two Matrices.
5. Write a Program
a. To find the maximum number in Array using pointer.
b. To reverse a number using pointer.
c. To add two numbers using pointer.
6. Write a Program to solve Quadratic Equation using functions.
7. Write a Program to find factorial of a number using Recursion
8. Write a Program to show Call by Value and Call by Reference
9. Write a Program to create a file containing Student Details.
10. Write a program to implement a stack using singly linked list, Implement Queue using Linked List.

### COURSE OUTCOMES:

Upon successful completion of this course the students would be able

- To relate the ways to solve simple programs
- To understand and trace the execution of programs using arrays
- To develop programs with functions and pointers
- To solve data handling problems using files
- To implement stack and queue operations.*****

**PROFESSIONAL ETHICS**

**I YEAR – I - SEMESTER**
**ALLIED COURSE I – 22SCACMM2A**
**ALGEBRA AND CALCULUS**

**Objectives :**

To lean the basic concept in the integration
To train the students to solve the problems in Theory of Equations

**UNIT I**

Theory of Equations: Relation between roots & coefficients – Transformations of Equations – Diminishing ,Increasing & multiplying the roots by a constant- Forming equations with the given roots –Rolle's Theorem, Descarte's rule of Signs(statement only) –simple problems.

**UNIT II**

Matrices : Singular matrices – Inverse of a non-singular matrix using adjoint method - Rank of a Matrix – Consistency - Characteristic equation, Eigenvalues, Eigen vectors – Cayley Hamilton's Theorem (proof not needed) –Simple applications only

**UNIT III**

Differentiation: Maxima & Minima – Concavity , Convexity – Points of inflexion - Partial differentiation – Euler's Theorem - Total differential coefficients (proof not needed) –Simple problems only.

**UNIT IV**

Integration : Evaluation of integrals of types

1] $\int \frac{px+q}{ax^2+bx+c}dx$ $\int \frac{px+q}{\sqrt{ax^2+bx+c}}dx$ $\int \frac{dx}{a+b\sin x}$

$\int \frac{dx}{a + b\cos x}$

Evaluation using Integration by parts – Properties of definite integrals – Fourier Series in the range ( 0 , 2 ) – Odd & Even Functions – Fourier Half range Sine & Cosine Series

**UNIT V**

Differential Equations: Variables Separables – Linear equations – Second order of types ( $a D^2 + b D + c ) y = F ( x )$ where a,b,c are constants and F ( x ) is one of the following types ( i ) $e^{K x}$ ( ii ) sin ( kx ) or cos ( kx ) ( iii ) $x^n$ , n being aninteger(iv)$e^{Kx}$f(x)

**TEXT BOOK(S)**

T.K. Manickavasagam Pillai& others, Algebra, Volume I, S.V Publications , 1985 Revised Edition (Units I, II)

S. Narayanan, T.K. Manicavachagam Pillai, Calculus, Vol. II, S. Viswanathan Pvt Limited, 2003.(UnitsIII,IVandV)

**REFERENCE(S)**

1. M.L. Khanna, Differential Calculus, Jaiprakashnath and Co., Meerut-2004.

# HUMAN VALUES

**I SEMESTER COURSE CODE: 22UGVED**
**PART IV –VALUE EDUCATION**

**Objectives:**

- To understand the philosophy of life and values through Thirukural
- To analyse the components of values education to attain the sense of citizenship
- To understand different types of values towards National Integration and international understanding
- To learn yoga as value education to promote mental and emotional health
- To understand human rights, women rights and other rights to promote peace and harmony

**Unit I** Philosophy of Life and Social Values
Human Life on Earth (Kural 629) -Purpose of Life(Kural46)-Meaning and Philosophy of Life (Kural 131, 226) -Family (Kural 45), Peace in Family (Kural 1025) Society (Kural 446), The Law of Life (Kural 952), Brotherhood (Kural 807) Five responsibilities / duties of Man(a)tohimself(b)tohis family (c) to his environment (d) to his society, (e) to the Universe in his lives (Kural 43,981).

**Unit II** Human Values and Citizenship
Aim of education and value education: Evolution of value oriented education, Concept of Human values: types of Values-Character Formation–Components of Value education- A P J Kalam's ten points for enlightened citizenship- The role of media in value building

**Unit III** Value Education towards National and Global Development
Constitutional or national values: Democracy, socialism, secularism, equality, Justice, liberty, freedom and fraternity - Social Values: Pity and probity, self-control, universal brotherhood - Professional Values - Knowledge thirst, sincerity in profession, regularity, punctuality and faith -Religious Values: Tolerance, wisdom, character-Aesthetic Values- Love and appreciation of literature and fine arts and respect for the same- National Integration and International Understanding.

**Unit IV** Yoga and Health
Definition, Meaning, Scope of Yoga - Aims and objectives of Yoga- Yoga Education with modern context- Different traditions and schools of Yoga - Yoga practices: Asanas, Pranayama and Meditation.

**Unit V** Human Rights
Concept of Human Rights: Indian and international perspectives- Evolution of Human Rights- definitions under Indian and International documents -Broad classification of Human Rights and Relevant Constitutional Provisions: Right to Life, liberty ad Dignity- Right to equality- Right against exploitation-Cultural and Educational Right- Economic Rights- Political Rights- Social Rights- Human Rights of Women and Children – Peace and harmony.

**Unit: VI** Current Contours:(for continuous internal assessment only):

**Books for References**

1. Thirukkural with English Translation of Rev. Dr. G. U. Pope, Uma Publication, 156,

Serfoji Nagar, Medical College Road, Thanjavur 613004
2. LeahLevin,HumanRights,NBT,1998
3. V.R.KrishnaIyer, Dialetics and Dynamics of Human Rights in India, Tagore Law Lectures.
4. Yogic Thearpy-Swami Kuvalayananda and Dr.S.L.Vinekar, Government of India, Ministry of Health, New Delhi.
5. SOUND HEALTH THROUGH YOGA-Dr. K.Chandrasekaran, Prem Kalyan Publications, Sedaptti,1999.
6. Grose .D. N–"Atext book of Value Education' New Delhi(2005)
7. Gawande. EN –"Value Oriented Education" – Vision for better living. New Delhi (2002) Saruptsons
8. Brain Trust Aliyar-"Value Education for Health, Happiness and Harmony" Erode(2004) Vethathiri publications

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**FirstYear** **CORECOURSEII** **Semester II**

## PROGRAMMING IN PYTHON

**Code: 22SCCAI2** **(Theory)** **Credit:5**

## COURSEOBJECTIVES:

- To develop programs using functions and pass arguments in Python.
- To write programs using loops and decision statements in Python.
- To design and program Python applications.

**UNIT-I:**

Introduction to Python: Features of Python- How to Run Python- Identifiers - Reserved Keywords - Variables - Comments in Python – Indentation in Python-Multi-Line Statements-Multiple Statement Group (Suite) - Quotes in Python - Input, Output and Import Functions - Operators. Data Types and Operations: Numbers–Strings–List–Tuple–Set–Dictionary–Data type conversion.

.

**UNIT-II:**

Flow Control: Decision Making – Loops – Nested Loops – Types of Loops. Functions: Function Definition–Function Calling- Function Arguments-Recursive Functions-Function with more than one return value.

**UNIT-III:**

Modules and Packages: Built-in Modules - Creating Modules - import Statement - Locating Modules - Namespaces and Scope - The dir() function-There load() function-Packages in Python-Date and Time Modules. File Handling- Directories in Python.

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**UNIT-IV:**

Object-Oriented Programming: Class Definition - Creating Objects - Built-in Attribute Methods-Built-in Class Attributes-Destructors in Python – Encapsulation - Data Hiding – Inheritance - Method Overriding- Polymorphism.

**UNIT-V:**

Exception Handling: Built-in Exceptions- Handling

Exceptions-Exception with Arguments-Raising Exception-User-defined Exception - Assertions in Python. Regular Expressions: The match() function - The search() function - Search and Replace - Regular Expression Modifiers: Option Flags-Regular Expression Patterns-Character Classes-Special Character Classes - Repetition Cases – findall()method - compile() method.

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**UNIT–VI CURRENT CONTOURS (For continuous internal assessment only):**

An Introduction to Interactive Programming in Python-Study on Julia–an high level language approach.

.

**REFERENCES:**


1. Jeeva Jose and P. Sojan Lal, "Introduction to Computing and Problem Solving with PYTHON", Khanna Book Publishing Co, 2016.
2. MarkSummerfield.—ProgramminginPython3:AComplete introduction to thePythonLanguage,Addison-WesleyProfessional,2009.
3. Martin C. Brown,—PYTHON: The Complete Reference‖, McGraw-Hill, 2001
4. WesleyJ.Chun, "Core Python Programming", Prentice Hall Publication, 2006.
5. Timothy A Budd, "Exploring Python", Tata McGraw Hill, New Delhi, 2011
6. JakeVanderPlas,"Python Data Science Handbook: Essential Tools for Working with Data",O'Reilly Media, 2016.
7. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist, 2nd edition, Updated for Python 3, Shroff/O Reilly Publishers, 2016
8. Guidovan Rossum and Fred L.Drake Jr,—An Introduction to Python –Revised and updated for Python 3.2, Network Theory Ltd., 2011.


**COURSEOUTCOMES:**

Upon successful completion of this course the students would be able:

- To recall and understand the features of python programming lan
- To illustrate various programming mechanism used in python
- To apply various language construct to write simple programs in python
- To examine the application of object oriented concept in python
- To distinguish the various constructs used in python.

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**First Year** **CORE PRACTICAL II** **Semester II**

## PROGRAMMING IN PYTHON LAB

**Code: 22SCCAI2P** **(Practical)** **Credit :4**

### COURSEOBJECTIVES:

- To develop the Numbers, Math functions and Strings.
- To create different Decision Making statements and Functions.
- To design GUI Applications in Python.

1. Write a python program that displays the following information: Your name, Full address Mobile number, College name, Course subjects.
2. Write a python program to find the largest three integers using if-else and conditional operator.
3. Write a python program that asks the user to enter a series of positive numbers (The user should enter a negative number to signal the end of the series) and the program should display the numbers in order and their sum.
4. Write a python program to find the product of two matrices[A] mxp and [B] pxr
5. Write recursive functions for GCD of two integers.
6. Write recursive functions for the factorial of positive integer.
7. Write recursive functions for Fibonacci Sequence up to given number n.
8. Writerecursivefunctionstodisplayprimenumberfrom2ton
9. Write a python program that writes a series of random numbers to a file fr
10. Write a python program to sort a given sequence: String, List and Tuple.
11. Write a python program to make a simple calculator.
12. Write a python program for Linear Search and Binary Search

### COURSEOUTCOMES:

Upon successful completion of this course the students would be able:

- To recall and relate the features of python programming language
- To compare various programming mechanism used in python
- To construct simple programs in python using various language features
- To distinguish the various constructs used in python
- To apprise the application of object oriented concept in python

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**IISEMESTER COURSECODE : 22SCACMM2B**

**ALLIED COURSE II NUMERICAL ANALYSIS AND PROBABILITY**

**Objectives:**

- To learn knowledge about an algebraic and transcendental equations.
- To make the students gain wide knowledge in probability which plays a main role in solving real life problems.

**Unit I**

Algebraic & Transcendental equations: Bisection Method, Newton Raphson Method, Iteration method-Finite differences–Forward, Backward differences – Newton's forward & backward difference interpolation formulae – Lagrange's interpolating polynomial.

**Unit II**

Numericaldifferentiation-NumericalIntegrationusingTrapezoidalruleand Simpson's first & second rules (proof not needed) - Solutions to Linear Systems – Gaussian Elimination Method – Jacobi & Gauss Siedal iterative methods – Theory and problems.

**Unit II**

Numerical solution of ODE: Solution by Taylor Series Method, Euler's Method, Runge-Kutta2ndordermethod-Adam'sPredictorCorrectorMethod and Milne's Predictor Corrector Methods.

**Unit IV**

Arithmetic Mean – Geometric Mean – Harmonic Mean - Median, Mode, StandardDeviation-QuartileDeviation–Percentiles-Expectation–Variance and covariance.

**Unit V**

Correlation and Regression – Properties of Simple Correlation and regression coefficients – Simple Numerical Problems only.

**UnitVI**
**Current Contours (For Continuous Internal Assessment Only): An introduction to MATLAB**

**References**


- S.S.Sastry, Numerical Analysis(Unit 1,2,3)
- Gupta. S.C &Kapoor, V.K,Fundamentals of Mathematical Statistics, Sultan Chand & sons, New Delhi -1994. (Units 4 & 5)
- M.K Jain, S.R.K. Iyengar and R.K.Jain, Numerical Methods for Scientific and Engineering Computation, New Age International Private Limited, 1999.
- C. E. Froberg, Introduction to Numerical Analysis, IIEdn, AddisonWesley, 1979.

**PROFESSIONAL ETHICS**

**IISEMESTER COURSE CODE:22SCACMM2C**

**ALLIEDCOURSE III–OPERATIONS RESEARCH**

**Objectives:**

To learn the basic concepts about Linear Programming Problem, Transportation Problem Assignment Problem, Sequencing Problem and Network.
To make students solve real life problems in Business and Management.

**UnitI**

OperationsResearch:Introduction-Basics ofOR– OR&decisionmaking– Role of Computers in OR - Linear programming formulations & graphical solution oftwo variables – Canonical & standard formsofLPP

**UnitII**

Simplex Method: Simplex Method for<,=,>constraints–Charne's method of penalties– Two phase Simplex method.

**UnitIII**
Transportation problem:Transportation algorithm–De generacy algorithm– Degeneracy in Transportation Problem, Unbalanced transportation problem-Assignment algorithm – Unbalanced Assignment problem

**UnitIV**
Sequencing problem: Processing of n jobs through two machines – Processingofnjobsthrough3machines–processing of two jobs through machines.

**UnitV**
Networks:Network–Fulkerson'srule-measure of activity–PERT computation – CPM computation - Resource scheduling.

**UnitVI**
Current Contours (For Continuous Internal Assessment Only): Integer and Dynamic programming.

**References**
Manmohan & Gupta, Operations Research, Sultan Chand Publishers, New Delhi
Prem Kumar Gupta and D.S.Hira, Operations Research: An Introduction, S.Chandand Co.,Ltd.NewDelhi,
Hamdy A.Taha, Operations Research(7thEdn.), McMillan Publishing Company, New Delhi, 1982.

# PROFESSIONAL ETHICS

## II SEMESTER COURSECODE:22PELPS1

## Part III- PROFESSIONAL ENGLISH FOR PHYSICAL SCIENCES-I

**OBJECTIVES:**

- To develop the language skills of students by offering adequate practice
- in professional contexts.
- To enhance the lexical, grammatical and socio-linguistic and
- communicative competence of first year physical sciences students
- To focus on developing students' knowledge of domain specific registers
- and the required language skills.
- To develop strategic competence that will help in efficient
- communication
- To sharpen students' critical thinking skills and make students culturally
- aware of the target situation.
- LEARNING OUTCOMES:
- Recognise their own ability to improve their own competence in using the
- language
- Use language for speaking with confidence in an intelligible and
- acceptable manner
- Understand the importance of reading for life
- Read independently unfamiliar texts with comprehension
- Understand the importance of writing in academic life
- Write simple sentences without committing error of spelling or grammar

**(Outcomes based on guidelines in UGC LOCF – Generic Elective)**

**UNIT 1: COMMUNICATION**

1. Listening: Listening to instructions
2. Speaking: Telephone etiquette and Official phone conversations
3. Reading short passages (3 passages, one from each – Physics, Chemistry, Mathematics/Computer Science)
5. Writing: Letters and Emails in professional context
6. Grammar in Context:
    - **Wh and yes or no,**
    - **Q tags**
    - **Imperatives**

7, Vocabulary in Context: Word formation - .

i)

Creating antonyms using Prefixes

ii)

Intensifying prefixes (E. g inflammable)

Changing words using suffixes

A) Noun Endings

B) Adjective Endings

C) Verb Endings

**UNIT 2: DESCRIPTION**

Listening – Listening to process description

Speaking - Role play

Formal: With faculty and mentors in academic environment, workplace

communication
Informal:
With peers in academic environment, workplace
communication
Reading –Reading passages on products, equipment and gadgets
Writing – Writing sentence definitions (e.g. computer) and extended definitions (e.g. artificial intelligence)
Picture Description – Description of Natural Phenomena
Grammar in Context: Connectives and linkers.
Vocabulary – Synonyms (register) - Compare & contrast expressions.

**UNIT 3: NEGOTIATION STRATEGIES**
Listening - Listening to interviews of specialists / inventors in fields (Subject specific)
Speaking – Brainstorming. (mind mapping). Small group discussions (subject specific)
Reading – longer Reading text. (Comprehensive passages)
Writing – Essay Writing (250 word essay on topics related to subject area, like pollution, use of pesticides in cultivation, merits and demerits of devices like mobile phones, merits and demerits of technology in development)
Grammar in Context: Active voice & Passive voice – If conditional - Collocations –Phrasal verbs

**UNIT 4: PRESENTATION SKILLS**
Listening - Listening to presentation. Listening to lectures. Watching documentaries (discovery / history channel)
Speaking –Short speech - Making formal presentations (PPT)
Reading – Reading a written speech by eminent personalities in the relevant field /Short poems / Short biography.
Writing - Writing Recommendations
Interpreting visuals - charts / tables/flow diagrams/charts
Grammar in Context – Modals
Vocabulary (register) - Single word substitution

**UNIT 5: CRITICAL THINKING SKILLS**
Listening - Listening to advertisements/news and brief documentary films (with subtitles)
Speaking – Simple problems and suggesting solutions. Reading: Motivational stories on Professional Competence, Professional Ethics and Life Skills (subject-specific) Writing Studying problem and finding solutions- (Essay in 200 words) Grammar-Make simple sentences Vocabulary - Fixed expressions

**SUGGESTED ACTIVITIES**

**UNIT 1**
Listening: Links for formal conversation can be given - Gap filling exercises – Multiple Choice questions – Making notes. Speaking - Role play activity Reading – Note making. Note-Taking. Writing: Guided Writing (developing hints) Email Grammar: Vocabulary – Worksheets – Games.

**UNIT 2**
Listening- Process Descriptions (Processes of Condensation and Evaporation./Process of Measuring the thickness of a wire using a Screw -Gauge./process of Exaction of sugar from sugarcane)
Speaking – Role Play Reading – Multiple choice questions - Evaluative answers – Classifying and labeling Writing - Picture description – Description of natural phenomena (rainbow, earthquake, volcanic eruption, erosion, natural disasters in 150 to 200 words). Vocabulary: Expansion of

compound nouns

**UNIT 3**

Listening- Gap fill exercises – Listening comprehension Speaking -Debates Reading -Reading comprehension Writing – Essay Writing Grammar - Vocabulary, Activities, Worksheets & Games.

**UNIT 4**

Listening - Note taking (of listening & viewing items) - Filling a table based on the listening item. Speaking – JAM, Presentations. (PPT-TECHNICAL) Reading-Reading comprehension Writing– Difference between recommendations and instructions Questions/MCQs based on graphs/flow diagrams/charts Grammar: Vocabulary – Activities, Worksheets & Games.

**UNIT 5**

Listening – Radio News/ TV-News telecast / Speaking - Watch or listen to documentaries and ask questions Reading - Reading motivational stories (success stories in subject area) Writing - Essay writing. Grammar -Vocabulary –Activities, Worksheets & Ga**mes**

# PROFESSIONAL ETHICS

**II SEMESTER** **COURSECODE:22UGCES**

## CORECOURSE: ENVIRONMENTAL SCIENCE

(Applicable to the candidates admitted from the academic year 2022-2023 onwards)

**COURSE OBJECTIVES**:

- To appreciate the scope of Environmental Studies, Community ecology and the
- interdisciplinary nature of environmental issues
- To have a basic knowledge of Natural resources its classification, concepts, and natural
- resources of India.
- The course designed to gain knowledge on values of biodiversity and conservation on global,
- national, and local scales
- To study about sources and effects of environmental pollution like air, water, soil, thermal,
- marine, nuclear and noise
- To understand the concerns related to Sustainable Development on environment and health
- To introduce the students in the field of Law and Policies and Acts both at the national and
- international level relating to environment.

**UNIT-1**: **The Multidisciplinary nature of environmental studies**

Definition, scope and importance. (2 lectures)

Need for public awareness

**UNIT-2**: **Natural Resources**:

Renewable and non-renewable resources:

Natural resources and associated problems.

a) Forest resources: use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.

c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

First Year PART-IV Semester-II

ENVIRONMENTAL STUDIES

Code: (Theory) Credit: 2

d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

e) Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies.

f) Land resources: Land as a resources, land degradation, man induced Landslides, soil erosion and desertification.  Role of an individual in conservation of natural resources.  Equitable use of resources for sustainable lifestyles.

(8 lectures)

**Unit: 3** 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:-  a. Forest ecosystem  b. Grassland ecosystem  c. Desert ecosystem  d. Aquatic ecosystems, (ponds, streams, lakes, rivers, oceans, estuaries)
(6 lectures)

**Unit: 4** Biodiversity and its conservation  Introduction – Definition : Genetic, species and ecosystem diversity  Biogeographical 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-spots of biodiversity  Threats to biodiversity : habitat loss, poaching of wildlife, man-wild life conflicts.  Endangered and endemic species of India  Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.  Biological Diversity Act 2002/ BD Rules, 2004
(8 lectures)

**Unit: 5** Environmental Pollution
Definition
Causes, effects and control measures of :
a. Air Pollution
b. Water Pollution
c. Soil Pollution
d. Marine Pollution
e. Noise pollution
f. Thermal Pollution
g. Nuclear hazards  Solid waste Management: Causes, effects and control measures of urban and industrial wastes.  Role of an individual in prevention of pollution  Pollution case studies  Disaster management: floods, earthquake, cyclone and landslides.  Ill-Effects of Fireworks: Firework and Celebrations, Health Hazards,
Types of Fire, Firework and Safety
(8 lectures)

**Unit: 6** 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.
(7 lectures)

**Unit: 7** Human Population and the Environment  Population growth, variation among nations.  Population explosion – Family Welfare Programmes  Environment and human health  Human Rights - Value Education
4
 HIV/ AIDS - Women and Child Welfare  Role of Information Technology in Environment and human

health  Case studies.

**Unit: 8** Field Work  Visit to a local area to document environmental assets-river / forest/ grassland/ hill / mountain

References:

1. Agarwal, K.C. 2001 Environmental Biology, Nidi Public Ltd Bikaner.
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt ltd, Ahamedabad – 380013, India, E-mail: mapin@icenet.net(R)
3. Brunner R.C. 1989, Hazardous Waste Incineration, McGraw Hill Inc 480 p
4. Clark R.S. Marine Pollution, Clanderson Press Oxford (TB)
5. Cunningham, W.P.Cooper, T.H.Gorhani E & Hepworth, M.T. 2001.
6. De A.K. Environmental Chemistry, Wiley Eastern Ltd
7. Down to Earth, Centre for Science and Environment (R)
8. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford University, Press 473p.
9. Hawkins, R.E. Encyclopedia of India Natural History, Bombay Natural History Society, Bombay (R)
10. Heywood, V.H & Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge University Press 1140 p.
11. Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws Himalaya Pub. House, Delhi 284 p.
12. Mckinney, M.L. & Schoch R.M. 1996. Environmental Science systems & Solutions, Web enhanced edition 639 p.
13. Mhaskar A.K. Matter Hazardous, Techno-Science Publications (TB)
14. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
15. Odum, E.P. 1971 Fundamentals of Ecology. W.B. Saunders Co. USA. 574 p
16. Rao MN & Datta, A.K. 1987 Waste Water treatment, Oxford & IBH Publication Co. Pvt Ltd 345 p.
17. Sharma B.K. 2001 Environmental chemistry Goel Publ House, Meerut.
18. Survey of the Environment, The Hindu (M ).
19. Townsend C. Harper, J and Michael Begon, Essentials of Ecology, Blackwell science (TB)
20. Trivedi R.K. Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media (R).
21. Trivedi R.K. and P.K. Goel, Introduction to air pollution, Techno-Science Publications (TB).
22. Wagner K.D. 1998 Environmental Management. W.B. Saunders Co. Philadelphia USA 499 p

(M) Magazine (R) Reference (TB) Textbook

23.http://nbaindia.org/uploaded/Biodiversityindia/Legal/33%20Biological%20Diversity%205
Rules,%202004.pdf.

**COURSE OUTCOMES**:

 Understand the environmental importance including interactions across local to global scales.

 The learners to update and analyze environmental relationships and interactions of environmental components
 The student to gain knowledge on importance of natural resources in a systematic way.
 The course content is introduce the concept of renewable and non-renewable energy resources and its scenario in India and at global level
 The students will know the relationship between biodiversity and ecosystem functions, direct and indirect values of biodiversity resources and their bioprospecting opportunities.
 The learners can gain awareness related on environmental pollution, causes and pollution control with case studies.
 Student to obtain the environmental ethics and gain knowledge about the sustainable development.
 Learners should realize the environmental legislation and policies of national and international regime and know the regulations applicable to industries and other organizations with significant Environmental aspects

**PROFESSIONAL ETHICS**

**Second Year** **CORECOURSE III** **Semester III**

**Code : 22SCCAI3** **RDBMS AND NOSQL** **Credit : 4**

**COURSEOBJECTIVES:**

To know the basic Concepts about database, its concepts, applications, data models, schemas and instances.
To gain knowledge about database system architecture, the relational data model and about SQL.
To Know about NoSQL and data models in NoSQL

**UNIT-I:**

Introduction to Databases : Databases and Database Users - Introduction- Example - Characteristics of the Database Approach - Actors on the Scene - Workers behind the Scene -Advantages of Using the DBMS Approach - A Brief History of Database Applications

**UNIT-II:**

Database System Concepts and Architecture : Data Models, Schemas, and Instances - Three-Schema Architecture and Data Independence - Database Languages and Interfaces - The Database System Environment - Centralized and Client/Server Architectures for DBMSs -Classification of Database Management Systems - The Relational Data Model and SQL : The Relational Data Model and Relational - Database Constraints - Relational Model Concepts -Relational Model Constraints and Relational Database Schemas-Update Operations, Transactions, and Dealing with Constraint Violations

**UNIT-III:**
BasicSQL:SQLDataDefinitionandDataTypes-SpecifyingConstraintsinSQL
Basic Retrieval Queries in SQL - INSERT, DELETE, and UPDATE Statements in SQL - Additional Features of SQL - More SQL: Complex Queries, Triggers, Views, and Schema Modification - More Complex SQL Retrieval Queries - Specifying Constraints as Assertions and Actions as Triggers - Views (Virtual Tables) in SQL
Schema Change Statements in SQL
.

**UNIT-IV:**

NoSQL : The Value of Relational Databases - Impedance Mismatch - Application and Integration Databases - Attack of the Clusters - The Emergence of NoSQL - Aggregate Data Models :Aggregates - Key-Value and Document Data Models- Column-Family Stores - Summarizing Aggregate-Oriented Databases.

**UNIT-V:**

Details on Data Models: Relationships- Graph Databases- Schemaless Databases- MaterializedViews-ModelingforDataAccess-DistributionModels Single Server- Sharding Master-Slave Replication-Peer-to-Peer Replication- Combining Sharding and

Replication.

**UNIT-VI: CURRENTCONTOURS (for Continuous Internal Assessment Only)**:
Contemporary Developents Related to the Course during the Semester Concerned

**REFERENCES:**
Fundamentals of Database System By Elmasari & Navathe-Pearson Education, 7th Edition, 2017
NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence, Sadalage, P. & Fowler, Wiley Publications, 1st Edition ,2019.
Bipin Desai,An Introduction to Database System Galgotia Publications,1981
S.K.Singh Database System:concept, Design&Application, Pearson Education, 2011
leon&leon, Database management system,Vikas publishing House,2009
TobyJ.Teorey, SamS.Lightstone, TomNadeau, Database Modeling and Design:Logical Design, Elsevier India Publications,2005
Gillenson, Fundamentals of Database Management System,Wiley,2008

**COURSEOUTCOMES:**

Upon successful completion of this course the students would be able:

To know about databases and about database users.
To understand the concept of Database system structure and the concept of Relational model.
To know about SQL.
To know about the Emergence of NoSQL.
To understand about data models in NoSQL.

**PROFESSIONAL ETHICS**

| | | |
|---|---|---|
| **Second Year** | **Core Practical III** | **Semester III** |
| | **RDBMS AND NOSQL LAB** | |
| **Code : 22SCCIT3P** | **(Practical)** | **Credit 4** |

**COURSEOBJECTIVES**:

- To practice the relational data base functions using various operations
- To write queries in SQL to retrieve any type of information from a database.
- To be able to understand unstructured table creation and processing using NoSQL.

Demonstrate the following SQL commands and can take any backend RDBMS system for implementation purpose.

1. Write a SQL query for creating Table, and SQL queries for inserting, deleting, updating the records in Table.
2. Write SQL Queries for AND/OR/NOT operation, Union-Intersection and Minus
3. Write SQL queries for various Join Operations.
4. Write SQL query for Sorting and Grouping the records.
5. Write Nested queries, Subqueries using SQL.
6. Write a SQL program using Built-in functions.
7. Create a view and access the view using query.
8. Creation of unstructured table contents using Nosql commands

**COURSEOUTCOMES:**

Upon successful completion of this course, the students would be able:

- To work on database queries.
- To relate the entity relationship and join dependencies with software programs
- Write queries on aggregate functions, subqueires.
- Create structured and unstructured data base using SQL and NoSQL
- Able to implement various functions of NoSQL.

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**PROFESSIONAL ETHICS**

**II YEAR – III - SEMESTER**
**(For the candidates admitted from the academic year 2016 – 2017 onwards)**
**SECOND ALLIED PHYSICS I**
**(For B.Sc. Artificial Intelligence and Machine Learning Student only)**
**DIGITAL COMPUTER FUNDAMENTALS – 22SCACAP1**

**Unit I Number Systems and Codes**
Binary Number System – Binary to Decimal Conversion – Decimal to Binary Conversion – Binary Addition and Subtraction – Binary Multiplication and Division – Octal Numbers – Hexadecimal Numbers – Binary Codes – Error Detecting and Correcting Codes.

**Unit II Boolean Algebra and Logic Gates**
Boolean Algebra: Definitions – Fundamentals of Boolean Algebra – Laws and Theorems of Boolean Algebra -Boolean Functions – Minterms and Maxterms — DeMorgan's Theorems. Logic Gates: AND,OR,NOT,NAND,NOR and Exclusive OR Gates – Applications of XOR Gate – The Exclusive NOR Gate – Positive and Negative Logic – Logic Chararcteristics – Bipolar Logic Families – Integrated Circuits — Universal Building Blocks (UBB) – NAND Gate as UBB – NOR Gate as UBB.

**Unit III K Map Techniques**
Karnaugh Map with 2, 3 and 4 variables -Sum of Products - AND-OR Network and Product of Sum - NAND and NOR Implementation — AND-OR-INVERT Implementation – OR-AND-INVERT Implementation – Don't Care Conditions – Overlapping Groups – Rolling the Map – Eliminating Redundant Groups.

**Unit IV Combinational Logic Circuits**
Binary Adders - Half and Full Adders – BCD Adder - Binary Subtractors – Half and Full Subtractors – Multiplexers (4:1 line) – 1 to 4 line Demultiplexers – Decoders: BCD to decimal ,BCD to Seven Segment. Encoders: 4:2 line, Octal to Binary - Floating Point Number System – Range of Stored Numbers.

**Unit V Sequential Logic Circuits:**
Flip Flops – RS Flip Flop – Clocked RS Flip Flop – D Flip Flop – JK Flip Flop – T Flip Flop – Triggering of Flip Flops – Master Slave Flip Flop – Conversion of D Flip Flop and T Flip Flop – Clock – Counters and Shift Registers: Counters – Asynchronous or Ripple Counter – Ring Counter – Twisted Ring Counter – State Diagrams and State Tables – Magnitude Comparator – Programmable Arrays of Logic Cells – Shift
Registers-SISO – SIPO – PIPO – PISO.

**Text Book:**
1. Principles of Digital Electronics, Dr. K. Meena, PHI Learning Private Limited, New Delhi, 2009.

**Reference Book:**
1. Digital Logic Design, M. MorrisMano, Pearson Education, 2010
2. Digital Technology, Virendrakumar, New Age international (P) Ltd., publisher, New Delhi, 2001

**Professional English-Semester-II**

[part-III -add on Course]

Weightage: 4 Credits Duration: 90hrs Objectives: The Professional Communication Skills Course is intended to help Learners in Arts and Science colleges • Develop their competence in the use of English with particular reference to the workplace situation. • Enhance the creativity of the students, which will enable them to think of innovative ways to solve issues in the workplace. • Develop their competence and competitiveness and thereby improve their employability skills. • Help students with a research bent of mind develop their skills in writing reports and research proposals.

**Unit 1**- Communicative Competence (18 hrs)

Listening – Listening to two talks/lectures by specialists on selected subject specific topics -(TED Talks) and answering comprehension exercises (inferential questions)

Speaking: Small group discussions (the discussions could be based on the

listening and reading passages- open ended questions Reading: Two subject-based reading texts followed by comprehension activities/exercises

Writing: Summary writing based on the reading passages.

Grammar and vocabulary exercises/tasks to be designed based on the

discourse patterns of the listening and reading texts in the book. This is

applicable for all the units.

**Unit 2** - Persuasive Communication (18 hrs)

Listening: listening to a product launch- sensitizing learners to the nuances of persuasive communication Speaking: debates – Just-A Minute Activities Reading: reading texts on advertisements (on products relevant to the subject areas) and answering inferential questions Writing: dialogue writing- writing an argumentative /persuasive essay.

**Unit 3**- Digital Competence

Listening to interviews (subject related) (18 hrs)

Speaking: Interviews with subject specialists (usingvideo conferencing skills)

Creating Vlogs (How to become a vlogger and use vlogging tonurture interests – subject related)

Reading: Selected sample of Web Page (subject area) Writing: Creating Web Pages

Reading Comprehension: Essay on Digital Competence for Academic and Professional Life.

The essay will address all aspects of digital competence in relation to MS Office and how they can be utilized in relation to work in the subject area

**Unit 4** - Creativity and Imagination

(18 hrs) Listening to short (2 to 5 minutes) academic videos (prepared by EMRC/ other MOOC videos on Indian academic sites – E.g. https://www.youtube.com/watch?v=tpvicScuDy0)

Speaking: Making oral presentations through short films – subject based Reading: Essay on Creativity and Imagination (subject based) Writing – Basic Script Writing for short films (subject based) - Creating blogs, flyers and brochures (subject based) - Poster making – writing slogans/captions(subject based)

**Unit 5**- Workplace Communication& Basics of Academic Writing (18 hrs) Speaking: Short academic presentation using PowerPoint

Reading & Writing: Product Profiles, Circulars, Minutes of Meeting. Writing an introduction, paraphrasing Punctuation(period, question mark, exclamation point, comma, semicolon, colon, dash, hyphen, parentheses, brackets, braces, apostrophe, quotation marks, and ellipsis) Capitalization (use of upper case) Outcomes of the Course. At the end of the course, learners will be able to,

- Attend interviews with boldness and confidence.
- Adapt easily into the workplace context, having become communicatively competent.
- Apply to the Research &Development organisations/ sections in companies and offices with winning proposals.

Instruction to Course Writers:

1. Acquisition of subject-related vocabulary should not be overlooked Textboxes with relevant vocabulary may be strategically placed as a Pre Task or in Summing Up
2. Grammar may be included if the text lends itself to the teaching of a Grammatical item. However, testing and evaluation does not include Grammar.

**Semester IV**

**Second Year** **Credit:4**

**Code:22SCCA** **CORE COURSE IV**

**ARTIFICIAL INTELLIGENCE**

**(Theory)** **COURSE**

**OBJECTIVES:**

- To gain a basic idea of AI and AI related problem solving, inference, perception, knowledge representation, and learning.
- To know about the Heauristic search techniques and about knowledge representation in AI
- To know about Predicate Logic and about Reasoning in AI

**UNIT-I:**

Artificial Intelligence: AI Problems – Underlying Assumption – AI Technique – Level of the Model – Criteria of Success – Some General References. Problems, Problem Spaces, and Search: Defining the Problem as a State Space Search– Production Systems – Problem Characteristics – Production System Characteristics – Issues in the Design of Search Programs.

**UNIT–II:**

Heuristic Search Techniques: Generate and Test–Hill Climbing–Best-FirstSearch – Problem Reduction – Constraint Satisfaction – Means-ends Analysis. Knowledge Representation Issues: Representations and Mappings–Approaches to Knowledge Representation – Issues in Knowledge Representation – The Frame Problem.

**UNIT-III:**

Using Predicate Logic :Representing Simple Factsin Logic– RepresentingInstanceandISARelationships–ComputableFunctionsandPredicates– Resolution–Natural Deduction- Representing Knowledge Using Rules: Procedural Versus Declarative Knowledge – Logic Programming – Forward Versus Backward Reasoning– Matching–Control Knowledge.

**UNIT-IV:**

Symbolic Reasoning Under Uncertainty: Introduction to Non-monotonic Reasoning – Logics for Non-monotonic Reasoning – Implementation Issues – Augmenting a Problem-solver – Implementation Depth First Search –Implementation Breadth First Search. Statistical Reasoning: Probability and Baye'sTheorem–CertaintyFactorsandRule-basedSystems–BayesianNetworks – Dempster -Shafer Theory – Fuzzy Logic

**UNIT-V:**

Semantic Nets-Frames.- Conceptual Dependency–Scripts–CYC.-Syntactic SemanticSpectrumofRepresentation–LogicandSlot-and-FillerStructures–Other Representational Technique

**UNIT–VI CURRENTCONTOURS (For continuous internal assessment only):**

Contemporary Developments Related to the Course during the Semester Concerned

**REFERENCES:**

1. KevinNight, ElaineRich, and NairB.,"Artificial Intelligence",McGrawHill, 2017
2. M.TimJones,-Artificial Intelligence: ASystems Approach(Computer Science), Jones and Bartlett Publishers Inc.; First Edition, 2008.
3. NilsJ.Nilsson,-TheQuestforArtificialIntelligence,CambridgeUniversity Press, 2009.
4. GerhardWelss,-MultiAgentsSystems,SecondEdition,2013
5. David L. Poole and Alan K. Mackworth, - Artificial Intelligence: Foundations of Computational Agents, Cambridge University Press, 2010.
6. DanW.Patterson,"IntroductiontoAIandES",PearsonEducation,2007

**COURSEOUTCOMES:**

Upon successful completion of this course the students would be able:

- Tounderstandthebasicideaofartificialintelligenceanditsapplicationareas.
- To apply basic principles of AI in solutions that requires problem solving, inference, perception, knowledge representation, and learning.
- To demonstrate awareness and a fundamental understanding of various applications of AI techniques.
- To understand about Logic programming and about Reasoning related to AI.
- To know about the different representational techniques in AI.

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**Second Year** **Semester IV**

## ARTIFICIAL INTELLIGENCE LAB

**Code: 22SCCAI4P (Practical) Credit:4**

### COURSE OBJECTIVES:

- To impart knowledge about the practical aspects in Artificial Intelligence related problems
- To program different AI methods using a programming language
- To know how the logical operations and reason based AI problems are using programming

1. Write a program to implement the Hill Climbing problem
2. Write a program to implement the Towers of Hanoi problem
3. Write a program to implement the Missionaries and Cannibals problem
4. Write a program to implement the 8queens problem
5. Write a program to implement the A*Algorithm
6. Write a program to Implement the Breadth first algorithm
7. Write a program to implement the Depth first algorithm
8. Write a program to implement the predicate logic

### COURSEOUTCOMES:

**Upon successful completion of this course the students would be able:**

- Solve various kinds of problems using AI techniques.
- Solve basic AI based problems using any programming language.
- Understand to implement the various kinds of AI based algorithms.
- Apply AI techniques to real-world problems to develop intelligent systems.
- To understand problems related to AI.

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## ALLIED PRACTICAL
## DIGITAL COMPUTER FUNDAMENTALS LAB

**Code: 22SCACAP1A (Practical)** **Credit: 2**

**(ANY 12 EXPERIMENTS)**

1. Verification of Logic gates
2. Construction of Half and Full adder
3. Construction of Half and Full subtractor
4. K-Map
5. Arithmetic Logic Unit
6. Study of Multiplexer and De-multiplexer
7. Encoder and Decoder using diodes
8. Flip-flops using NAND and NOR gate
9. Shift Register
10. Up Down Counters
11. Ring Counter
12. Johnson counter / Twisted ring counter
13. NAND as UBB
14. NOR as UBB
15. Study of RAM

**II YEAR – IV - SEMESTER**
**SECOND ALLIED PHYSICS II**

## COMPUTER AND ORGANIZATION ARCHITECTURE – 22SCACAP2

**UNIT I Computer Organization, Architecture and Functions**
Organization and Architecture – Structure and function – Computer Component – Computer Function – Interconnection Structures – Bus Interconnections.

**UNIT II Memory organization**
Computer Memory System Overview – Cache Memory principles – Semiconductor Main Memory: Organization – DRAM and SRAM – Types of ROM – Error Correction.

**UNIT III I/O Modules**
External Devices - I/O Modules – Programmed I/O – Direct Memory Access – I/O Channels and Processors.

**UNIT IV Instruction sets, processor organization and control unit**
Machine Instruction Characteristics – Types of operands – Addressing – Instruction formats – processor organization – Register Organization – instruction cycle. Control Unit: Micro Operations – Control of the processor.

**UNIT V Parallel Processing**
Parallel Organization – Multiprocessor Organization – Symmetric multiprocessors – Multithreading and Chip Microprocessor – Non uniform memory Access - Vector Computation.

**Text Book :**
Computer Organization & Architecture Designing for Performance – William Stallings, Pearson Education, 2014

**Reference Book :**
Computer Architecture and Organization : From 8085 to Core 2 Duo and Beyond, SubrataGhoshal, Pearson Education, 2011

**Second Year** **NON MAJOR ELECTIVE COURSE - II** **Semester-IV**

**1. BUSINESS ETHICS**

**Code: (Theory)** **Credit: 2**

**COURSE OBJECTIVES:**

- To understand the concept of Ethical value
- Analyze the ethical issues involved in business
- The best way to manage ethical conduct in business

UNIT – I:

Business Ethics - Meaning – Definition – Nature – Importance – Ground Rules – Myths – Methodology – Characteristics of Managerial Ethics - Factors Influencing Business Ethics - Types Of Ethical Issues- Corruption In Businesses.

UNIT – II:

Ethical Values - Work Ethics – Work Culture – Ethical Theories – Ethical values Environmental Ethics – Consumer Protection..

UNIT – III:

Managing Ethical Conduct - Skills for Managers - Whistle Blowing - Individual differences and Ethical Judgments – Cognitive Barriers to Ethical Judgment- Corporate Social Responsibility towards the community.

UNIT – IV:

Corporate Governance - Issues – need - corporate governance code - transparency & disclosure -
role of auditors - board of directors and share holders - corporate scams - Committees in India.

UNIT – V:

Consumerism – unethical issue in sales, marketing and technology – competitive strategy.

UNIT-VI CURRENT CONTOURS (For Continuous Internal Assessment Only) :

Practical: Collection of data about unethical strategy followed in the products

TEXT BOOKS:

1. Dr. S. Sankaran., Business Ethics & Values, 2010, Margham Publication.
2. Fernando. A. C., Business Ethics – An Indian Perspective, 3rd Edition, Pearson Publication

REFERENCE BOOKS:

1. Hasnian Baber, Business Ethics and Corporate Governance, 2nd Edition, Global Vision Publishing House
2. Chakraborty, S.K., Management by Values, 2014, Oxford Univ.Press.
3. Velasquez, Business Ethics - Concepts and Cases, Prentice Hall, 5th Edition.

E – RESOURCES:

- https://www.economicsdiscussion.net/business/business-ethics/31798
- https://tsubakimoto.com/sustainability/governance/corporate/control-policy/
- https://elink.io/p/consumerism-9a251f9

**COURSE OUTCOME:**

- To outline the significance of ethics in business.
- To known the culture of organisation
- To appreciate the best ethical practices in every actions of organization
- To recognize the importance of Corporate Social Responsibility.
- Students can the understand the unethical issues in the environment

**Third Year** **CORE COURSE V** **Semester V**

**EMBEDDED SYSTEM AND IOT** **Credit: 5**

**Code: 22SCCAI5** **(Theory)**

**COURSE OBJECTIVES:**

- To expose the students about the fundamentals of Embedded System.
- To discuss on aspects required in embedded system design techniques.
- To understand the fundamentals of Internet of Things.

**UNIT - I:**

Embedded System vs General Computing System - Classification of Embedded System, Purpose of Embedded system, Quality Attributes of Embedded System Typical Embedded System- Core of Embedded System, Memory, Sensors and Actuators, Communication Interface- Onboard communication interface, External communication interface.

**UNIT - II:**

Embedded Firmware Design Approaches- Embedded Firmware Development Languages - Embedded System Development Environment - IDE, Compiler, Linker - Types of File Generated on Cross Compilation-Simulator, Emulator and Debugging- Fundamental issues in Hardware Software Co-design- Integration and Testing of Embedded Hardware and Firmware.

**UNIT - III:**

Introduction-Characteristics - Physical design - protocols – Logical design – Enabling technologies – IoT Levels – Domain Specific IoTs – IoT vs. M2M. IoT systems management – IoT Design Methodology – Specifications Integration and Application Development.

**UNIT - IV:**

Physical device – Raspberry Pi Interfaces – Programming – APIs / Packages – Web services. Intel Galileo Gen2 with Arduino- Interfaces - Arduino IDE – Programming - APIs and Hacks. Various Real time applications of IoT- Connecting IoT to cloud – Cloud Storage for IoT

**UNIT - V:**

IoE – Overview – Architecture-Smart objects and LLNs-Secure mobility. Home automation – Cities: Smart parking – Environment: Weather monitoring – Agriculture: Smart irrigation – Data analytics for IoT – Software & management tools for IoT cloud storage models & Communication APIs – Cloud for IoT – Amazon Web Services for IoT.

**UNIT – VI** CURRENT CONTOURS (For continuous internal assessment only): Contemporary Developments Related to the Course during the Semester

**REFERENCES:**

1. Shibu K.V, "Introduction to Embedded System", Tata McGraw-Hill, 2014.
2. Unit -1: Chapters 1 & 2.1 to 2.4, Unit-2: Chapters 2.5, 7, 9, 12, 13.
3. Internet of things – A Hands on approach, Arshdeep Bahga, Vijay Madisetti
4. Unit-3: Chapters 1,2,3,4,5, Unit-4: Chapters 7,8,9,10, Unit-5: Chapters 9,10, 11,13
5. David E. Simon, "An Embedded Software Primer", Pearson Education Asia, Addison Wesley, 2001. Dr. M. Kalaiselvi Geetha, Professor in CSE, FEAT, Annamalai University Page 217
6. Marilyn Wolf, Computers as Components, Principles of Embedded Computing System Design", Morgan Kaufmann Publishers, Third edition, 2012.
7. Arshdeep Bahga, Vijay Madisetti, "Internet of Things – A hands-on approach", Universities Press, 2015.
8. Manoel Carlos Ramon, "Intel Galileo and Intel Galileo Gen 2: API Features and Arduino Projects for Linux Programmers", Apress, 2014.
9. Marco Schwartz, "Internet of Things with the Arduino Yun", Packet Publishing, 2014.

**COURSE OUTCOMES**: Upon successful completion of this course the students would be able:

- To understand the embedded system design process and embedded firmware
- concepts.
- To understand the fundamental issues I hardware and software co-design.
- To learn physical and logical design, IoT levels, and IoT design methodologies.
- To understand tools for IoT cloud storage models & Communication APIs
- To understand the Communication APIs, Cloud for IoT, Amazon Web Services
- for IoT.

**Third Year** **Semester V**

**Code: 22SCCAI6** **CORE COURSE VI** **Credit: 5**

**OPEN SOURCE SOFTWARE**

**(Theory)**

**COURSE OBJECTIVES:**

- To explain the need and importance of open source software
- To introduce the various open source software's like Linux, MySQL, PHP and Python
- To provide a built-in community that continuously modifies and improves the source code.

**UNIT - I:**

Introduction to open sources–Need of open sources–advantages of open sources – application of open sources. Open source operating systems: LINUX: Introduction – general overview –Kernel mode and user mode–process–advanced concepts –scheduling–personalities–cloning–signals–development with Linux.

**UNIT - II:**

MySQL: Introduction –setting up account –starting, terminating and writing your own SQL programs -record selection Technology – working with strings – Date and Time – sorting Query results – generating summary – working with meta data–using sequences– MySQL and Web.

**UNIT - III**:

PHP: Introduction–programming in web environment–variables- constants–data types –operators –statements – functions – arrays – OOP – string manipulations and regular expression – file handling and data storage–PHP and SQL database PHP and LDAP – PHP connectivity – sending and receiving E-mails –debugging and error handling– security–templates

**UNIT - IV:**

Syntax and style– python objects – numbers – sequences–strings–lists and tuples–dictionaries–conditional loops–files–input and output–errors and exceptions–functions–modules–classes and OOP – execution environment

**UNIT - V:**

Pearl back grounder – pearl overview–pearl parsing rules–variables and data statements and control structures– subroutines, packages and modules– working with files– data manipulation.

**UNIT – VI**

CURRENT CONTOURS (For continuous internal assessment only): Contemporary Developments Related to the Course during the Semester

**REFERENCES:**

1. Remy Card, Eric and Frank Mevel ,The Linux Kernel Book, ,Wiley Publications, 2003 Unit-1: Chapters 1,2,3,4, 5
2. Steve Suchring, John, MySQL Bible, Wiley, 2002. Unit-2: Chapters 1,6,7,9,11 & 12
3. Rasmus Lerdorf and Levin Tatroe, Programming PHP, O Reilly, 2002
4. Unit-3: Chapters 1,2,3,4,5,8, & 12
5. Wesley J. Chun, Core Python Programming, Prentice Hall, 2001
6. Unit-4: Chapters 1,2,3,4, 5 & 7
7. Martin C. Brown, Perl: The Complete Reference,2ndEdn, TMH, 2009
8. Unit-5: Chapters 1,2,5,6,7 & 8
9. Vikram Vaswani, MySQL: The Complete Reference, 2nd Edn, TMH,2009

**COURSE OUTCOMES:**

Upon successful completion of this course the students would be able:

- To explain common open source licenses and the impact of choosing a license.
- To explain open source project structure and how to successfully setup a project.
- To be competent with distributed software engineering tools and processes such as test-driven development, issues tracking, unit testing, code review, distributed version control, and continuous integration.
- To work on an open source project and will be expected to make a significant contribution.
- To study common open source software licenses, open source project structure, distributed team software development, and current events in the open source world.

**Third Year** **Semester V**

**Code:22SCCAI7** **COURSE OBJECTIVES:** **Credit: 5**

**CORE COURSE VII**

**ROBOTICS**

**(Theory)**

- To understand the functions of the basic components of a Robot.
- To study the use of various types of End of Effectors and Sensors
- To impart knowledge in Robot Kinematics and Programming.

**UNIT - I:**

Robot - Definition - Robot Anatomy - Coordinate Systems, Work Envelope Types and Classification- Specifications-Pitch, Yaw, Roll, Joint Notations, Speed of Motion, Pay Load- Robot Parts and their Functions-Need for Robots-Different Applications.

**UNIT-II:**

Pneumatic Drives-Hydraulic Drives-Mechanical Drives-Electrical Drives-D.C. Servo Motors, Stepper Motors, A.C. Servo Motors-Salient Features, Applications and Comparison of all these Drives, End Effectors-Grippers-Mechanical Grippers, Pneumatic and Hydraulic- Grippers, Magnetic Grippers, Vacuum Grippers; Two Fingered and Three Fingered Grippers; Internal Grippers and External Grippers; Selection and Design Considerations.

**UNIT - III:**

Requirements of a sensor, Principles and Applications of the following types of sensors- Position sensors - Piezo Electric Sensor, LVDT, Resolvers, Optical Encoders, pneumatic Position Sensors, Range Sensors Triangulations Principles, Structured, Lighting Approach, Time of Flight, Range Finders, Laser Range Meters, Touch Sensors ,binary Sensors., Analog Sensors, Wrist Sensors, Compliance Sensors, Slip Sensors, Camera, Frame Grabber, Sensing and Digitizing Image Data- Signal Conversion, Image Storage, Lighting Techniques, Image Processing and Analysis-Data Reduction, Segmentation, Feature Extraction, Object Recognition, Other Algorithms, Applications- Inspection, Identification, Visual Serving and Navigation.

**UNIT - IV:**

Forward Kinematics, Inverse Kinematics and Difference; Forward Kinematics and Reverse Kinematics of manipulators with Two, Three Degrees of Freedom (in 2 Dimension), Four Degrees of freedom (in 3 Dimension) Jacobians, Velocity and Forces-Manipulator Dynamics, Trajectory Generator, Manipulator Mechanism Design-Derivations and problems. Lead through Programming, Robot programming Languages-VAL Programming-Motion Commands, Sensor Commands, End Effector commands and simple Programs.

**UNIT - V:**

RGV, AGV; Implementation of Robots in Industries-Various Steps; Safety Considerations for Robot Operations - Economic Analysis of Robots.

**UNIT – VI** CURRENT CONTOURS (For continuous internal assessment only): Contemporary Developments Related to the Course during the Semester Concerned

REFERENCE BOOKS:

1. Klafter R.D., Chmielewski T.A and Negin M., "Robotic Engineering - An Integrated Approach", Prentice Hall, 2003. (Unit 1 : Chapter 1 & 2, Unit II: Chapter 4, Unit III: Chapter 5, Unit IV: Chapter 3 & 8, Unit V: Chapter 9)
2. Groover M.P., "Industrial Robotics -Technology Programming and Applications", McGraw Hill, 2001.
3. Craig J.J., "Introduction to Robotics Mechanics and Control", Pearson Education, 2008.
4. Deb S.R., "Robotics Technology and Flexible Automation" Tata McGraw Hill Book Co., 1994.
5. Fu.K.S.,Gonzalz R.C. and Lee C.S.G., "Robotics Control, Sensing, Vision and Intelligence", McGraw Hill Book Co., 1987.
6. Janakiraman P.A., "Robotics and Image Processing", Tata McGraw Hill, 1995.
7. Rajput R.K., "Robotics and Industrial Automation", S.Chand and Company, 2008.

**COURSE OUTCOMES:**

Upon successful completion of this course the students would be able to:

- Understand the fundamentals of robots.
- Know the concepts of sensors and machine vision.
- Understand navigation controls for operating robotics.
- Understand the planning and navigation of obstacle avoidance.
- Understand the implementation of robot economics.

**Third Year** **Semester V**

**Code: 22SCCAI5P** **CORE PRACTICAL V** **Credit: 4**

**ROBOTICS LAB**

**(Practical)**

**COURSE OBJECTIVES:**

- To Impart Practical Training related to Artificial Intelligence and
- Robotics and various movements of robots through hands on training.
- Open source platforms used to experiment the kinematics
- It helps to perform robotics tasks execution using computer vision.

**List of Experiments:**

1. Determination of maximum and minimum position of links.
2. Verification of transformation (Position and orientation) with respect to gripper and world coordinate system
3. Estimation of accuracy, repeatability and resolution.
4. Robot programming and simulation for pick and place
5. Robot programming and simulation for Colour identification
6. Robot programming and simulation for Shape identification
7. Robot programming and simulation for machining (cutting, welding)
8. Robot programming and simulation for writing practice
9. Robot programming and simulation for any industrial process (Packaging, Assembly)
10. Robot programming and simulation for multi process.

**COURSE OUTCOMES:**

Upon successful completion of this course the students would be able to:

- Understand various graphical function for bot functioning.
- Gain more knowledge and hands on training on robot movement
- programming.
- Understand the implementation of open source platforms.
- Implement the robotics tasks execution.
- Implement kinematics based experiment and know any robotic simulation
- software to model the different types of robots and calculate work volume for
- different robots.

**Third Year** **MAJOR BASED ELECTIVE I** **Semester V**
**Code:** **2. FUZZY LOGIC AND NEURAL NETWORKS** **Credit: 5**
**(Theory)**

**COURSE OBJECTIVES:**

- To introduce the concepts of neural networks and fuzzy systems
- To explain the basic mathematical elements of the theory of fuzzy sets.
- Understand the context of neural networks and deep learning. Know how to use a neural network

**UNIT - I:**

Introduction: What is a Neural Networks:-Artificial Neural Networks- Biological Neural Networks- Where are neural nets being used? - Signal Processing-Control Pattern Recognition- Medicine- Speech Production-Speech Recognition-Business How Are Neural Networks Used- Typical Architectures -Setting the Weights-Supervised training – unsupervised training – Fixed-weight nets-Common Activation Functions.

**UNIT - II:**

Developing Neural Networks: The 1940s: The Beginning of Neural Nets-The 1950s and1960s: The First Golden Age of Neural Networks-The 1970s The Quiet years The 1980s Enthusiasm. When Neural Nets Began?-The McCulloch-Pitts Neuron: Architecture-Algorithm-Applications.

**UNIT - III:**

Simple Neural Nets for Pattern classification-General Discussion: Architecture Biases and Thresholds-Linear separability - Data Representation. Hebb Net:-Algorithm - Application. Perceptron – Architecture – Algorithm - Application Adaline: Architecture – Algorithm – Applications - Madaline.- Architecture - Algorithm-Applications-

**UNIT-IV:**

Fuzzy Set Theory: Fuzzy versus Crisp. Crisp Sets: Operations on Crisp Sets Properties of Crisp sets- Partition and covering – Rule of Addition – Rule of Inclusion-Fuzzy Sets: Membership.

**UNIT - V:**

Basic Fuzzy Set Operations-Properties of Fuzzy sets. Crisp Fuzzy Relations: Fuzzy Cartesian product-Operations on Fuzzy Relations. Fuzzy logic-Fuzzy Proposition Fuzzy Rule based System-Fuzzy logic-Defuzzification

**UNIT – VI**

CURRENT CONTOURS (For continuous internal assessment only):

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Contemporary Developments Related to the Course during the Semester Concerned

**REFERENCES:**

1. Fausett, L. V. (1993). Fundamentals of neural networks: Architectures, algorithms and applications: United States edition. Pearson. Unit I : Chapter1 Unit II : Chapters 1.5, 1.6, 1.7, Chapter 2, Unit III : Chapter 2
2. Rajasekaran, S., & Pai, G. A. V. (2007). Neural networks, fuzzy logic, and

genetic algorithms: Synthesis and applications. New Delhi: Prentice Hall.Unit IV Chapter 6, Unit V: Chapters 7
3. Haykin, S. S. (1994). Neural networks: A comprehensive foundation. Macmillan.
4. Valluru, S. K., & Rao, T. N. (2010). Introduction to neural networks, fuzzy logic & genetic algorithms. Jaico Publishing House.

**COURSE OUTCOMES:**

Upon successful completion of this course the students would be able to:

- Understand the basic concept of fuzzy sets, fuzzy logic defuzzification
- Learn basics of Artificial Neural of theory and programming of Microprocessors
- Analyze various techniques in feedback and feed forward Neural networks.
- Understand the principle of competitive neural networks Adaptive resonance theory
- Learn the architecture and algorithm of Cognitron, Neo cognitron The concepts of fuzzy associative memory and fuzzy systems.

| Third Year | SKILL BASED ELECTIVE I | Semester V |
|---|---|---|
| Code: 22SSBEAIB | MOBILE APPLICATION DEVELOPMENT (Theory) | Credit: 2 |

**COURSE OBJECTIVES:**

- Understand system requirements for mobile applications
- Generate suitable design using specific mobile development frameworks
- Implement the design using specific mobile development frameworks

**UNIT-I:**

INTRODUCTION: Introduction to mobile applications – Embedded systems - Market and business drivers for mobile applications – Publishing and delivery of mobile applications – Requirements gathering and validation for mobile applications

**UNIT - II:**

BASIC DESIGN: Introduction – Basics of embedded systems design – Embedded OS - Design constraints for mobile applications, both hardware and software related – Architecting mobile applications – user interfaces for mobile applications – touch events and gestures – Achieving quality constraints – performance, usability, security, availability and modifiability.

**UNIT - III:**

ADVANCED DESIGN: Designing applications with multimedia and web access capabilities – Integration with GPS and social media networking applications – Accessing applications hosted in a cloud computing environment – Design patterns for mobile applications

**UNIT - IV:**

TECHNOLOGY I – ANDROID: Introduction – Establishing the development environment – Android architecture – Activities and views – Interacting with UI – Persisting data using SQLite – Packaging and deployment – Interaction with server side applications – Using Google Maps, GPS and Wifi – Integration with social media applications.

**UNIT - V:**

TECHNOLOGY II – IOS: Introduction to Objective C – iOS features – UI implementation – Touch frameworks – Data persistence using Core Data and SQLite – Location aware applications using Core Location and Map Kit – Integrating calendar and address book with social media application – Using Wifi - iPhone marketplace.

**UNIT – VI**

CURRENT CONTOURS (For continuous internal assessment only): Contemporary Developments Related to the Course during the Semester Concerned.

**REFERENCES:**

1. Jeff McWherter and Scott Gowell, "Professional Mobile Application Development", Wrox, 2012
2. Charlie Collins, Michael Galpin and Matthias Kappler, “Android in Practice”, Dream Tech, 2012
3. James Dovey and Ash Furrow, “Beginning Objective C”, Apress, 2012
4. David Mark, Jack Nutting, Jeff LaMarche and Frederic Olsson, “Beginning iOS
5. Development: Exploring the iOS SDK”, Apress, 2013.

**COURSE OUTCOMES**:

Upon successful completion of this course the students would be able to:

- Describe the requirements for mobile applications
- Explain the challenges in mobile application design and development
- Develop design for mobile applications for specific requirements
- Implement the design using Android SDK
- Implement the design using Objective C and iOS and deploy mobile applications in Android
  and iPone marketplace for distribution

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| Third Year | CORE COURSE VIII | Semester VI |
|---|---|---|
| Code: 22SCCAI8 | HUMAN COMPUTER INTERACTION (Theory) | Credit: 6 |

**COURSE OBJECTIVES:**

- To learn the foundations of Human Computer Interaction.
- To become familiar with the design technologies for individuals and persons with disabilities and be aware of mobile HCI.
- To learn the guidelines for user interface.

**UNIT - I:**

FOUNDATIONS OF HCI: The Human: I/O channels – Memory – Reasoning and problem solving; The Computer: Devices – Memory – processing and networks; Interaction: Models – frameworks – Ergonomics – styles – elements – interactivity- Paradigms. - Case Studies

**UNIT - II:**

DESIGN & SOFTWARE PROCESS: Interactive Design: Basics – process – scenarios – navigation – screen design – Iteration and prototyping. HCI in software process: Software life cycle – usability engineering – Prototyping in practice – design rationale. Design rules: principles, standards, guidelines, rules. Evaluation Techniques – Universal Design

**UNIT - III:**

MODELS AND THEORIESHCI Models: Cognitive models: Socio-Organizational issues and stakeholder requirements – Communication and collaboration models Hypertext, Multimedia and WWW.

**UNIT - IV:**

MOBILE HCI: Mobile Ecosystem: Platforms, Application frameworks- Types of Mobile Applications: Widgets, Applications, Games- Mobile Information Architecture, Mobile 2.0, Mobile Design: Elements of Mobile Design, Tools. - Case Studies

**UNIT - V:** WEB INTERFACE DESIGN: Designing Web Interfaces – Drag & Drop, Direct election, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow - Case Studies

**UNIT – VI**

CURRENT CONTOURS (For continuous internal assessment only): Contemporary Developments Related to the Course during the Semester.

**REFERENCES:**

1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, ―Human Computer Interaction‖, 3rd Edition, Pearson Education, 2004 (UNIT I, II & III)
2. Brian Fling, ―Mobile Design and Development‖, First Edition, O‘Reilly Media Inc., 2009 (UNIT – IV)
3. Bill Scott and Theresa Neil, ―Designing Web Interfaces‖, First Edition, O‘Reilly, 2009. (UNIT-V)
4. Human-Computer Interaction: Fundamentals and Practice, Gerard Jounghyun Kim, CRC Press, 2015
5. M.G. Helander, Handbook of Human-Computer Interaction, Elsevier Science, 2014.
6. Kim, Gerard Jounghyun. Human-Computer Interaction: Fundamentals and Practice, CRC Press, 2015.

7. Biele, Cezary. Human Movements in Human-Computer Interaction (HCI), Springer International Publishing,2021
8. Cognitive Behavior and Human Computer Interaction Based on Machine Learning Algorithms, Wiley, 2021.

**COURSE OUTCOMES:**

Upon successful completion of this course the students would be able:

- To design effective dialog for HCI
- To design effective HCI for individuals and persons with disabilities.
- To assess the importance of user feedback.
- To explain the HCI implications for designing multimedia / ecommerce / e-learning Web sites. • To develop meaningful user interface.

**COURSE OBJECTIVES:**

- To facilitate the basics of machine learning concepts.
- To learn building a machine learning model from the scratch
- To understand the evaluation of models.

**UNIT - I:**

Introduction: Introduction, easy for human hard for machines, a simple predicting machine, classifying is not very different from predicting, training a simple classifier, one classifier is not enough, Types of machine learning, Applications of Machine Learning, Perspectives and issues in machine learning.

**UNIT - II:**

Probabilistic and Stochastic Models: Bayesian Learning – Bayes theorem, Concept learning, Maximum likelihood, Bayes optimal classifier, Gibbs algorithm, Naive Bayes classifier, Expectation maximization and Gaussian Mixture Models, Hidden Markov models

**UNIT - III:**

Supervised learning: Introduction, Regression, Linear regression, Classification: Decision trees, k-Nereast Neighbours, Support Vector Machine, Logistic regression, Random Forest. Artificial Neural Network: Introduction, Perceptrons, multi-layer networks and back propagation.

**UNIT - IV:**

Unsupervised learning: Introduction, Supervised vs Unsupervised Cluster Analysis, K-means clustering, Hierarchical clustering. Dimension reduction: Principal Component Analysis, Linear Discriminant Analysis

**UNIT - V:**

Modelling and evaluation: Building the model, Training a model, evaluating a model, improving a model. Performance metrics - accuracy, precision, recall, sensitivity, specificity, AUC, RoC, Bias Variance decomposition. Unit – VI Current Contours (for Continuous Internal Assessment Only): Contemporary Developments Related to the Course during the Semester

**REFERENCES:**

1. Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das, ―Machine Learning, Pearson Education.(Unit1: Chapter1:.4,1.5,1.7,1.9; Unit 2: Chapter 6; Unit 3: Chapter 7, 8, 10; Unit 4 Chapter 9 (9.1,9.4), Unit 5: Chapter 3;)
2. Ethem Alpaydin,"Introduction to Machine Learning", MIT Press, Prentice Hall of India, Third Edition 2014. (Unit2: Chapter 7, Chapter 15)
3. Tariq Rashid, "Make your own neural network", Create Space Independent Publishing Platform, US 2016, ISBN:978-1-5308-2660-5 (Unit1, Part1)
4. Shai Shalev-Shwartz, Shai Ben-David, ― Understanding Machine Learning: From Theory to Algorithms, Cambridge University Press.
5. T. Hastie, R. Tibshirani and J. Friedman, "Elements of Statistical Learning", Springer.
6. Charu C. Aggarwal, "DATA CLUSTERING Algorithms and Applications", CRC Press, 2014.
7. C. Bishop, "Pattern Recognition and Machine Learning", Springer.
8. Sebastian Raschka and Vahid Mirjalili, "Python Machine Learning", Packt Publishing, Third Edition, 2019

COURSE OUTCOMES:

Upon successful completion of this course the students would be able to:

- Explain machine learning
- Apply machine learning concepts in various domains
- Implement supervised, unsupervised learning techniques
- Differentiate supervised and unsupervised learning techniques
- Create and evaluate models

**Third Year** **CORE PRACTICAL VI** **Semester VI**
**Code: 22SMBEAI2A MACHINE LEARNING TECHNIQUES LAB Credit : 4**
**(Practical)**

**COURSE OBJECTIVES:**

- Make use of Data sets in implementing the machine learning algorithms
- To Impart Practical Training in Machine Learning.
- It focuses on providing hands on training to implement various kinds applications using the tools.

1. Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a.CSV file.
2. For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples
3. Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and pply this knowledge to classify a new sample.
4. Build an Artificial Neural Network by implementing the Back propagation algorithm and test the same using appropriate data sets.
5. Write a program to implement the naïve Bayesian classifier for a sample training data sets to redasa .CSV file. Compute the accuracy of the classifier,considering few test data sets.
6. Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Built-in Java classes / API can be used to write the program. Calculate the accuracy, precision, and recall for your dataset.

**Course Outcomes:**

Upon successful completion of this course the students would be able:

- To understand the implementation procedures for the machine learning algorithms
- To design Java/Python programs for various Learning algorithms.
- To apply appropriate data sets to the Machine Learning algorithms.
- To identify and apply Machine Learning algorithms to solve real world problems.
- To understand to Implement character recognition using Multilayer Perceptron

**Third Year** **MAJOR BASED ELECTIVE II** **Semester VI**
**Code: 22SMBEAI2B** **1. NATURAL LANGUAGE PROCESSING (Theory)** **Credit: 5**

**COURSE OBJECTIVES:**

- To learn the fundamentals of natural language processing
- To understand the use of CFG and PCFG in NLP
- To understand the role of semantics of sentences and pragmatics and to apply

the NLP techniques to IR applications

**UNIT - I:**

INTRODUCTION: Origins and challenges of NLP – Language Modeling: Grammar based LM, Statistical LM - Regular Expressions, Finite-State Automata – English Morphology, Transducers for lexicon and rules, Tokenization, Detecting and Correcting Spelling Errors, Minimum Edit Distance.

**UNIT - II:**

WORD LEVEL ANALYSIS: Unsmoothed N-grams, Evaluating N-grams, Smoothing, Interpolation and Backoff – Word Classes, Part-of-Speech Tagging, Rule-based, Stochastic and Transformation-based tagging, Issues in PoS tagging – Hidden Markov and Maximum Entropy models.

**UNIT - III:**

SYNTACTIC ANALYSIS: Context-Free Grammars, Grammar rules for English, Tree banks, Normal Forms for grammar – Dependency Grammar – Syntactic Parsing, Ambiguity, Dynamic Programming parsing – Shallow parsing – Probabilistic CFG, Probabilistic CYK, Probabilistic Lexicalized CFGs - Feature structures, Unification of feature structures.

**UNIT - IV:**

SEMANTICS AND PRAGMATICS: Requirements for representation, First-Order Logic, Description Logics – Syntax-Driven Semantic analysis, Semantic attachments – Word Senses, Relations between Senses, Thematic Roles, sectional restrictions – Word Sense Disambiguation, WSD using Supervised, Dictionary & Thesaurus, Bootstrapping methods – Word Similarity using Thesaurus and Distributional methods.

**UNIT - V:**

DISCOURSE ANALYSIS AND LEXICAL RESOURCES: Discourse segmentation, Coherence – Reference Phenomena, Anaphora Resolution using Hobbs and Centering Algorithm – Co-reference Resolution – Resources: Porter Stemmer, Lemmatizer, Penn Treebank, Brill's Tagger, Word Net, Prop Bank, Frame Net, Brown Corpus, British National Corpus (BNC).

**Unit – VI** Current Contours (for Continuous Internal Assessment Only):

Contemporary Developments Related to the Course during the Semester

**REFERENCES:**

1. Daniel Jurafsky, James H. Martin―Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech, Pearson Publication, 2014.1. Breck Baldwin, ―Language Processing with Java and Ling Pipe Cookbook, Atlantic Publisher, 2015.
2. Richard M Reese, ―Natural Language Processing with Java‖, O_Reilly Media, 2015.
3. Nitin Indurkhya and Fred J. Damerau, ―Handbook of Natural Language

4. Processing, Second Edition, Chapman and Hall/CRC Press, 2010. Tanveer Siddiqui, U.S. Tiwary, ―Natural Language Processing and Information
5. Retrieval‖, Oxford University Press, 2008.
6. Steven Bird, Ewan Klein and Edward Loper, ―Natural Language Processing with Python‖, First Edition, O_Reilly Media, 2009.

Course Outcomes:

Upon successful completion of this course the students would be able:

- To tag a given text with basic Language features
- To design an innovative application using NLP components
- To implement a rule based system to tackle morphology/syntax of a language
- To design a tag set to be used for statistical processing for real-time applications
- To compare and contrast the use of different statistical approaches for different types of NLP applications.

**Third Year** **PROJECT** **Semester-VI**
**Code: 22SAIPW** **Credit: 3**

The candidate shall be required to take up a Project Work by group or individual and submit it at the end of the final year. The Head of the Department shall assign the Guide who, in turn, will suggest the Project Work to the students in the beginning of the final year. A copy of the Project Report will be submitted to the University through the Head of the Department on or before the date fixed by the University.
The Project will be evaluated by an internal and an external examiner nominated by the University. The candidate concerned will have to defend his/her Project through a Viva-voce.

**ASSESSMENT / EVALUATION / VIVA VOCE:**

**1. PROJECT REPORT EVALUATION (Both Internal & External)**
I. Plan of the Project
II. Execution of the Plan/collection of
Data / Organisation of Materials /
Hypothesis, Testing etc. and
presentation of the report.
III. Individual initiative
2. Viva-Voce / Internal & External
TOTAL
PASSING MINIMUM:
Vivo-Voce 20 Marks
Project
40% out of 20 Marks
(i.e. 8 Marks) - 20 marks - 45 marks - 15 marks - 20 marks - 100 marks
Dissertation 80 Marks
40% out of 80 marks
(i.e. 32 marks)
A candidate who gets less than 40% in the Project must resubmit the Project Report. Such candidates need to defend the resubmitted Project at the Viva-voce within a month. A maximum of 2 chances will be given to the candidate.

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**Third Year** **SKILL BASED ELECTIVE II** **Semester VI**
**Code: 22SSBEAI2** **CLOUD COMPUTING** **Credit: 2**
**(Theory)**

**COURSE OBJECTIVES:**

- To learn the basics of cloud computing, to implement the key concept of virtualization.
- To inculcate the knowledge of different cloud computing services and security and to apply Map-Reduce concept of applications and amazon web services
- To understand how to migrate the applications in cloud

**UNIT - I:**
Introduction-History of Cloud Computing – Characteristics of Cloud – Cloud Computing Model – Issues and Challenges for Cloud Computing – Advantages and disadvantages of Cloud Computing – Security Privacy and Trust – Virtualization – Threats to Cloud Computing – Next Generation of Cloud computing - Cloud Computing Architecture: Cloud Architecture – Cloud Computing Models – Comparisons of Models – Deployment Models – Identity as a Service.

**UNIT - II:**
Virtualization – Implementation of virtualization – Virtualization Support at The OS Level – Middleware Support For Virtualization – Advantages of Virtualization – Virtualization Implementation Techniques – Hardware Virtualization - Types of Virtualization – Load Balancing in Cloud Computing – Logical Cloud Computing Model – Virtualization for Data-Centre .

**UNIT - III:**
Security Reference Architecture – Security Issues in Cloud Computing – Classification of Security issues - Types of Attacks – Security Risks in Cloud Computing – Security Threats against Cloud Computing - Emerging trends in Security and Privacy.

**UNIT - IV:**
Amazon Web Services – Microsoft Azure - Google App Engine – Data Security - Privacy – Service Oriented Architecture Components – Design Principle of SOA – SOA Requirements – Benefits of SOA – Web Services .

**UNIT - V:**
Motivations for Migration – Issues in Migrating the Applications to the Cloud –Types of Migration - Planning for Migrating the application to Cloud – Migration Road Map.

**Unit – VI:** Current Contours (for Continuous Internal Assessment Only): Trends on cloud computing such edge computing, serverless computing, Kubemetes – study of cloud examples (Microsoft Azure, Icloud, salesforce, IBMcloud, VMware

**REFERENCES:**
1. "Cloud Computing" – V.K. Pachghare PHI Delhi Learning Private Limited, 2016. ISBN: 978-81-203-5213-1 [Unit– I: Chapter 1,2; Unit– II: Chapter 3; Unit – III: Chapter 5; Unit – IV: Chapter 7,9; Unit – V: Chapter 10;]
2. Sharma, Rishabh," Cloud Computing Fundamentals, Industry Approach and Trends", New Delhi: John Wiley, 2017, ISBN: 978-81-265-5306-8
3. Chitra, D,"Grid and Cloud Computing ", D. Chitra and A. Kaliappan, Jodhpur: Scientific Publishers (India), 2016, ISBN: 978-93-85983-05-4
4. Rittinghouse and Ransome, Cloud Computing: Implementation, Management, and Security, CRC Press, 2016.
5. Michael Miller "Cloud Computing Web based application that change the way you work and collaborate online". Pearsonedition, 2008.
6. Kris Jamsa, Cloud Computing: SaaS, PaaS, IaaS, Virtualization, Business Models, Mobile, Security and More, Jones & Bartlett Learning,2012.

**COURSE OUTCOMES:**

Upon successful completion of this course the students would be able:

- To define cloud computing and memorize the different cloud service and
- deployment models.
- To apply and design suitable Virtualization concept, Cloud Resource
- Management and design scheduling algorithms.
- To use and examine different cloud computing services.
- To design different workflows according to requirements and apply Map
- Reduce programming model.
- To analyze the components of open stack& Google cloud platform Understand
- mobile cloud computing and migrating strategies for cloud applications

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PART-IV SOFT SKILLS DEVELOPMENT PART-IV

COURSE FOR ALL UG ARTS, SCIENCE, COMMERCE AND MANAGEMENT
CHOICE BASED CREDIT SYSTEM – LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (CBCS - LOCF)

(Applicable to the candidates admitted from the academic year 2022-2023 onwards)

Third Year

**Code: 22UGSDC** SOFT SKILLS DEVELOPMENT (Theory) Semester-V Credit: 2

OBJECTIVES :

- To Develop communicative competence among the Students.
- To enhance the learner's soft skills by giving adequate exposure in LSRW and sub skills.
- To enable learners to put the life skills into practice with confidence.

**UNIT- I**

Introduction

KNOW THYSELF / UNDERSTANDING SELF:

to Soft skills-Self discovery-Developing positive attitude-Improving perceptions- Forming values.

**UNIT -II**

INTERPERSONAL SKILLS/ UNDERSTANDING OTHERS:

Developing interpersonal relationship-Team building-group dynamics-Net working- Improved work relationship

**UNIT -III** COMMUNICATION SKILLS / COMMUNICATION WITH OTHERS:

Art of listening –Art of reading –Art of speaking –Art of writing-Art of writing e-mails e mail etiquette.

**UNIT- IV** CORPORATE SKILLS / WORKING WITH OTHERS

Oral Presentation – Memos- Note taking - Note making and preparing Minutes- Reports, Proposals, Abstracts - Technical Writing.

**UNIT -V** SELLING SELF / JOB HUNTING

Writing resume/cv-interview skills-Group discussion- Mock interview-Mock GD – Goal setting - Career planning

**UNIT - VI**: CURRENT CONTOURS: (for continuous internal assessment only):

REFERENCES:

1. N. Krishnasamy, Manju Dhariwel and Lalitha Krishnasamy(2015). Mastering Communication Skills and Soft Skills – Bloomburg.
2. Meena.K and V.Ayothi (2013) A Book on Development of Soft Skills (Soft Skills : A Road Map to Success), P.R. Publishers & Distributors,
3. Meera Banerjee and Krishna Mohan: Developing Communication Skills, Trinity Publishers-(Lakshmi Publications.
4. Alex K. (2012) Soft Skills – Know Yourself & Know the World, S.Chand & Company LTD, Ram Nagar, New Delhi- 110 055.

COURSE OUTCOMES:

- Develop listening, speaking, reading and writing skills in English.
- Enhance soft skills and engage in a range of communicative tasks and activities
- Comprehend a text and identify specific and global information
- Promote communicative ability in both spoken and written form of the language
- Develop interpersonal skills to maintain human relationship

# Gender

**PART-V** **GENDER STUDIES** **Third Year**

**COURSE FOR ALL UG ARTS, SCIENCE, COMMERCE AND MANAGEMENT**
**CHOICE BASED CREDIT SYSTEM – LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (CBCS - LOCF)**
**(Applicable to the candidates admitted from the academic year 2022-2023 onwards)**

**PART-V Semester-VI** **GENDER STUDIES** **Credit: 2**
**Code: 22UGGS**

**OBJECTIVES:**

- To make students to aware of Gender constructions and gendering Process
- To explore existing gender biases in the society and to understand the need to work towards the inclusive society
- To inculcate sensitivity and build gender perspectives.
- To use the course to bring attitudinal cum behavioral changes towards gender
- neutral ambience and promote the humanistic values

**UNIT- I**
**INTRODUCTION TO GENDER STUDIES CONCEPTS**
Gender Spectrum.-Sex – Gender distinction – Biological Determinism – Patriarchy – Feminism – Gender Socialization and Stereotyping-Gender Discrimination – Gender Division of labour and roles– Gender Sensitivity and awareness – Gender Equity – Equality – Gender Main streaming and Gender Analysis.

**UNIT- II**

UGC INITIATIVES ON WOMEN'S STUDIES
Definition of Women's Studies –Gender Studies –UGC Initiatives and guidelines on Women's Studies - Beijing Conference, UN Initiatives – Convention on Elimination of All forms of

Discrimination Against Women (CEDAW)- Sustainable Development Goals on Gender Equality (SDG 5) and targets

**UNIT- III** AREAS OF GENDER DISCRIMINATION

Gender Socialization- Sex Ratio– Health and Nutrition– – Literacy and Education Employment- Governance – participation in decision making- politics- property rights and access to credit- gender based violence- Social institutions –Family, Caste, Class, religion, gender, State. Market – Media – Politics – Judiciary

**UNIT -IV** WOMEN DEVELOPMENT AND GENDER EMPOWERMENT

Towards Equality Report of Status of Women in India 1974 – International Women's Decade –

International Women's Year – National Policy for Empowerment of Women 2001

**UNIT -V** WOMEN'S MOVEMENTS AND SAFEGUARDING MECHANISM :

In India National /State Commission for Women(NCW) – All Women Police Station – Family Court Legislations safeguarding women –Transgender Policy—Constitutional amendments for women's political participation

**UNIT - VI** CURRENT CONTOURS: (for continuous internal assessment only):

Tamil Nadu State Policy for Women 2021- National Policy for Women 2015 – Prevention of Sexual Harassment at Work places Act 2013-
Protection of Children from Sexual Offences Act, 2012 - Analysis of regressive and progressive High court and supreme court judgments- women proactive policies, programmes, interventions

REFERENCE :

1. Bhasin Kamala, Understanding Gender : Gender Basics , New Delhi : Women Unlimited , 2004
2. Bhasin Kamala, Exploring Masculinity: Gender Basics , New Delhi: Women Unlimited ,2004
3. Bhasin Kamala , What is Patriarchy? : Gender Basics, New Delhi :Women Unlimited ,1993
4. Arya Sadhna Women ,Gender Equality and the State ,New Delhi :Deep &Deep Publication ,2000
5. ghypaiy Ghpe;J nfhs;Nthk;> kJiu :Vf;jh>……..
6. Mishra .O.P,Law Relating to Women &Child ,Allahabad :Central Law Agency ,2001
7. Uma Chakravarti, Gendering Caste Through a Feminist Lens, Sage Publication 2003
8. Bhattacharya Malini , Sexual Violence and Law ,Kolkata; West Bengala Commission for Women ,2002
9. Sexual Harassment at the Workplace – A Guide , New Delhi ;Sakshi,1999
10. m[pjh> FLk;g td;KiwapypUe;J ngz;fis ghJfhf;Fk; rl;lk; 2005> kJiu :
Vf;jh 2005
11. nghd;.fpU\;zrhkp>N[.ghy; gh];fh;&
M.[hd; tpd;nrd;l;> ngz;fSk; cr;r
ePjpkd;wKk;> kJiu :Nrhf;Nfh thrfh; tl;lk;> 2004
12. FLk;g td;KiwapypUe;J ngz;fis ghJfhf;Fk; rl;lk; 2005- ifNaL> jpUr;rp:
Women's Integrated National Development Trust
13. https://www.schooloflegaleducation.com/women-and-law-in-india-e-book/

COURSE OUTCOMES:

- Students would have gained a perspective and understood the social reality of gender society
- understood the differences of gender and sex and may resort to building alternative
- perspectives and critical thinking.
- Gained knowledge on the various social institutions governing gender and the
- intersectionality.
- Exposed to the kind of initiatives of the State towards gender equality