22UBT148B		03-Credits
Hrs/Week: 3:0:0	**Biomass and Bioenergy**	**CIE Marks:**50
Total Hours: 40 Hrs		**SEE Marks:**50

Course Objectives:
1. To understand the basic concepts of biomass and bioenergy.
2. To gain the knowledge about different biomass conversion technologies.
3. To know about innovative bioenergy plants and bio refinery concept.

UNIT - I	10 Hrs

Biomass
Biomass: Definition, constituents and energy properties. Biomass as an energy core and its different mode of utilization. Biomass typologies: lignocellulosic, starchy, sugary, oilseeds, MSW, sewage sludge.
Introduction to Biofuels - definition (liquid -biodiesel, bioethanol; gaseous -syngas, biogas; solid -charcoal and biochar), advantages and disadvantages. Biofuel life cycle. Conventional fuels and their environmental impacts. Renewable energy sources. Modern fuels and their environmental impacts.

UNIT – II	10 Hrs

Types of Bioenergies :
First generation, Second generation, third generation and next/future generation fuels.
Biomass Conversions Technologies:
Physical conversion**:** Dewatering, drying, size reduction, pelleting, chipping, oil extraction.
Thermochemical conversion: Oil trans-esterification
Chemical conversion: Lignocellulosic conversion (2G technology)
Biochemical conversion -Anaerobic digestion (biogas production from organic waste and Waste water), CBG. Fermentation (bioethanol production)

UNIT - III	10 Hrs

Thermal conversion plants:
Combustion plants for heat generation: wood and pellet burning stoves; wood, pellet and wood chips boiler. Gasification plants, Pyrolysis plants.
Innovative bioenergy plants: biomass to synthetic natural gas; biomass to liquid biofuels through Fisher-Tropsch; Hydrothermal processes: carbonization, Liquefaction, gasification.

UNIT - IV	10 Hrs

Bio-Energy and Bio-Refinery
Overview of Integrated biorefinery concept, value-added processing of bioenergy residues.
Economic feasibility of producing bioenergy (with one example), Issues with bioenergy production & use. Impact of bioenergy in global climate change & food production. Strategies for new vehicle technologies. Current research on biomass & bioenergy production. Market barriers of bioenergy.

Reference books:
1. Understanding biomass energy by Mark Cook, 2022.
2. Biomass and Biofuels by Shibu Jose and Thallada Bhaskar, 2015.
3. Biomass for biofuels by Katarzyna Bulkowska, Zygmunt Mariusz Gusiatin, Ewa Klimiuk, Artur Pawlowski, Tomasz Polcoj, 2016.
4. Biofuel Engineering Process technology by Caye M. Drapcho, Nghiem Phu Nhuan, Terry H. Walker, Mc Grow Hill company, 2008.
5. Biofuel Technology Handbook by Dominik Rutz & Rainer Janssen, 2008.

Course Outcomes:
CO1: Emphasize on the basic aspects of biomass and bio-energy.
CO2: Interpret & describe biomass conversion technologies.
CO3: Acquire knowledge of innovative bioenergy plants.
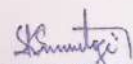**CO4**: Interpret & describe of bio-refinery concept.

Course Outcomes	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	1	2				3					2
CO2	1	3	3	2	3	1	3					1
CO3	1	1	3	2	3	1	3					1
CO4	1		2		2	1	2					2

1.2.1 Number of new courses introduced across all programmes offered during the year 2022-23

The new courses introduced in the program during the year 2022-23 are as follows

Sl. No	Name of the Course	Course Code	Course Category	Credits
01	Introduction to Electronics Engineering	22UEC114N /214N	Engineering Science Course	03
02	Introduction to Embedded System	22UEC134B	Emerging Technology Course	03
03	Introduction to Communication Technology	22UEC135B	Emerging Technology Course	03
04	Higher Programming Paradigm	21UEC308C	Ability Enhancement Course	01
05	Analog and Digital Communication	21UEC404C	Professional Core Course	03
Link to access the courses https://drive.google.com/file/d/1niDoMGFir87jJHWVQpUAsUwJ6OiLz9d3/view?usp=sharing				

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Course Title: Introduction to Electronics Engineering			Course Code: 22UEC114N/214N
Credits: 03	L-T-P: 3-0-0	Contact Hours / Week: 03	Total Teaching Hours: 40
CIE Marks: 50		SEE Marks: 50	Total Marks: 100

Department: Electronics and Communication Engineering.
Course Type: Engineering Science Course - I

Course Objectives:

The objectives of the course are to

1. Understand the operation of semiconductor devices and their applications.
2. Know characteristics and design principles of BJT amplifier.
3. Study Operational Amplifier (Op-Amp) and its applications.
4. Know logic circuits and their optimization.
5. Understand the principles of transducers and communication systems.

Course Outcomes:

A student who successfully completes this course should be able to

1. Differentiate semiconductor devices based on their V-I characteristics.
2. Analyze basic applications of electronic circuits.
3. Analyze basic logic gates and logic circuits.
4. Design simple electronic circuits.
5. Distinguish transducer and sensor; modulation and demodulation.

The topics that enable to meet the above objectives and course outcomes are given below

Unit I

Power Supplies: Block diagram, PN junction diode characteristics, half-wave rectifier, full-wave rectifiers and filters, voltage regulators, output resistance and voltage regulation, voltage multipliers.

BJT Characteristics and Biasing: Common base and common emitter configurations, voltage divider biasing.

Self study component: Switched mode power supply.

Unit II

Amplifier and Oscillators: Single stage CE amplifier, Barkhausen criterion, sinusoidal and non-sinusoidal oscillators, Ladder network oscillator, Wien bridge oscillator, multivibrators, single-stage astable oscillator, Crystal controlled oscillators (Only Concepts, working, and waveforms. No mathematical derivations)

Operational amplifiers: Ideal op-amp; characteristics of ideal and practical op-amp; **Practical op- amp circuits:** Inverting and non-inverting amplifiers, voltage follower, summer, integrator and differentiator.

Self study component: Op-Amp as zero crossing detector.

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Unit III

Boolean Algebra and Logic Circuits: Binary numbers, number base conversion, octal & hexa decimal numbers, complements, basic definitions, axiomatic definition of Boolean algebra, basic theorems and properties of Boolean algebra, Boolean functions, canonical and standard forms, other logic operations, digital logic gates.

Combinational logic: Introduction, design procedure, Adders- Half adder, Full adder, Parallel adder.

Self study component: Half subtractor and full subtractor.

Unit IV

Analog Communication Schemes: Modern communication system scheme, information source, and input transducer, transmitter, channel or medium – hardwired and soft wired, noise, receiver, multiplexing, types of communication systems. Types of modulation (only concepts): AM, FM.

Digital Modulation Schemes: Advantages of digital communication over analogcommunication, ASK, FSK, PSK, radio signal transmission multiple access techniques.

Sensors and Interfacing: Instrumentation and control systems, Transducers, Sensors.

Self study component: Opto-couplers

Reference Books:

1. Mike Tooley, "Electronic Circuits, Fundamentals & Applications", 4th Edition, Elsevier, 2015
2. M. Morris Mano, "Digital Logic and Computer Design", PHI Learning, 2008
3. D. P. Kothari, I. J. Nagrath, "Basic Electronics", 2nd edition, McGraw Hill Education (India), 2018

POs satisfied by the course:

PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO5. Modern tool usage: Create, select, and apply appropriate techniques, resources, andmodern engineering and IT tools including prediction and modeling to complex engineering

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activities with an understanding of the limitations.

PO6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PSOs satisfied by the course:

PSO1. Analyze and design systems for electronics, communication, and signal processing applications.

Course Articulation Matrix

Course Outcomes	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	2	-	2	2	-	-	-	-	-	-	3	-	-
CO2	3	2	3	-	2	1	-	-	-	-	-	-	3	-	-
CO3	3	2	3	-	3	-	-	-	1	-	-	-	3	-	-
CO4	2	1	1	-	2	1	-	-	1	-	-	1	3	-	-
CO5	2	1	1	-	2	1	-	-	1	-	-	1	3	-	-
Course Contribution to POs and PSOs	2.6	1.8	2	-	2.2	1	-	-	0.6	-	-	0.4	3	-	-

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Course Title: Introduction to Embedded System			Course Code: 22UEC134B
Credits: 03	L-T-P: 3-0-0	Contact Hours / Week: 03	Total Teaching Hours: 40
CIE Marks: 50		SEE Marks: 50	Total Marks: 100

Department: Electronics and Communication Engineering.
Designation: Emerging Technology Course

Course Objectives:

The objectives of the course are to
1. Impart knowledge about embedded systems, applications and processor architectures.
2. Understand different communication interfaces, characteristics and quality attributes of embedded systems.
3. Study general purpose processors software and processor peripherals.
4. Know 8051 Microcontroller architecture, features and its applications.

Course Outcomes:
A student who successfully completes this course should be able to
1. Represent embedded systems in block diagram with functions of each block.
2. Analyze communication interfaces, characteristics and quality attributes of embeddedsystems.
3. Identify general purpose processors software and processor peripherals necessary forembedded systems.
4. Explore 8051 Microcontroller capabilities through programming using pseudo codes.

The topics that enable to meet the above objectives and course outcomes are given below

Unit I

Introduction to embedded systems, Embedded system vs. general computing system, classifications, purpose of embedded system, major application areas. The typical embedded system, microcontrollers, microprocessors, RISC, CISC, Harvard and Von-Neumann, Big-Endian, Little-Endian processors.

Unit II

Memory, sensors, actuators, communication interface: Inter integrated interface, serial peripheral interface, UART, parallel interface, RS232 and Bluetooth. Characteristics and quality attributes of embedded systems.

Unit III

General purpose processors software: Introduction, basic architecture, operation, instructionset, program and data memory space, registers, I/O, interrupts, operating system, ASIP's, microcontrollers, DSP, selecting microprocessor.

Standard Single Purpose Processors peripherals: Introduction, timers, counters and watch dog timers, UART.

Unit IV

8051 Microcontroller: Introduction, features of 8051 microcontroller, block diagram, ALU, PC, ROM, RAM, address line, data line, special function registers, RAM organization, stack,

basics of serial communication, interrupts, timers and counters, input output ports, simple pseudo code.

Textbook:

1. Shibu K V, "Introduction to embedded systems", Tata McGraw Hill private limited, 2010.

2. Frank Vahid, Tony Givargis, "Embedded system design: A unified hardware/software introduction", John Wiley and Sons, 2001.

3. Kenneth J Ayala, "The 8051 Microcontroller, Architecture programming and applications", West publishing company, college and school division, 1997

Reference Book:

1. Rajkamal, "Embedded systems: architecture, programming and design", Tata McGraw Hill private limited, 2nd edition.

POs satisfied by the course:

PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO5. Modern tool usage: Create, select, and apply appropriate techniques, resources, andmodern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and needfor sustainable development.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
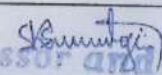
PSOs satisfied by the course:

PSO2: Use domain specific tools for design, analysis, synthesis, and Validation of VLSI and embedded systems.

Course Articulation Matrix

Course Outcomes	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	1	1	-	1	1	1	1	1	1	-	1	-	3	-
CO2	3	2	2	-	1	1	1	1	1	2	-	1	-	3	-
CO3	3	2	2	-	1	2	1	1	2	1	-	2	-	3	-
CO4	3	2	2	-	1	2	1	1	2	1	-	2	-	3	-
Course Contribution to POs and PSOs	3.0	1.75	1.75	-	1.0	1.5	1.0	1.0	1.5	1.25	-	1.5	-	3	-

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Course Title: Introduction to Communication Technology			Course Code: 22UEC135B
Credits: 03	L-T-P: (3-0-0)	Teaching Hours: 40 Hrs	Contact Hours/Week: 3 Hrs
CIE Marks: 50		SEE Marks: 50	Total Marks: 100

Department: Electronics and Communication Engineering

Designation: Emerging Technology Course - I

Course Objectives:

The objectives of the course are to
1. Know the fundamentals of communication engineering, modulation and demodulation techniques.
2. Understand modern communication techniques and their application in cellular systems.
3. Know the basics of communication standards and protocols.
4. Understand design principles of cellular mobile systems and radio wave propagation.

Course outcomes:

A Student who successfully completes this course should be able to
1. Distinguish various sub systems of wireless communication.
2. Choose appropriate communication standards for different types of cellular communication.
3. Evaluate performance of different multiple access systems.
4. Select specific type of communication system and standards to meet required communication quality of services.

The topics that enable to meet the above objectives and course outcomes are given below

Unit I

Introduction to communication systems: Elements of communication systems, Need for modulation, Electromagnetic spectrum and applications, Terminologies in communication systems.

Introduction to wireless communication systems: Evolution of mobile radio communication, Beginning of Radio, Wireless mobile communication, Applications of wireless communication, disadvantages of wireless communication systems, examples of wireless communication systems, difference between fixed telephone network and wireless telephone network, development of wireless communication, fixed network transmission hierarchy, comparison of wireless communication systems.

Unit II

Modern communication systems: Introduction, first generation (1G), second generation (2G), generation (2.5G), third generation (3G), evolution from 2G to 3Gt, fourth generation (4G), digital cellular parameters, differences between analog cellular and digital cellular systems, Wireless Local Loop (WLL), Wireless Local Area Networks (WLANs), Personal Area Networks (PANs), Bluetooth.

Introduction to cellular mobile systems: Introduction, spectrum allocation, International Telecommunication Union (ITU), wireless communication system, basic components of cellular systems, cellular system architecture, GSM: Most popular cellular system, type of channels, cell concept in wireless communication, shape selection of the cell.

Unit III
Cellular system design fundamentals: Introduction, frequency reuse, cellular capacity increasing parameters, channel assignment strategies, hand-off strategies, hands-off initiation, type of hands-off on the basis of decision-making process, channel assignment strategies for hands-off, interference, tracking, trucking, grade of service.

Unit IV
Multiple access techniques for wireless communication: Introduction, Frequency Division Multiple Access (FDMA), Time Division Multiple Access (TDMA), Advanced TDMA, multipath interference, comparison between TDMA & FDMA, Space Division Multiple Access (SDMA), spread spectrum, types of spread spectrum, Code Division Multiple Access (CDMA). **Radio wave propagation:** Introduction, Doppler shift, parameters of multipath channels, fading, diversity techniques, free space propagation model, phenomenon of propagation, propagation models.

Reference Books:
1) George Kennedy, Bernard Davis, S. R. M. Prasanna, "Electronic Communication Systems", 5th Edition, Tata McGraw hill education private limited, New Delhi 2) Rajeshwar Dass, "Wireless Communication Systems", I. K. international publishing house private limited, New Delhi

POs satisfied by the course:

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of and needfor sustainable development.

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PSOs satisfied by the course:

PSO1: Analyze and learning the development of communication systems for mobile communication technology, modern communication systems, cellular technology and applications.
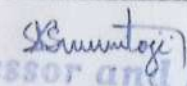
Course Articulation Matrix:

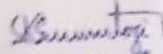| Course Outcomes	POs												PSOs		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	3	-	2	2	-	-	-	-	-	-	3	-	-
CO2	3	3	2	-	2	1	-	-	-	-	-	-	3	-	-
CO3	3	2	3	-	3	-	1	-	-	-	-	-	3	-	-
CO4	2	1	1	-	3	1	1	-	-	-	-	-	3	-	-
Course contribution to POs and PSOs.	2.75	2	2.25	-	2.5	1	0.5	-	-	-	-	-	3	-	-

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SUBJECT CODE: 21UEC308C		Credits: 01
L:T:P – 2-0-0	Higher Programming Paradigm	CIE Marks: 50
Hours/Week: 02		SEE Marks: 50

UNIT-I	10 Hrs.

Data types in python: comments in python, Docstrings, How python sees variables, Datatypes in python, Sequences in python, Literals in python, Determing the data type of a variable, Identifiers and reserved words, Naming conventions in python
Operators in Python: Operator,operator precedence and associativity, Mathematical functions
Input and Output: Output statements, Input statements, Command Line arguments, Control Statements, Strings and Characters.

UNIT–II	10 Hrs.

Functions: Defining a function, calling a function , Returning Results from a function, Returning multiple values from a function, Formal and actual arguments, local and global variables, passing a group of elements to a function, recursive functions, the special variable name. **Lists and tuples:** lists, tuple , Dictionaries.

UNIT–III	10 Hrs.

Exceptions: exceptions, exception handling, types of exceptions, user defined exceptions
Files in python: files, types of files in python, opening a file, closing a file, working with text files containing strings, working with binary files, pickle in python.

UNIT–IV	10 Hrs.

Object Orineted Programming: Classes and Objects, Creating Classes in Python, Creating Objects in Python, The Constructor Method, Classes with Multiple Objects, Class Attributes versus Data Attributes, Encapsulation, Inheritance, The Polymorphism.

Reference Books *

Text Books
1. Core Python Programming by Dr. R. Nageswawar Rao, Dream tech press, 2nd Edition 2018.
Reference Books
1. Introduction to Python Programming by Gowrishankar S. Veena A. , CRC Press Taylor&Francis Group, 1st Edition 2019.
2. PythonProgramming by Michael Urban and Joel Murach , Mike Murach Elizabeth Drake, 1st Edition, 2016

Course Outcomes

After completion of the course students will be able to
1. Explain syntax and semantics of different statements and functions inPython.
2. Demonstrate the use of strings, files, lists, dictionaries and tuples in simple applications.
3. Demonstrate Exception Handling and file operations.
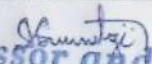4. Explain class, objects, polymorphism, inheritance.

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Course Outcomes	Programme Outcomes (POs)												Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	2	-	2	2	-	-	-	-	-	-	1	-	2
CO2	3	2	3	-	2	1	-	-	-	-	-	-	2	2	1
CO3	3	2	3	-	3	-	-	-	1	-	-	-	2	1	3
CO4	2	1	1	-	2	1	-	-	1	-	-	1	1	3	1

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21UEC404C	Analog and Digital Communication	Credits: 03
L : T : P - 3 : 0 : 0		CIE Marks: 50
Total Hours/Week: 03		SEE Marks: 50

UNIT-I	10 Hrs.

Linear modulation: Baseband and carrier communication, time domain and frequency domain description, generation and detection of Amplitude Modulation (AM) waves.

DSB-SC modulation: Time and frequency domain representation, generation and detection of DSB-SC modulated waves.

SSB modulation: Time domain representation of SSB signal, generation and detection of SSB modulated waves, Quadrature Amplitude Modulation (QAM).

Vestigial side band modulation: Frequency domain representation, generation and detection of VSB, comparison of amplitude modulation techniques, superheterodyne receiver.

UNIT–II	10 Hrs.

Angle modulation: Concept of angle modulation, relation between frequency and phase modulation, bandwidth of angle modulated wave.

Generation of FM: direct and indirect methods, PLL, demodulation of FM, pre-emphasis and de-emphasis, FM radio.

UNIT–III	10 Hrs.

Digital Communication: Model of digital communication systems Sampling process: Sampling Theorem, quadrature sampling of Band pass signal, reconstruction of a message from its samples, signal distortion in sampling. Line codes, unipolar, polar and Manchester codes and their power spectral densities.

UNIT–IV	10 Hrs.

Digital Modulation Techniques: Digital Modulation formats, Coherent binary modulation techniques (ASK, PSK, FSK), Probability of error for ASK, PSK, FSK modulation. Coherent quadrature modulation techniques, MSK, (without derivation of probability of error equation). Non-coherent binary modulation techniques (FSK and DPSK).

Reference Books

1. B. P. Lathi "Modern Digital and Analog Communication Systems", 3rd Edition, Oxford University, 2006
2. Simon Haykin, "Digital communications", John Wiley, Edition 2014
3. George Kennedy "Electronic Communication Systems", 3rd Edition, Tata McGraw Hill Publication, 1984
4. B.P.Lathi "Communication Systems", 3rd Edition, B.S. Publications, 2009
5. Simon Haykin "Communication Systems", 3rd Edition, John Wiley and Sons, 2005
6. John. G. Proakis, and Masoul Salehi "Fundamental of Communication System" Pearson Education, Edition 2014

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7. Bernard Sklar and Prabitrakumary Ray, "Digital Communication Fundamentals and Applications", Pearson Publications, 2010
8. K. Sam Shanmugam, "Digital and Analog Communication Systems", John Wiley & Sons, 2006

Course Outcomes

After completion of the course student will be able to
1. Compute spectrum of modulated and demodulated signals
2. Analyze amplitude modulation and demodulation circuits
3. Do analysis of angle modulation and demodulation techniques.
4. Design sampling and reconstruction circuit for given different sampling frequencies
5. Design different digital modulation /demodulation techniques.

Course Outcomes	Programme Outcomes (POs)												Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	2	0	1	1	1	0	0	0	0	0	3	0	0
CO2	3	2	2	0	1	1	1	0	0	0	0	0	3	0	0
CO3	3	3	2	0	1	0	0	0	0	0	0	0	3	0	0
CO4	3	3	1	0	1	0	0	0	0	0	0	0	3	0	0
CO5	3	3	1	0	1	0	0	0	0	0	0	0	3	0	0

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Subject Title	:	Universal Human Values-II
Subject Code	:	21UHS324C
Semester	:	3
Credits with LTP Structure	:	1 Credits (1L--0T-0P)
Lecture Hours per Week	:	1 Hours
Tutorial Hours per Week	:	0 Hours
Total Contact Hours	:	15 (15 Teaching Hours + 00 Tutorial Hours)

Course Outcomes:

After completing the course the student will be able to:

1. Explore holistic vision of life - themselves and their surroundings.
2. Develop competence and capabilities for maintaining Health and Hygiene.
3. Analyse various problems in life, family,Society and in handling problems with Sustainable Solutions.
4. Apply values to their own self in different day-to-day settings in real life and in handling problems with sustainable solutions.
5. Adopt the value of appreciation and aspiration for excellence and gratitude for all.

UNIT-I	04 Hours	Teaching Hours	Tutorial Hours
Introduction to Value Education: Right Understanding; Relationship and Physical Facility; Understanding Value Education; Self-exploration as the Process for Value Education, Continuous Happiness and Prosperity -the Basic Human Aspiration-Current Scenario and Method to Fulfill the Basic Human Aspirations.		04	00

UNIT-2	04 Hours	Teaching Hours	Tutorial Hours
Harmony in the Human Being: Understanding Human being as the Co-existence of the Self and the Body, distinguishing between the Needs of the Self and the Body, The Body as an Instrument of the Self, Understanding Harmony in the Self, Harmony of the Self with the Body, Programme to ensure self-regulation and Health.		04	00

UNIT-3	04 Hours	Teaching Hours	Tutorial Hours
Harmony in the Family and Society and Nature: Harmony in the Family – the Basic Unit of Human Interaction; 'Trust' – the Foundational Value in Relationship; 'Respect' – as the Right Evaluation: Other Feelings, Justice in Human-to-Human Relationship; Understanding Harmony in the Society; Vision for the Universal Human Order; Understanding Harmony in the Nature; Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature.		04	00

UNIT-4	03 Hours	Teaching Hours	Tutorial Hours
Implications of the Holistic Understanding – a Look at Professional Ethics: Definitiveness of (Ethical) Human Conduct; A Basis for Humanistic Education, Humanistic Constitution and		03	00

HoD

Universal Human Order; Competence in Professional Ethics; Holistic Technologies, Production Systems and Management Models; Strategies for Transition towards Value-based Life and Profession		

Text Books:

Reference Books:

1. A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria,2 nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034- 47-1
2. Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2 nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93- 87034- 53-2
3. JeevanVidya: EkParichaya, A Nagaraj, JeevanVidyaPrakashan, Amarkantak, 1999.
4. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
5. The Story of Stuff (Book).
6. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi.
7. Small is Beautiful - E. F Schumacher.
8. Slow is Beautiful - Cecile Andrews.
9. Economy of Permanence - J C Kumarappa
10. Bharat Mein Angreji Raj – Pandit Sunderlal.
11. Rediscovering India - by Dharampal.
12. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
13. India Wins Freedom - Maulana Abdul Kalam Azad
14. Vivekananda - Romain Rolland (English)
15. Gandhi - Romain Rolland (English)

HoD

System Administration Laboratory [21UIS412L]

1. Installation of Operating Systems in both Windows and Linux Platforms
2. Installation of Applications/Utility Softwares, Devices, and Anti-viruses
3. File Management
4. User Management
5. Firewall Configuration and Management
6. TCP/IP Networking and Connecting to the Internet
7. Cross Platform File sharing
8. Configure FTP on Linux Server. Transfer files to demonstrate the working of the same
9. Installation and Configuration of Web Server
10. Installation and Configuration of Telnet Server

HoD

<center>**21UIS413I: Internship**</center>

Topics covered during Internship in Information Science and Engineering: Advanced computer skills.

Week 1: First week all students of ISE have undergone the Internship in the department.

Day 1:	Mail Merge in MS Excel and MS Word processing
Day 2:	Fillable forms in MS Word.
Day 3:	Using Animations, charts, graphs in MS Power Point Presentations.
Day 4:	Working with Data Sheets, generate various charts in MS Excel
Day 5:	Working with Google forms, Canva. A test was conducted on the various topics learnt. The students were asked to upload the work done in Google classroom.

Week 2: Inter Department Internship:

The students of ISE have undergone the Internship in other departments. Students were given the choices to select the departments.

Week 2: Inter Department Internship:

The students of ISE have undergone the Internship in other departments. Students were given the choices to select the departments.

HoD

Subject Title	:	Samskruthika Kannada	
Subject Code	:	21UHS422C	
Semester	:	3	
Credits with LTP Structure	:	1 Credits (1L--0T-0P)	
Lecture Hours per Week	:	1 Hours	
Tutorial Hours per Week	:	0 Hours	
Total Contact Hours	:	15 (15 Teaching Hours + 00 Tutorial Hours)	

೧. ವಿದ್ಯಾರ್ಥಿಗಳು ಬೌದ್ಧಿಕವಾಗಿ ಬೆಳೆಯುವುದರೊಂದಿಗೆ ನಮ್ಮ ನಾಡಿನ ಮತ್ತುದೇಶದ ಸಾಂಸ್ಕೃತಿಕ ವಾರಸುದಾರರಾಗಿ ಬೆಳೆದು ಸ್ವಾವಲಂಬಿಯಾಗಿ ಬದುಕು ಕಟ್ಟಿಕೊಳ್ಳುತ್ತಾರೆ.

೨. ಕನ್ನಡ ಭಾಷೆಯನ್ನು ಸಮರ್ಥವಾಗಿ ಮಾತನಾಡುವುದರೊಂದಿಗೆ, ಅನ್ಯರನ್ನು ಅರ್ಥೈಸಿಕೊಳ್ಳುವ ಮನೋಬಲ ಬೆಳೆಸಿಕೊಳ್ಳುತ್ತಾನೆ. ಇವತ್ತಿನ ಸಂಕೀರ್ಣವಾದ ಸಾಮಾಜಿಕ ವ್ಯವಸ್ಥೆಯಲ್ಲಿ ಸೌಹಾರ್ದಯುತವಾದ ನಡುವಳಿಕೆಯೊಂದಿಗೆ ಸಂಪನ್ಮೂಲ ವ್ಯಕ್ತಿಯಾಗಿ ರೂಪುಗೊಳ್ಳುತ್ತಾನೆ.

೩. ಜಾಗತಿಕರಣದ ಸಂದರ್ಭದಲ್ಲಿ ವಿದ್ಯಾರ್ಥಿಗಳು ಸ್ವತಂತ್ರ ವಾಗಿಆಲೋಚಿಸುವ, ಸ್ವತಂತ್ರವಾಗಿ ಬರೆಯುವ, ಸ್ವತಂತ್ರವಾಗಿ ಚಿಂತನಶೀಲರಾಗುವ ಸಾಮರ್ಥ್ಯವನ್ನು ಪಡೆದು, ಸಮಯೋಚಿತವಾಗಿ ಸೂಕ್ತ ನಿರ್ಧಾರಗಳನ್ನು ಕೈಗೊಳ್ಳುವಲ್ಲಿ ಈ ಅಧ್ಯಯನ ದೀಪಸ್ಥಂಬವಾಗಿದೆ.

೪. ವಿದ್ಯಾರ್ಥಿಗಳು ಇಂದಿನ ಜಾಗತಿಕ ವಿದ್ಯಮಾನಗಳನ್ನು ಅರ್ಥೈಸಿಕೊಂಡು, ಸಮಾಜದಲ್ಲಿ ಸಂಘಜೀವಿಯಾಗಿ ಬೆಳೆಯುವ ಮನೋಬಲವನ್ನು ಮತ್ತುಆತ್ಮಸ್ಥೈರ್ಯವನ್ನುತುಂಬುವಲ್ಲಿ ಈ ಅಧ್ಯಯನ ಸೂಕ್ತವಾದ ಮಾರ್ಗದರ್ಶಿಕೆಯಾಗಿದೆ.

೫. ತನ್ನ ಅಸ್ಮಿತೆಯ ಹುಡುಕಾಟದಲ್ಲಿರುವ ವ್ಯಕ್ತಿಗೆ, ಅದು ಈ ನೆಲದ ಸ್ವಾಭಿಮಾನ, ಭಾತೃತ್ವ, ಪ್ರೀತಿ, ಸೌಹಾರ್ದಯುತವಾದ ಮನಸ್ಸುಗಳಲ್ಲಿ ಇದೆಂಬುದನ್ನು ವಿದ್ಯಾರ್ಥಿಗಳ ಅರಿತಕ್ಷರತ್ತದೆ. ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಪರಿಸರ ಪ್ರಜ್ಞೆಯನ್ನು ಜಾಗೃತಗೊಳಿಸಿ, ದೈವಸೃಷ್ಟಿಯಾದ ಈ ಅಮೂಲ್ಯ ಸಂಪತ್ತನ್ನು ಹಿತ-ಮಿತವಾಗಿ ಬಳಸಿಕೊಂಡು ಮುಂದಿನ ತಲೆಮಾರಿಗೆಅದನ್ನು ಬಳುವಳಿಯಾಗಿ ಬಿಟ್ಟುಹೋಗುವಲ್ಲಿಜಾಗೃತನಾಗುತ್ತಾನೆ.

ಭಾಗ-ಖ	೦೪ ಊಠಐಣಡಿ	**Teaching Hours**	**Tutorial Hours**
೧. ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿ : ಹಂಪ ನಾಗರಾಜಯ್ಯ ೨. ಕರ್ನಾಟಕದ ಏಕೀಕರಣ : ಒಂದು ಅಪೂರ್ವ ಚರಿತ್ರೆ - ಜಿ. ವೆಂಕಟಸುಬ್ಬಯ್ಯ ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ - ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶಮತ್ತುಪ್ರೊ. ವಿ. ಕೇಶವಮೂರ್ತಿ		**04**	**00**

ಭಾಗ-ಖಖ	04 Hours	**Teaching Hours**	**Tutorial Hours**
೧. ವಚನಗಳು :ಜೇಡರದಾಸಿಮಯ್ಯ,ಬಸವಣ್ಣ, ಅಕ್ಕಮಹಾದೇವಿ,ಅಲ್ಲಮಪ್ರಭು,ಆಯ್ದಕ್ಕಿಲಕ್ಕಮ್ಮ, ೨. ಕೀರ್ತನೆಗಳು : ತಲ್ಲಣಿಸದಿರು ಕಂಡ್ಯ ತಾಳು ಮನವೆ - ಕನಕದಾಸ ೩. ತತ್ವಪದಗಳು : ಸಾವಿರ ಕೊಡಗಳ ಸುಟ್ಟು - ಶಿಶುನಾಳ ಷರೀಫ 4. ಜನಪದ ಗೀತೆ : ಬೀಸುವ ಪದ		**04**	**00**

ಭಾಗ-ಖಖಖ	04 Hours	**Teaching Hours**	**Tutorial Hours**
೧. ಮಂಕುತಿಮ್ಮನ ಕಗ್ಗ : ಡಿ.ವಿ.ಜಿ. ೨. ಕುರುಡು ಕಾಂಚಾಣಾ : ದ.ರಾ. ಬೇಂದ್ರೆ		**04**	**00**

HoD

		Teaching Hours	Tutorial Hours
೩. ಹೊಸಬಾಳಿನಗೀತೆ: ಕುವೆಂಪು 4. ಚೋಮನಮಕ್ಕಳಹಾಡು : ಸಿದ್ದಲಿಂಗಯ್ಯ ಆಮರಈಮರ : ಚಂದ್ರಶೇಖರಕಂಬಾರ			
ಭಾಗ-ಖಗಿ **03 Hours**			
೧. ಡಾ. ಸರ್ ಎಂ ವಿಶ್ವೇಶ್ವರಯ್ಯ – ವ್ಯಕ್ತಿ ಮತ್ತು ಇತಿಹ್ಯ :ಎ ಎನ್ ಮೂರ್ತಿರಾವ್ ೨. ಕರಕುಶಲ ಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ : ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ 'ಕ' ಮತ್ತು 'ಬ' ಬರಹ ತಂತ್ರಾಂಶಗಳುಮತ್ತುಕನ್ನಡದ ಟೈಪಿಂಗ್		**03**	**00**

೧. ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ (ಸಂ), ಡಾ.ಹಿ.ಚಿ.ಬೋರಲಿಂಗಯ್ಯ & ಡಾ.ಎಲ್.ತಿಮ್ಮೇಶ, ಕಡಿಖಿಚಿಡಿಚಿಟಿರಿಚಿ ಗಿಖಿಗಿ, ಚಿಜಟಚಿರಿಚಿತು, ಎಚಿಡಿಟಿಚಿಣಚಿಇಾಚಿ, ೨೦೨೦.

HoD

Subject Title	:	**Balake Kannada**
Subject Code	:	21UHS423C
Semester	:	3
Credits with LTP Structure	:	1 Credits (1L--0T-0P)
Lecture Hours per Week	:	1 Hours
Tutorial Hours per Week	:	0 Hours
Total Contact Hours	:	15 (15 Teaching Hours + 00 Tutorial Hours)

Course Outcomes:

After completing the course the student will be able to:

೧. ವಿದ್ಯಾರ್ಥಿಗಳು ಕನ್ನಡ ಭಾಷೆಯನ್ನು ಸುಲಭವಾಗಿ ಅರ್ಥೈಸಿಕೊಂಡು, ಸಾಮಾಜಿಕವಾಗಿ, ಆರ್ಥಿಕವಾಗಿಆಯಾ ಪ್ರದೇಶದಜನರೊಂದಿಗೆಅನ್ಯೋನ್ಯವಾಗಿ ವ್ಯವಹರಿಸುತ್ತರೆ.

೨. ಈ ಪಠ್ಯಾಧ್ಯಯನದಿಂದ ವಿದ್ಯಾರ್ಥಿಯಆಯಾ ಪ್ರದೇಶಗಳ ನಂಬಿಕೆ, ಸಂಪ್ರದಾಯ ಮತ್ತು ಆಚರಣೆಗಳನ್ನು ಸುಲಭವಾಗಿ ಅರ್ಥಮಾಡಿಕೊಳ್ಳಲು ಸಾಧ್ಯವಾಗುತ್ತದೆ.

೩. ಕನ್ನಡ ಸಂಖ್ಯೆಗಳ ಪರಿಕಲ್ಪನೆಯಿಂದ ವಿದ್ಯಾರ್ಥಿಯು ವಾಣಿಜ್ಯ ವ್ಯವಹಾರಗಳನ್ನು ಸುಲಭವಾಗಿ ನೆರೆವೇರಿಸಲು ಸಾಧ್ಯವಾಗುತ್ತದೆ.

೪. ಹಂತಹಂತವಾಗಿ ವಿದ್ಯಾರ್ಥಿಯು ಕನ್ನಡ ಭಾಷೆಯಲ್ಲಿ ಬರವಣಿಗೆಯಕಲೆಯನ್ನು ಮತ್ತುಓದುವಕಲೆಯನ್ನು ಬೆಳೆಸಿಕೊಳ್ಳುತ್ತಾನೆ.

5. ಈ ಭಾಷೆಯ ಸಂಪರ್ಕದಿಂದಾಗಿ ವಿದ್ಯಾರ್ಥಿಯು ಕನ್ನಡ ಸಾಹಿತ್ಯ ಪ್ರಕಾರಗಳಾದ ಕತೆ, ಕವನ, ಕಾದಂಬರಿ, ನಾಟಕ ಮುಂತಾದ ಕ್ಷೇತ್ರಗಳಲ್ಲಿ ತನ್ನ ಅಭಿರುಚಿಯನ್ನು ಹೆಚ್ಚಿಸಿಕೊಳ್ಳುತ್ತಾನೆ

UNIT – I	**04 Hours**	**Teaching Hours**	**Tutorial Hours**
- Necessity of learning a local language: - Tips to learn the language with easy methods. - Easy learning of a Kannada Language: A few tips - Hints for correct and polite conservation - Key to Transcription **Lessons to teach and Learn kannada Language** 1. ವೈಯಕ್ತಿಕ,ಸ್ವಾಮ್ಯಸೂಚಕ/ಸಂಬಂಧಿತಸರ್ವನಾಮಗಳುಮತ್ತುಪ್ರಶ್ನಾ ರ್ಥಕಪದಗಳು – Personalpronouns, possessive Forms, Interrogative words 2.ನಾಮಪದಗಳಸಂಬಂಧಾರ್ಥಕರೂಪಗಳು, ಸಂದೇಹಾಸ್ಪದಪ್ರಶ್ನೆಗಳು ಮತ್ತುಸಂಬಂಧವಾಚಕನಾಮಪದಗಳು – Possessive forms of nouns, dubitive question and Relative nouns 3 ಗುಣ,ಪರಿಮಾಣಮತ್ತುವರ್ಣಬಣ್ಣವಿಶೇಷಣಗಳು, ಸಂಖ್ಯಾವಾಚಕಗಳು – Qualitative,Quantitative and Colour Adjectives, Numerals		**04**	**00**

UNIT – II	04 Hours	Teaching Hours	Tutorial Hours
1. ಸಂಖ್ಯಾಗುಣವಾಚಕಗಳುಮತ್ತುಬಹುವಚನನಾಮರೂಪಗಳು – Ordinal numerals and piural markers 2. ನ್ಯೂನ / ನಿಷೇಧಾರ್ಥಕಕ್ರಿಯಾಪದಗಳುಮತ್ತುವರ್ಣಗುಣವಾಚಕಗಳು – Defective/Negative Verbs and Colour Adjectives ಅಪ್ಪಣೆ / ಒಪ್ಪಿಗೆ, ನಿರ್ದೇಶನ, ಪ್ರೋತ್ಸಾಹಮತ್ತುಒತ್ತಾಯಅರ್ಥರೂಪಪದಗಳುಮತ್ತು 3. ವಾಕ್ಯಗಳು Permission, Commands, encouraging and Urging words (Imparative words and sentences) 4. ಹೋಲಿಕೆ (ತರತಮ), ಸಂಬಂಧಸೂಚಕಮತ್ತುವಸ್ತುಸೂಚಕಪ್ರತ್ಯಯಗಳುಮತ್ತುನಿಷೇಧಾರ್ಥಕ ಪದಗಳ ಬಳಕೆ – Comparitive, Rilation ship, identification and Negation words		04	00

UNIT – III	04 Hours	Teaching Hours	Tutorial Hours
1. ಕಾಲಮತ್ತುಸಮಯದಹಾಗೂಕ್ರಿಯಾಪದಗಳವಿವಿದಪ್ರಕಾರಗಳು – Different types of forms of Tense, Time and Verbs 2. ಸಂಭಾಷಣೆಯಲ್ಲಿದಿನೋಪಯೋಗಿಕನ್ನಡಪದಗಳು – Kannada words in Conversation 3. ಕರ್ನಾಟಕರಾಜ್ಯಮತ್ತುರಾಜ್ಯದಬಗ್ಗೆಕುರಿತಾದಇತರೆಮಾಹಿತಿಗಳು 4. ಭಾಷೆಕಲಿಯಲುಏನನ್ನುಮಾಡಬೇಕುಮತ್ತುಮಾಡಬಾರದು – Do's and don'ts in learning language		04	00

UNIT – IV	03 Hours	Teaching Hours	Tutorial Hours
1. Kannada language script part – 1 2. Kannada language script part – 1		03	00

Text Books:
1. **"BaLake Kannada"** - Author : Dr. L Thimmesha Published by Prasaranga, Visvesvaraya Technological University, Belagavi, Karnataka.

HoD

Subject Title	:	Data Science using Python
Subject code	:	UIS047E
Semester	:	5
Credits with LTP Structure	:	3 Credits (3L-0T-0P)
Lecture Hours per Week	:	3 Hours
Tutorial Hours per Week	:	0 Hours
Total Contact Hours	:	40 (40 Teaching Hours + 00 Tutorial Hours)

Course Outcomes:

After completing the course the student will be able to:

1. Comprehend fundamental concepts of data science along with its relation with other disciplines and skills needed for it.
2. Apply computational thinking and data pre-processing techniques of data analysis.
3. Use data analytical techniques and tools necessary to generate useful information from datasets.
4. Solve linear regression problems using linear modelling and gradient descent approaches.
5. Apply supervised machine learning methods for classification and unsupervised machine learning methods for clustering.
6. Apply data collection and evaluation skills in data science and machine learning.

UNIT - I	10 Hours	Teaching Hours	Tutorial Hours
Introduction: Data Science, Applications of data science, Data science related to other field, Relationship between data science and Information science, Computational thinking, Skills for data science, Tools for data science, Issues of Ethics, Bias, and Privacy in Data Science **Data:** Introduction, Data types: Structured Data, Unstructured Data, Challenges with Unstructured Data. Data Collections: Open Data, Social Media Data, Multimodal Data, Data Storage and Presentation.Data Pre-processing: Data Cleaning, Data Integration, Data Transformation, Data Reduction, Data Discretization.		**10**	**00**

UNIT - II	10 Hours	Teaching Hours	Tutorial Hours
Techniques: Introduction, Data Analysis and Data Analytics, Descriptive Analysis, Variables, frequency Distribution, Measures of Centrality, Dispersion of a Distribution, Diagnostic Analytics, Correlations, Predictive Analytics, Prescriptive Analytics, Exploratory Analysis, Mechanistic Analysis, Regression. **Tools for data science: Python:** Introduction, Getting Access to Python, Download and Install Python, Running Python through Console, Using Python through Integrated Development Environment (IDE) , Basic Examples, Control Structures, Statistics Essentials, Importing Data, Plotting the Data, Correlation , Linear Regression, Multiple Linear Regression.		**10**	**00**

HoD

UNIT - III	10 Hours	Teaching Hours	Tutorial Hours
Machine Learning Introduction and Regression: Introduction, Machine Learning, Regression, Gradient Descent **Supervised Learning:** Introduction, Logistic Regression, Classification with kNN, Naïve Bayes **Tools for data science: Python:**Introduction to Machine Learning, Classification (Supervised Learning)		10	00

UNIT - IV	10 Hours	Teaching Hours	Tutorial Hours
Unsupervised learning: Introduction, Agglomerative Clustering, Introduction to Reinforcement Learning **Tools for data science: Python:** Clustering (Unsupervised Learning) **Data Collection, Experimentation, and Evaluation**: Introduction, Data Collection Methods: Surveys, Survey Question Types, Survey Audience, SurveyServices, Analyzing Survey Data , Pros and Cons of Surveys, Interviews and Focus Groups, Why Doan Interview? Why Focus Groups? Interview or Focus Group Procedure, Analyzing Interview Data ,Pros and Cons of Interviews and Focus Groups, Log and Diary Data, User Studies in Lab and Field,Picking Data Collection and Analysis Methods: Introduction to Quantitative Methods, Introduction toQualitative Methods , Mixed Method Studies, Evaluation: Comparing Models, Cross-Validation.		10	00

Text Books:

1. A hands-on introduction to Data Science, Chirag Shah, Cambridge University Press, 2020.
    Unit1: Chapter 1, 2
    Unit 2: Chapter 3, 5.1,5.2,5.3,5.4,5.5
    Unit 3: Chapter 8, 9.1,9.2,9.4,9.7,5.6.1,5.6.2
    Unit 4: Chapter 10.2,10.5,5.6.3, 12

Reference Books:

1. Data Science from Scratch, Joel Grus, O'Rielly Publications, 2015.
2. 2) Introduction to Data Science, Laura Igual and Santi Segui, Springer International Publications, 2017.

HoD

Subject Title	:	Database Management
Subject Code	:	UIS002N
Semester	:	6
Credits with LTP Structure	:	3 Credits (3L-0T-0P)
Lecture Hours per Week	:	3 Hours
Tutorial Hours per Week	:	0 Hours
Total Contact Hours	:	40 (40 Teaching Hours + 00 Tutorial Hours)

Course Outcomes:

After completing the course the student will be able to:

1. Comprehend the fundamentals of DBMS concepts, its applications etc.
2. Identify entities, attributes, relationships between entities, their type etc., and draw the ER diagram for a given small problem.
3. Normalise the relations up to 3NF/BCNF and Design a relational schema.
4. Use SQL commands and constructs to create, update and retrieve data from tables.
5. Understand the concepts of transaction processing.
6. Learn various recovery algorithms.

Unit –I	10 Hours	Teaching Hours	Tutorial Hours
INTRODUCTION: Characteristicsofdatabaseapproach;AdvantagesofusingDBMSapproach; Usage of DBMS. Data models, schemas and instances; Three-schema architectureanddataindependence;Databaselanguagesandinterfaces;Thedatabase systemenvironment;Centralizedandclient-serverarchitectures;ClassificationofDatabaseManagementsystems. **ENTITY-RELATIONSHIP MODEL**: Using High-Level Conceptual Data Models for DatabaseDesign;Anexample databaseapplication;Entity types,Entitysets,AttributesandKeys;Relationshiptypes, Relationship sets, RolesandStructural constraints; Weakentitytypes;Refining the ER Design; ER Diagrams, Naming conventions and design issues.		10	00

Unit –II	10 Hours	Teaching Hours	Tutorial Hours
RELATIONALMODEL AND RELATIONAL DATABASE CONSTRAINTS: Relational model concepts; Relational modelconstraints and Relational database schemas; Update operations, Transaction and dealing with constraint violations. **DATABASEDESIGN**:Informaldesignguidelinesforrelationschemas;Functional dependencies; Normal forms based on primary keys; General definitions of second and thirdnormalforms; Boyce-CoddNormalForm.		10	00

HoD

Unit -III	10 Hours	Teaching Hours	Tutorial Hours
SQL: data definition and data types; Specifying basic constraints in SQL; Schema changestatements in SQL; Basic queries in SQL; More complex SQL queries. Insert, Delete and Update statements in SQL; Specifying constraintsas Assertion and Trigger; Views(Virtual Tables) inSQL;		10	00
Unit-IV	10 Hours	Teaching Hours	Tutorial Hours
TRANSACTION MANAGEMENT: Introduction to transaction processing; Transaction &system concepts; Desirable properties of transactions; Characterizing schedules based onrecoverability; Characterizing schedules based on serializability; Transaction support in SQL; Transaction Controlin SQL. **RECOVERY ALGORITHMS:**		10	00

Text Book(s):

1. FundamentalsofDatabaseSystems", RemezElmasri&ShamkantB.Navathe, 5ᵗʰEdition, Pearson Education

Reference Books:

1. DatabaseManagementSystems", RamakrishananGehrke3ʳᵈedition,   McGraw-HillHigherEducation;
2. "AnIntroductiontoDatabase systems", C. J.Date, AddisonWesley, 4ᵗʰedition.

Subject Title	:	Advanced Java Programming
Subject code	:	UIS048E
Semester	:	6
Credits with LTP Structure	:	3 Credits (3L-0T-0P)
Lecture Hours per Week	:	3 Hours
Tutorial Hours per Week	:	0 Hours
Total Contact Hours	:	40 (40 Teaching Hours + 00 Tutorial Hours)

Course Outcomes:
After completing the course the student will be able to:
1. Build Java applets for solving given problems.
2. Use Java applets for event handling.
3. Implement J2EE applications using Java servlets.
4. Apply the concept of database connectivity using java applications.
5. Deploy enterprise web applications using JSP.

UNIT - I	10 Hours	Teaching Hours	Tutorial Hours
Applets and Event Handling **The Applet Class:** Two types of Applets, Applet basics, Applet Architecture, An Applet skeleton, Simple Applet display methods, Requesting repainting, The HTML'APPLET' tag, Passing parameters to Applets. **Event Handling:** Two Event Handling Mechanisms, The Delegation Event Model, Event Classes, Sources of Events, Event Listener Interfaces, Using the Delegation Event Model		10	00

UNIT - II	10 Hours	Teaching Hours	Tutorial Hours
Java2 Enterprise Edition and Servlets **Java2 Enterprise Edition(J2EE) Overview:** J2EE and J2SE, The Birth of J2EE, Databases, The maturing of Java, Java beans and java message service, need for J2EE. **Multi-Tier architecture**: Distributive Systems, The tier, J2EE multitier architecture. **Servlets**: Java Servlets and Common Gateway Interface Programming, A Simple Java Servlet. Anatomy of a Java Servlet, Reading data from a client, Reading HTTP request headers, Sending data to a client and Writing the HTTP response header, Working with Cookies, Tracking Sessions.		10	00

UNIT - III	10 Hours	Teaching Hours	Tutorial Hours
JDBC and Embedded SQL **JDBC Objects:** The concepts of JDBC, JDBC Drivers Types, JDBC Packages, A brief overview of the JDBC Process, Database connection, Statement Objects, ResultSet, Transaction Processing,		10	00

HoD

Metadata, Data Types, Exceptions **JDBC and Embedded SQL**: Model programs, Tables, Inserting data into tables, Selecting data from a table, Updating tables, Deleting data from a table.			
UNIT - IV	**10 Hours**	**Teaching Hours**	**Tutorial Hours**
Java Server Pages (JSP) **JSP Syntax and semantics**: JSP Overview**,** The JSP Development model, Components of JSP Page, A complete example, Expressions, Scriptlets and Declarations: Expressions, Scriptlets, and Declarations. **Request dispatching:** Anatomy of request processing, Including other resources, The include directive, The <jsp:include> action, Method to be used, Forwarding requests.		**10**	**00**

Text Books:

1. The Complete Reference -Java, Herbert Schildt, 7th edition, McGraw Hill Publication.(Chapters 21,22)

2. The Complete Reference –J2EE, Jim Keogh, McGraw Hill Publication.(Chapters 1, 2, 6, 7, 10)

3. The Complete Reference –JSP 2.0, Phil Hanna, McGraw Hill Publication.(Chapters 4, 5, 6, 7)

Reference Books:

1. Java 6 Programming Black Book, Dreamtech Press. 2007.

2. Core servlets and Java Server Pages, Marty Hall, Larry Brown, Volume 1: Core Technologies, Second Edition.

HoD

Subject Title	:	Internet of Things
Subject Code	:	UIS045E
Semester	:	7
Credits with LTP Structure	:	3 Credits (3L-0T-0P)
Lecture Hours per Week	:	3 Hours
Tutorial Hours per Week	:	0 Hours
Total Contact Hours	:	40 (40 Teaching Hours + 00 Tutorial Hours)

Course Outcomes:

After completing the course the student will be able to:
1. Comprehend the fundamentals of IoT.
2. Identify the challenges driving the architectures of IoT systems.
3. Identify design limitations and the role of IoT networks.
4. Analyze the data generated with IoT devices.
5. Use appropriate physical IoT devices to implement an application.
6. Design solutions to open ended problems using IoT.

UNIT –I	10 Hours	Teaching Hours	Tutorial Hours
Introduction to IoT: What is IoT? Genesis of IoT, IoT and Digitization, IoT Impact, Convergence of IT and IoT, IoT Challenges, IoTNetwork Architecture and Design: Drivers Behind New Network Architectures, Comparing IoTArchitectures, ASimplifiedIoTArchitecture,TheCoreIoTFunctionalStack,IoT Data Management and Compute Stack.		10	00

UNIT –II	10 Hours	Teaching Hours	Tutorial Hours
Smart Objects: The "Things" in IoT, Sensors, Actuators, and Smart Objects, Sensor Networks,Connecting Smart Objects: Communications Criteria, IoT Access Technologies: Salient features ofprotocolstacksutilizingIEEE 802.15.4(Intd.): Zigbee Protocol, LoRaWAN		10	00

UNIT -III	10 Hours	Teaching Hours	Tutorial Hours
IP as the IoT Network Layer: The Business Case for IP, the need for Optimization, Optimizing IP for IoT, Application Protocols for IoT: The Transport Layer, IoT Application Transport Methods: CoAP, MQTT Data and Analytics for IoT: An Introduction to Data Analytics for IoT, Machine Learning, Big Data Analytics Tools and Technology, Edge Streaming Analytics, Network Analytics.		10	00

UNIT-IV	10 Hours	Teaching Hours	Tutorial Hours
Securing IoT: A Brief History of OT Security, Common Challenges in OT Security, How IT and OT Security Practices and Systems Vary, Formal Risk Analysis Structures: OCTAVEandFAIR, The Phased Application of Security in an Operational Environment. IoT Physical Devices and Endpoints-Arduino UNO: Introduction to Arduino, Installing Software,		10	00

HoD

Fundamentals of Arduino Programming, Example Modules on Arduino: Blinking an LED, Toggle the state of LED using Switch, Traffic light simulation for pedestrians, Interfacing Sensors to the Arduino: Temperature Sensor, Light Sensor, Ultrasonic Sensor, Interfacing Displays to Arduino: 7 Segment Display.

Text Book(s):

1. DavidHanes,GonzaloSalgueiro,PatrickGrossetete,RobertBarton,JeromeHenry,"IoTFundamentals:Networking Technologies, Protocols, and Use Cases for the Internet of Things", Edition, Pearson Education(CiscoPressIndian Reprint). (ISBN:978- 9386873743)
2. SrinivasaKG,"InternetofThings",CENGAGELeaningIndia,2017

Reference Books:

1. VijayMadisettiandArshdeepBahga,"InternetofThings(AHands-on- Approach)", 1ˢᵗ Edition, VPT, 2014. (ISBN:978-8173719547)
2. RajKamal,"InternetofThings:ArchitectureandDesignPrinciples",1ˢᵗEdition,McGrawHillEducation,2017.(ISBN:978-9352605224)

HoD

Subject Title	:	Data Mining
Subject code	:	**UIS731N**
Semester	:	**7**
Credits with LTP Structure	:	**3 Credits (4L-0P-0T)**
Lecture Hours per Week	:	**3 Hours**
Tutorial Hours per Week	:	**00**
Total Contact Hours	:	**40 (40 Teaching Hours + 00 Tutorial Hours)**
Pre-requisites:	:	**Nil**
Who can register	:	**Students from Any discipline**

Course Objectives:
- To introduce the concepts of Data Mining.
- To learn the data preprocessing.
- To learn and apply various Data Mining algorithms.
- To know the advanced applications of Data Mining.

Course Outcomes:

After Completion of the course the student will be able to:

CO1: Display a comprehensive understanding of Data mining, its role and importance in present scenario.

CO2: Apply various data preprocessing techniques to prepare the given raw input data, assess it and provide suitable data for a range of data mining algorithms.

CO3: Discover useful and interesting associations between various types of items in transactional data using association mining algorithms.

CO4: Apply classification algorithms to real time data.

CO5: Find and evaluate clusters in given real time data and find useful patterns.

CO6: Select and apply proper data mining algorithms to real time applications.

UNIT - I	10 Hours	Teaching Hours	Tutorial Hours
Introduction to data mining: Definition of Data Mining, Motivating Challenges of DM, Data Mining Tasks. Data Preprocessing: Data Attributes, Types of Data, Quality of Data and Data Preprocessing, Measures of Similarity and Dissimilarity.		10	0

UNIT - II	10 Hours	Teaching Hours	Tutorial Hours
Association Analysis: Definition of Association Analysis, Frequent Item Set Generation, Rule Generation, Compact Representation of Frequent Item Sets. FP Growth Algorithms, Evaluation of Association Patterns		10	0

UNIT - III	10 Hours	Teaching Hours	Tutorial Hours
Classification: Preliminaries, Decision Tree Based Classifier, Nearest Neighbor Classifier.		10	0

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Cluster Analysis: Overview, K-means, DBSCAN			
UNIT - IV	**10 Hours**	**Teaching Hours**	**Tutorial Hours**
Applications: Data Mining Applications, Web Mining, Search Engines		10	0

Text Books:

1. "Introduction to Data Mining with Case Studies", G K Gupta, 3rd Edition, PHI. (Chapter 1,2,3,4,5, 6)

Reference Books:

1. Data Mining – Concepts and Techniques", Jiawei Han and Micheline Kamber, Morgan Kaufman, 2006, 2nd Edition.
2. "Introduction to Data Mining", Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Pearson Education.

HoD

Subject Title	:	NOSQL
Subject Code	:	UIS039E
Semester	:	8
Credits with LTP Structure	:	3 Credits (3L-0T-0P)
Lecture Hours per Week	:	3 Hours
Tutorial Hours per Week	:	0 Hours
Total Contact Hours	:	40 (40 Teaching Hours + 00 Tutorial Hours)

Course Outcomes:

After completing the course the student will be able to:
1. Explain and compare different types of NoSQL Databases.
2. Compare and contrast RDBMS with different NoSQL databases.
3. Demonstrate the detailed architecture and performance tune of Document-oriented NoSQL databases.
4. Explain performance tune of Key-Value Pair NoSQL Databases.
5. Apply NoSQL development tools on different types of NoSQL Databases.

UNIT –I	10 Hours	Teaching Hours	Tutorial Hours
What is NoSQL? Where is it used? What is it? Features of NoSQL. Types of NoSQL Databases. Why NoSQL? Advantages of NoSQL. The Value of Relational Databases, Getting at Persistent Data, Concurrency, Integration, Impedence Mismatch, Application and Integration Databases, Attack of the Cluster, The Emergence of NoSQL, Comparison of relational databases to NoSQL , Application, RDBMS approach, Challenges.		**10**	**00**

UNIT –II	10 Hours	Teaching Hours	Tutorial Hours
NoSQL key/value databases using MongoDB, Document Databases, Document oriented Database features, Consistency, Transactions, Avalability, Query Features, Scaling, Suitable Use Cases, Event Logging, Content Management Systems, Blogging Platforms, Web Analytics or Real-Time Analytics, E-Commerce Applications, Complex Transactions Spanning Different Operations, Queries against varying Aggregate structure. MongoDB Query Language		**10**	**00**

UNIT -III	10 Hours	Teaching Hours	Tutorial Hours
Column-oriented NoSQL databases using Apache Cassandra, Column-Family Data store features, Consistency, Transactions, Availability, Query Features, Scaling, Suitable use Cases, Event Logging, Content Management Systems, Blogging Platforms, Counters, Expiring Usage. Cassaandra Query Language Graph Databases. What is Graph Database. Features. Consistency, Transactions, Availability, Query Featur Dataes, Scaling. Suitable		**10**	**00**

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Use Cases.			
UNIT-IV	**10 Hours**	**Teaching Hours**	**Tutorial Hours**
Schema Migrations: Schema Changes, Schema Changes in RDMBS, Schema changes in a NoSQL Datastore, Polyglot Perstenence, Beyond NoSQL, Choosing Your Database		**10**	**00**

Text Book(s):

1. Sadalage.P & Fowler, NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persitence, Wiley Publications, 1ˢᵗ Edition, 2019
2. Getting Started with NoSQL: Your Guide to the world and Technology of NoSQL-Gaurav Vaish, Packt Publishing

Reference Books:

1. Seema Acharya and Subhashini Chellappan – Big Data and Analytics, Wiley India Pvt Ltd
2. Dan Sullivan, "NoSQL For Mere Mortals", 1ˢᵗ Edition, Pearson Education India, 2015. (ISBN-13:978-9332557338)
3. Dan McCreary and Ann Kelly, "Making Sense of NoSQL: A Guide for Managers and the Rest of us", 1ˢᵗ Edition, Manning Publication/Dreamtech Press 2013. (ISBN-13:978-9351192022)
4. https://www.geeksforgeeks.org/introdution-to-nosql
5. https://www.javapoint.com/nosql-databa

HoD

Syllabus for B.E III - Semester for academic year 2022 – 2023
(For students admitted to I year in 2021-22)

21UEE306C	Electronic Circuits	03 - Credits (3 : 0 : 0)
Hours/Week : 03		CIE Marks : 50
Total Hours : 40		SEE Marks : 50

UNIT – I	10 Hrs.

Diode Circuits: Introduction, clipping circuits, Clipping at two independent levels, Clamping Circuits, Comparators, Full wave rectifier with C filter.

Transistor Biasing: Introduction, Operating point, DC load line, Bias stability, voltage divider bias, Derivation of stability factors, Bias compensation.

UNIT – II	10 Hrs.

BJT Low Frequency Analysis: Introduction, two port devices. Hybrid model, transistor hybrid model. h - Parameters, Analysis of transistor amplifier circuit using h- parameters (CE amplifier only).

Multistage Amplifiers & Power Amplifier: Introduction, Classification of Amplifiers, , Frequency response of R-C coupled amplifier, Class A large signals amplifier, Transformer coupled power amplifier, Class B (Push pull) amplifiers.

Field Effect Transistor: Transfer characteristics of JFET, Important relationships, Depletion & Enhancement type MOSFETs.

UNIT – III	10 Hrs.

Basics of Op-Amps: Block diagram and characteristics of 741 Op-amp, Op-amp as an inverting and non- inverting amplifier, voltage follower, adder, subtractor, integrator and differentiator.

Signal Processing circuits: Precision half wave & full wave rectifiers, limiting circuits, clamping circuits, peak detectors, sample and hold circuits, Voltage regulators basics, voltage follower regulator, adjustable output regulator.

UNIT – IV	10 Hrs.

Applications of Op-Amps: Zero crossing detectors, inverting Schmitt trigger circuit, non-inverting Schmitt circuit. Astable multivibrator and mono-stable multivibrator using 555 timer, Phase shift oscillator, oscillator amplitude stabilization and Wein bridge oscillator.

Active filters: First and second order high pass and low pass filters, band stop and band pass filters.

Reference Books:

1. Jacob Milliman, Christos C. Halkias, Chetan D. Parikh, Integrated Electronics-Analog and Digital Circuits and Systems, 2ndEdition, Tata McGraw Hill Education Private Limited, New Delhi, 2015.
2. G. K. Mithall, Electronic Devices and Circuits, Khanna Publishers, New Delhi, 1998.
3. David A. Bell, "Operational Amplifier and Linear ICS", 3rdEdition, Oxford, 2012.
4. Robert L. Boylestad, Louis Nashelsky, Electronic Devices and Circuits Theory, 9thEdition, Pearson/Prentice Hall, India, 2006.
5. Ramakanth A. Gayakwad, "Operational Amplifier and Linear ICS", 4thEdition, PHI, 2016.
6. Jacob Millman, Arvin Grabel, Microelectronics, 2ndEdition, Tata McGraw Hill, New Delhi, 2003

Course Outcomes:

After completion of the course the students will be able to,

1. Design and analyze diode clipping, limiting and clamping circuits

2. Examine various transistor biasing circuits
3. Analyse BJT, MOSFETs, and multistage amplifiers
4. Design and analyse op-amp based feedback circuits and various applications of op amps

Course Outcomes - Programme Outcomes Mapping Table

Sl.	Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	21UEE306C.1	3	2	2									2	3	3	3
2	21UEE306C.2	3	2										2	2	3	3
3	21UEE306C.3	3		3		1			1		1		1	2	2	1
4	21UEE306C.4	3	3	3		1			1		1		2	2	2	1

Syllabus for B.E IV - Semester for academic year 2022 – 2023
(For students admitted to I year in 2021-22)

21UEE406C		**Logic Design**	03 - Credits (3 : 0 : 0)
Hours/Week : 03			CIE Marks : 50
Total Hours : 40			SEE Marks : 50

UNIT – I	10 Hrs.

Introduction: Introduction to Digital logic Design; Binary Systems and Codes: Binary Numbers, Octal and Hexadecimal Numbers; Number Base Conversions; Arithmetic Operation with different Bases; Complements. Signed Binary Numbers; Binary Codes and conversions: BCD, Gray, ASCII and EBCDIC. Binary Logic and Logic Gates: AND, OR and NOT.

UNIT – II	10 Hrs.

Boolean Algebra and Logic Gates: Basic Definition. Basic Theorems. Boolean Functions; Standard Forms: Minterm and Maxterm. Simplification of Boolean Functions using SOP and POS; Logic Operations: NAND, NOR, Exclusive-OR and Equivalence. Integrated Circuits
Gate-Level Minimization: The Map Method. Two- and Three-Variable Map. Four-Variable Map. Product of Sums Simplification. Don't-Care Conditions, logic gates implementation, determination and selection of Prime Implicants, Essential and Nonessential prime Implicants.

UNIT – III	10 Hrs.

Analysis and Synthesis of Combinational Circuits: Combinational Circuits. Analysis and Design Procedure; Binary Adders-Subtractor; Decoders and Multiplexers, Sequential Circuits, Latches.
Flip-Flops: RS, D, JK and T; Analysis of Clocked Sequential Circuits. Design Procedure, Registers and Counters: Registers. Shift Registers; Synchronous Counters. Ripple Counters.

UNIT – IV	10 Hrs.

Sequential Circuits with Programmable Logic Devices: Introduction, Random-Access Memory, Memory Decoding, Read-Only Memory. Programmable Logic Array.
Verilog: Introduction to Verilog, Verilog Structural and Behavioral Design, Verilog Time Dimension and Test Benches.

Reference Books:
1. Morris Mano, Charles R. Kime, Logic and computer design fundamentals, Pearson Prentice Hall, 2004
2. Basavaraj,B., Digital fundamentals, New Delhi : Vikas Publishing House, 1999.
3. Kandel Langholz, Digital Logic Design, Prentice Hall, 1988.
4. Rafiq uzzaman& Chandra, Modern Computer Architecture, West Pub. Comp., 1988.
5. Zvi. Kohavi, Switching and Finite Automata Theory, Tata McGraw Hill, India, 2004.
6. C. V. S. Rao, Switching and Logic Design, 3rd Edition , Pearson Education, India, 2009.
7. Donald D. Givone, Digital Principles and Design, Tata McGraw Hill, India, 2002.

Course Outcomes:
After completion of the course the students will be able to,
1. Simplify Boolean functions using various reduction algorithms
2. Design and implement variety of logical circuits using combinational logic
3. Design and implement variety of logical circuits using sequential logic
4. Model various Verilog descriptions to test and verify digital systems

Syllabus for B.E IV - Semester for academic year 2022 – 2023

(For students admitted to I year in 2021-22)

Course Outcomes - Programme Outcomes Mapping Table

Sl.	Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	21UEE406C.1	3	2	2									2	1	3	1
2	21UEE406C.2	3	2	3									3	1	3	1
3	21UEE406C.3	3		3	1	1					1		3	1	3	1
4	21UEE406C.4	3	3	3	1	1			1		1		2	1	3	1

Syllabus for B.E. VI - Semester for academic year 2022 – 2023

(For students admitted to I year in 2020-21)

UEE656N	Fundamentals of Wind Energy Conversion Systems	03 - Credits (3 : 0 : 0)
Hours/Week : 03		CIE Marks : 50
Total Hours : 40		SEE Marks : 50

UNIT – I	(10L-0T Hours)

Introduction: Historical Development (BC – 20th Century); Historical Development (20th Century – 1980s); Recent Developments (1980s – present); The Nature of the Wind, origin of wind; Wind Energy Potential; Offshore Wind Energy; Modern Wind Turbines; Wind Vs Conventional power generation.

UNIT – II	(10L-0T Hours)

Wind Resource Assessment: Introduction – Spatial variation, Time variation; Characteristics of steady wind; Weibull wind speed distribution function; Vertical profiles of steady wind; Wind rose; Energy content of wind; Resource assessment.

UNIT – III	(10L-0T Hours)

Aerodynamics: Introduction; Aerofoil – Two dimensional theory ,Relative wind velocity, Stall control; Wind flow models – Wind flow pattern; Axial momentum theory; Momentum theory for rotating wake; Blade element theory, Strip theory; Tip losses and correction; Wind Machine Characteristics.

UNIT – IV	(10L-0T Hours)

Wind Turbines: Introduction; Classification of Wind Turbines; Wind Turbine Components; Basic principles of wind energy extraction; Extraction of wind turbine power(Numerical problems)- Weibull distribution-Wind power generation curve-Betz's Law-Modes of wind power generation.

Reference Books:
1. Siraj Ahmed, Wind Energy- Theory and Practice, Prentice Hall of India, New Delhi,2010
2. D. P. Kothari, S. Umashankar, Wind Energy Systems and Applications, Narosa publishers,2017
3. Khan B. H., Non-Conventional Energy Resources, Tata McGraw Hill, 2009.

Course Outcomes

At the end of this course, students will be able to
1. list and define various parameters and features of wind energy conversion systems.
2. Explain various concepts and theory related to wind energy conversion systems.
3. Evaluate/calculate various parameters related to wind energy conversion systems.
4. Relate/articulate the concepts and theories related to wind energy conversion systems.

Course Outcomes - Programme Outcomes Mapping Table

Sl.	Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	UEE656N.1	3	1	1				1	1		1		1
2	UEE656N.2	3	1	1				2	1		1		1
3	UEE656N.3	3	2	1				2	1	1	1		1
4	UEE656N.4	3	3	3				2	1		1		2

UEE853E		03 - Credits (3 : 0 : 0)
Hours/Week : 03	**Smart Grid**	CIE Marks : 50
Total Hours :40		SEE Marks : 50

UNIT – I	(10LHours)

Smart Grid Architectural Designs: Introduction, Today's Grid versus the Smart Grid, Energy Independence and Security Act of 2007: Rationale for the Smart Grid, Computational Intelligence, Power System Enhancement, Communication and Standards, Environment and Economics, General View of the Smart Grid Market Drivers, Stakeholder Roles and Function, Working Definition of the Smart Grid Based on Performance Measures, Representative Architecture, Functions of Smart Grid Components.

Smart Grid Communications and Measurement Technology: Communication and Measurement, Monitoring, PMU, Smart Meters, and Measurements Technologies, GIS and Google Mapping Tools, Multiagent Systems (MAS) Technology, Microgrid and Smart Grid Comparison.

Performance Analysis Tools for Smart Grid Design: Introduction to Load Flow Studies, Challenges to Load Flow in Smart Grid and Weaknesses of the Present Load Flow Methods, Load, Flow State of the Art: Classical, Extended Formulations, and Algorithms, Congestion Management, Effect, Load Flow for Smart Grid Design, DSOPF Application to the Smart Grid.

UNIT – II	(10L Hours)

Network Theorems: Introduction to Stability, Strengths and Weaknesses of Existing Voltage Stability Analysis Tools, Voltage Stability Assessment, Voltage Stability Assessment Techniques, Voltage Stability Indexing, Analysis Techniques for Steady-State Voltage Stability Studies, Application and Implementation Plan of Voltage Stability, Optimizing Stability Constraint through Preventive Control of Voltage Stability, Angle Stability Assessment.

Computation Tools for Smart Grid: Introduction to Computational Tools, Decision Support Tools, Optimization Techniques, Classical Optimization Method, Heuristic Optimization, Evolutionary Computational Techniques, Pareto Method.

UNIT – III	(10L Hours)

Pathway for Designing Smart Grid:: Introduction to Smart Grid Pathway Design, Barriers and Solutions to Smart Grid Development, Solution Pathways for Designing Smart Grid Using Advanced Optimization and Control Techniques for Selection Functions, General Level Automation, Bulk Power Systems Automation of the Smart Grid at Transmission Level, Distribution System, Automation Requirement of the Power Grid, End User/Appliance Level of the Smart Grid, Applications for Adaptive Control and Optimization.

Renewable Energy and Storage: Renewable Energy Resources, Sustainable Energy Options for the Smart Grid, Penetration and Variability Issues Associated with Sustainable Energy Technology, Demand Response Issues, Electric Vehicles and Plug-in Hybrids, PHEV Technology, Environmental Implications, Storage Technologies, Tax Credits.

UNIT – IV	(10L Hours)

Interoperability, Standards, and Cyber Security: Introduction, Interoperability, Standards, Smart Grid Cyber Security, Cyber Security and Possible Operation for Improving Methodology for Other Users.

Research, Education, and Training for the Smart Grid: Introduction, Research Areas for Smart Grid Development, Research Activities in the Smart Grid, Multidisciplinary Research Activities, Smart Grid Education, Training and Professional Development.

Case Studies and Test beds for the Smart Grid:

Introduction, Demonstration Projects, Advanced Metering, Microgrid with Renewable Energy, Power System Unit Commitment (UC) Problem, ADP for Optimal Network Reconfiguration in Distribution Automation, Case Study of RER Integration, Testbeds and Benchmark Systems, Challenges of Smart Transmission, Benefits of Smart Transmission.

Reference Books:
1. James Momoh., "Smart Grid, Fundamentals of Design and Analysis", (1st Edition), Wiley, 2012.
2. Clark W Gellings, "The Smart Grid, Enabling Energy Efficiency and Demand Side Response"- CRC Press, 2009.
3. Yokoyama, Nick Jenkins, "Smart Grid: Technology and Applications"- Wiley, 2012.

Course Outcomes:

After completion of the course the students will be able to,
1. Identify the smart measuring instruments for two way communication of each components in grid.
2. Apply the suitable load flow analysis technique for exiting distribution system.
3. Evaluate the optimal value for distribution system including renewable energy and storage systems.
4. Formulate the existing distribution for the conversion to smartgrid using standards as for the case studies.

Course Outcomes - Programme Outcomes Mapping Table

Sl.	Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	UEE853E.1	3	1		1	3	1		1		2		1
2	UEE853E.2	3	2	1	1				1		1		1
3	UEE853E.3	3	3	2	2	1			1		1		1
4	UEE853E.4	3	2	3	2	1			1	1	1	1	2

HoD EE

1.2.1. New courses introduced across during the year 2022-23

Sl. No	Name of the Course	Course Code	Activities/Content with a direct bearing on Employability/ Entrepreneurship/ Skill development
1	Business and Legal Environment	22PBA202C	Environment scanning helps the students to venture into new opportunities
2	Research Methodology and IPR	22PBA204C	Research is a process of finding solutions to a problem after a thorough study & analysis of the situational factors
3	Entrepreneurship Development	22PBA205C	Impart basic entrepreneurial skills and understandings to run a business efficiently and effectively.

Head of the Department

Department of Management Studies
MBA Programme
Basaveshwar Engineering College
BAGALKOT-587 103

22PBA202C: BUSINESS & LEGAL ENVIRONMENT
03 CREDITS (3-0-0)

Course Objectives:
1. The objective of this course is to sensitize towards the overall business environment within which organization has to function.
2. To educate the students on the role of business in modern society with emphasis on significant relationship which exists between the business and different sectors of Indian Economy
3. To expose the students to basic concepts of implications of Ethical, social, legal, political, Economic fiscal and financial environment in India
4. Understand fundamental legal issues pertaining to business world to enhance their ability to lead and delegate.

Course Outcomes:
1. Demonstrate, describe, and explain the understanding of the fundamental concepts related to business environment
2. Apply the application knowledge of business environment & legal in various practical / business situations.
3. Analyze & evaluate the various business environment theories & business situations of different businesses.
4. Design, develop, devise, create, or implement suitable business solutions (or strategies or models) for various business environments (functionalities/ products/ services/ entities etc.) of a business or organization.

UNIT -I

Globalization, Liberalization & Privatization and Business Environment: Meaning and Implications, Phases, Impact on Indian Economy across Sectors. GATT and WTO: Agreements and Implications.
Global environmental issues: Sustainable development-Concepts, relevance in modern Business, World Business Council for Sustainable Development (WBCSD) Report.
Indian Economy and Business environment: Structure of the Business Environment – Internal and External environment. Socio Cultural factors affecting the Business.

L-10 Hours

UNIT-II
Small Scale industries: Growth, problems and prospects**. Large scale industries**: Growth, problems and prospects**.** Public and Private Sector Enterprises,
Macroeconomic policies in India: Monetary policy, Credit control tools.
Business cycle- Features, phases of Business environment
Foreign Exchange Regulation Act (**FERA**),
Foreign Exchange Management Act (FEMA).

L-10 Hours

UNIT III

Indian Contract Act: Offer and Acceptance, Performance and Discharge of contract, quasi contract, Contract of Guarantee, Bailment (rights and duties of bailor and bailee),
Agency : Various modes of creating agency, rights and duties of agents and principal.
Law of Sales: Sale of Goods Act: Sale and Agreement to sell, Conditions and Warrantees, Transfer of property
Law of partnership 1932: Definition, Essentials of Partnership, Formation of Partnerships, Dissolution of Partnership Firm.
Company Law: Salient Features of Companies, Classification and Formation of Companies, Memorandum and Articles of Association, Doctrine of Indoor Management, Appointment of Directors. Meetings of Directors. Shareholders of companies, overview of different modes of Winding up of Companies.

T-12 Hours

UNIT-IV
Business Ethics: Relation between ethics and business ethics, evolution of business ethics, unethical behavior, ethical decision making, some unethical issues, benefits from managing ethics at workplace,
Corporate Social responsibility: Types and nature of social responsibilities, CSR principles and strategies, Best practices of CSR, Need of CSR, Arguments for and against CSR, CSR Indian perspective, Indian examples.

L-10 Hours
Total L (Lecture) - 42 Hours

Practical Component:

1. International Cultural environment- The problems faced by MNC's – A Case study.
2. Case studies/Role plays related ethical issues in business with respect to Indian context.
3. Students are expected to study any five CSR initiatives by Indian organizations and submit
   report for the same.
4. A group assignment on "The relationship between Business, Government and Society in India".

Reference Books:

1. Misra. K. S, Puri K. V., Economic Environment of Business, HHP.
2. Justin Paul, Business Environment Text and Cases, McGraw – Hill Publishers. Suresh Bedi,
3. Business Law for Managers, Goel P. K,biztantra, 2012..
4. Business Law- S.S. Gulshan
5.BusinessLaw-Kucha

22PBA204C: RESEARCH METHODOLOGY AND IPR04
CREDITS (4-0-0)

Course Objectives:
1. To understand the importance of research in creating and extending the knowledge-base of their subject area.
2. To gain ability to distinguish between the strengths and limitations of different research approaches regarding their Subject/research area.
3. To acquire the skills to work independently, to plan and to carry out a small-scale research project and report writing.
4. To provide the insights of IPR and IPR system in India

Course Outcomes:
1. Define, describe, explain, exhibit a fair understanding of the concepts related to business research and IPR
2. Apply or demonstrate the research knowledge in various practical situations.
3. Analyze, Evaluate and interpret the data collected using statistical tools and charts.
4. Plan, design and implement various research designs, data collection tools and strategies to reach pertinent research objectives.

UNIT I
Introduction to Business Research: Meaning, types, process of research- management problem, defining the research problem, formulating the research Hypothesis, developing the research proposals, research design formulation, sampling design, planning and collecting the data for research, data analysis and interpretation. Research Application in business decisions, Ethical issues in business research. Features of a good research study.

Business Research Design: Meaning, types and significance of research design, errors affecting research design.

Exploratory Research: Meaning, purpose, methods, Literature search, experience survey, focus groups and comprehensive case methods.

Conclusive Research Design: Descriptive Research, Meaning, Types, Cross sectional studies and longitudinal studies.

Experimental Research Design: Meaning and classification of experimental designs, formal and informal, Pre experimental design, True experimental design, Quasi-experimental design, Statistical experimental design..

L - 14 Hours

UNIT II

Sampling: Concepts, Types of Sampling, **Probability Sampling**: simple random sampling, systematic sampling, stratified random sampling, cluster sampling,
Non Probability Sampling: convenience sampling- judgmental sampling, snowball sampling, quota sampling, Errors in sampling**.**

Data Collection: Meaning, types, **Data collection methods**: Observations, survey and interview techniques, **Questionnaire design**: Meaning, process of designing questionnaire. Qualitative Techniques of data collection Secondary data Sources: advantages and disadvantages.

Measurement and Scaling Techniques: Basic measurement scales-Nominal scale, Ordinal scale, Interval scale, Ratio scale.

Attitude measurement scale - Likert Scale, Semantic Differential Scale, Thurston scale, **Multi-Dimensional Scaling**: Non comparative scaling techniques.

L - 14 Hours

UNIT III

Data Analysis and Report Writing: Editing, Coding, Classification, Tabulation, Validation. Analysis and Interpretation, Report writing and presentation of results, Importance of report writing, types of research reports, Report structure, Guidelines for effective documentation.

L - 12 Hours

UNIT IV

Ethics: definition, moral philosophy, nature of moral judgements and reactions.

Intellectual Property Rights: Meaning and Concepts of Intellectual Property, Nature and Characteristics of Intellectual Property, Origin and Development of Intellectual Property, Kinds of Intellectual Property, Intellectual Property System in India, IPRs- Invention and Creativity- Intellectual Property- Importance and Protection of Intellectual Property Rights (IPRs)- **A brief summary of**: Patents, Copyrights, Trademarks, TRIPS and TRIMS , Industrial Designs- Integrated Circuits-Geographical Indications-Establishment of WIPO- Application and Procedures.

L -12 Hours

Total L (Lecture) -52 Hours

PRACTICAL COMPONENT:

4. Students are asked to do analyses of the data, finding and recommendations for the research they carried and prepare a report.

REFERENCE BOOKS:
1. Research Methodology: C R Kothari, Viswa Prakasam Publication, 2014.
2. Naresh K Malhotra (2007), Marketing Research, Pearson Education /PHI, 5th e.
3. Uma Sekaran and Roger Bougie, (2010), Research Methods for Business, Wiley India, 5the.
4. Intellectual Property Rights. India, IN: Neeraj, P., & Khusdeep, D. (2014). PHI learning Private Limited.
5. David I. Bainbridge, Intellectual Property, Longman, 9th Edition, 2012.

1. Students are asked to do literature review, identify theproblem, and set the objectives for the study.
2. Students are asked to design research methodology andframe the questionnaire.
3. Students are asked to collect data and tabulate data inSPSS.

22PBA205C: ENTREPRENEURSHIP DEVELOPMENT03
CREDITS (3-0-0)

Course Objectives:
1. To develop and strengthen entrepreneurial quality and motivation in students.
2. To impart basic entrepreneurial skills and understandings to run a business efficiently and effectively.
3. To provide insights to students on entrepreneurship opportunities

Course Outcomes:
1. Understand, remember and explain various concepts of Entrepreneurship.
2. Apply and relate the theoretical knowledge entrepreneurship.
3. Analyze and evaluate various business scenarios with the lens of entrepreneurship.
4. Plan, design or implement strategies of entrepreneurship in real time scenarios.

UNIT-I
Introduction to Entrepreneur:

Meaning of entrepreneur - Evolution of the concept - Functions of an Entrepreneur - Types of Entrepreneur -Intrapreneur- an emerging class - Concept of Entrepreneurship -Entrepreneurial Culture - Stages in entrepreneurial process.

Creativity and Innovation: The role of creativity – The innovation Process – Sources of New Ideas – Methods of Generating Ideas – Creative Problem Solving – Entrepreneurial Process.

L-08 Hours

UNIT-II
Business Planning Process: Meaning of business plan, Business plan process, Advantages of business planning, Marketing plan, Production/operations plan, Organization plan, financial plan,
and final project report with feasibility study, preparing a model project report for starting a new venture.

Institutions Supporting entrepreneurs: Small industry financing developing countries, A brief overview of financial institutions in India, Central level and state level institutions, SIDBI,NABARD, IDBI,SIDCO, Indian Institute of Entrepreneurship, DIC, Single Window, Latest Industrial Policy of Government of India.

L-12 Hours

UNIT-III

Family Business: Importance of family business, Types, History, Responsibilities and rights of shareholders of a family business, Succession in family business, Pitfalls of the family business, strategies for improving the capability of family business, improving family business performance.

International Entrepreneurship Opportunities: The nature of international entrepreneurship, Importance of international business to the firm, International versus domestic entrepreneurship, Stages of economic development, Entrepreneurship entry into international business, exporting, direct foreign investment, barriers to international trade.

L-10 Hours

UNIT-IV

Informal risk capital and venture capital: Informal risk capital market, venture capital, nature and overview, venture

capital process, locating venture capitalists, approaching venture capitalists.

Social Entrepreneurship: Social enterprise-need, types, characteristics and benefits of social enterprises-Social entrepreneurship, Rural entrepreneurship-need and problems of rural entrepreneurship, challenges and opportunities-Role of government.

L-10 Hours

Total L (Lecture) – 40 Hours

Practical component:

1. Interview a local entrepreneur to find out his/her major motivations to start a business, which of the skills and characteristics do you find in the entrepreneur?
2. Analyze the performance of listed family firms. How is their performance compared to the performance of other firms? Does a family firm successfully manage to create wealth for non-family investors?
3. Study a local for-profit business and try to list out the positive social impacts of the business
4. Make a business plan for your intended business, talk to bankers to find out what they look for in a business plan , modify accordingly and present it in the class

REFERENCE BOOKS:

1. Entrepreneurship Development-Small Business Enterprise- Poornima Charantimath Pearson Education, 2007
2. Entrepreneurship- Rober D Hisrich, Michael P Peters, Dean A Shepherd, 6/e, The McGraw-Hill companies, 2007
3. Entrepreneurship Development , Khanka, S Chand Publications
4. Entrepreneurship Development, B Janakiram
5. Entrepreneurship Theory at crossroads - Dr.Mathew J Manimala, 2/e, Biztantra, 2007

UCS071E		Credits: 03
L:T:P – 3:0:0	UI / UX Design	CIE Marks: 50
Total Hours/Week: 3		SEE Marks: 50

UNIT-I	10 Hrs.

User Interface Design (UI) -The Relationship Between UI and UX , Roles in UI/UX, A Brief Historical Overview of Interface Design, Interface Conventions, Approaches to Screen Based UI, Template vs Content, Formal Elements of Interface Design, Active Elements of Interface Design, Composing the Elements of Interface Design, UI Design Process

UNIT–II	10 Hrs.

Visual Communication design component in Interface Design The User Interface Design process-Obstacles, Usability, Human characteristics in Design, Human Interaction speeds, Business functions-Business definition and requirement analysis, Basic business functions, Design standards.

UNIT–III	10 Hrs.

UX Basics- Foundation of UX design, Good and poor design, Understanding Your Users, Designing the Experience-Elements of user Experience, Visual Design Principles, Functional Layout, Interaction design, Introduction to the Interface, Navigation Design, User Testing, Developing and Releasing Your Design working Prototype using Prototyping tools, Sharing and Exporting Design

UNIT–IV	10 Hrs.

User Study- Interviews, writing personas: user and device personas, User Context, Building Low Fidelity Wireframe and High-Fidelity Polished Wireframe Using wireframing Tools, Creating the working Prototype using Prototyping tools, Sharing and Exporting Design

Reference Books

Professor and Head
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Basaveshwar Engineering College
Bagalkot 587102

1. Chandler, Unger, 2012, A Project Guide to UX Design: For user experience designers in the field or in the making (2nd Edition), New Riders Publishing

2. Garrett, 2011, The Elements of User Experience: User-Centered Design for the Web and Beyond (2nd Edition), Pearson Education

3. Galitz, 2007, The Essential Guide to User Interface Design: An Introduction to GUI Design Principles and Techniques (3rd Edition), Wiley Publishing

4. Hartson, Pyla, 2012, The UX Book Process and Guidelines for Ensuring a Quality User Experience, Elsevier

Course Outcomes

After completion of the course student will be able to

1. Explain iterative user-centred design of graphical user interfaces and user experience

2. Apply the user Interfaces to different devices and requirements.

3. Describe the components of user experience, especially emotional impact.

4. Design better user experience through user interfaces

5. Create high quality professional documents and artifacts related to the design process.

Course Outcomes	Programme Outcomes (POs)												Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1		3		2			2	1	2	3		3	3		
CO2		3		2				1	3			3	3		
CO3	3							1	2	3		3	3		
CO4	3						2	1	2	3		3			

UCS632N		Credits : 3
L:T:P – 3:0:0	Artificial Intelligence and Robotics	CIE Marks : 50
Total Hours/Week : 3		SEE Marks : 50

UNIT-I	10 Hrs.

Introduction to AI : The AI Problems, Underlying assumptions, AI technique, Level of the model, Criteria for success (1.1 to1.5 from Richand Knight)

Problems : Problems paces and search Problem as a state space search, Production systems, Problem characteristics, Production system characteristics, Issues in the design of search problems, additional problems(2.1 to 2.6 from Richand Knight)

UNIT–II	10 Hrs.

Search and control Strategies : Introduction, Generate and Test, Hill Climbing, Simulated annealing (3.1, 3.2 from Richand Knight)

Expert systems Architectures : Introduction, Rule-Based System Architectures, Nonproduction System Architectures, Dealing with Uncertainty, Knowledge Acquisition and Validation (15.1 to 15.6 from Dan W.Patterson)

UNIT–III	10 Hrs.

Introduction to Robotics : The Seven Criteria of Defining a Robot, Robot Categories, Sensors, Actuators, End Effectors, Controllers, Scenario, Giving the robot instructions.(Chapter 1 from Cameron Hughes)

Robot Vocabularies and RSVP : Additional Effort, Actions, The Autonomous Robot's ROLL Model, RSVP (Robot Scenario Visual Planning) : Mapping the Scenario, Pseudo code and Flow charting RSVP. (Chapter 2 and 3 from Cameron Hughes)

UNIT–IV	10 Hrs.

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Actual Capabilities of Robot:

The Reality Check for the Microcontroller, Sensor Reality Check, Determine Your Robot's Sensor, Limitations, Actuators End-Effectors Reality Check. (Chapter 4 from Cameron Hughes)

Sensors : Types of Sensors, Sensor Interfacing with Microcontrollers, Attributes of Sensors, Sensor Calibration. (Chapter 5 from Cameron Hughes)

Reference Books

1. Artificial Intelligence Elaine Rich, Kevin and Shivashankar B.Nair TMH Education(P)Ltd., NewDelhi 3rd Edition, 2010

2. Introduction to Artificial Intelligence and Expert Systems   Dan W.Patterson Prentice Hall of India, Private Ltd., NewDelhi 1st Edition, 2015

3. Robot Programming: A Guide to Controlling Autonomous Robots Cameron Hughes Tracey Hughes Pearson Education 1st Edition, 2016

4. Artificial Intelligence : A modern approach Stuart Russell and Peter Norvig Pearson Education, India 3rd Edition, 20165.

5. Artificial Intelligence Saroj Kaushik Cengage Learning India 1stEdition, 2011

6. Introduction to AI Robotics Robin R. Murphy MIT Press 1st Edition, 2000

7. Introduction to Robotics Saha S. K.TMH Publications 1s tEdition, 2008

Course Outcomes

After completion of the course student will be able to

1. Explain the fundamentals of artificial intelligence, robotics and expert systems.

2. Identify knowledge associated and represent it by on to logical engineering to plan a strategy to solve given problem.

3. Apply the suitable algorithms to solve AI problems

4. Solve problem using problem decomposition and planning

5. Design smart system using different informed search/uninformed search or heuristic approaches

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Basaveshwar Engineering College, Bagalkote
Department of Computer Science & Engineering
Scheme of Teaching and Evaluation
(Academic Year 2021-2022)

Course Outcomes	Programme Outcomes (POs)												Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	2	3	2									3	1	2
CO2	3	2		3										2	
CO3		3	3	3		2							3		3
CO4		2	1	3	3									2	
CO5				3								3		3	2

UCS070E	Block Chain Technology	Credits: 03
L:T:P - 3:0:0		CIE Marks: 50
Total Hours/Week: 03		SEE Marks: 50

UNIT-I	10 Hrs.

Blockchain 101: Distributed systems, History of blockchain, Introduction to blockchain: various technical def of block chain, Generic Elements, Features, Applications

Types of blockchain: Public, Private, Semi-private, Side chain, Permissioned ledger, Distributed ledger, Shared, Fully private and proprietary block chains, Tokenized and tokenless block chains, Consensus block chains, CAP theorem and blockchain, Benefits and limitations of blockchain.

UNIT–II	10 Hrs.

Decentralization and Cryptography: Decentralization using blockchain, Methods of decentralization, Routes to decentralization, Blockchain and full ecosystem decentralization, Smart contract, Decentralized organizations.

Cryptography and Technical Foundations: Cryptographic primitives, Asymmetric cryptography

UNIT–III	10 Hrs.

Bitcoin and Alternative Coins

A: Bitcoin, Transactions life cycle, structure, types of transaction, Blockchain: structure of block and header, Genesis block, bitcoin network, Wallets, Bitcoin payments: investment and buying and selling bitcoins, Bitcoin installation, Bitcoin programming and command line interface, BIPS

B: Alternative Coins

Theoretical foundations: proof of work, Difficulty adjustment and retargeting algorithms, Bitcoin limitations,

UNIT–IV	10 Hrs.

Smart Contracts and Ethereum 101:

Smart Contracts: Definition, Ricardian contracts: Smart contract templates, oracles, Smart oracles, Deploying smart contracts on a blockchain.

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Ethereum 101: Introduction, Ethereum blockchain, Elements of the Ethereum Block chain, Precompiled contracts.

Reference Books

1. Bashir, 2017, "Mastering Blockchain - Distributed ledgers, decentralization and smart contracts explained, Packt Publishing Ltd

2. Narayanan, Bonneau, Felten, 2016, Bitcoin and Cryptocurrency Technologies, Princeton University Press

3. Drescher, 2017, Blockchain Basics: A Non-Technical Introduction in 25 Steps (1st Edition), Apress

4. Antonopoulos, 2014, Mastering Bitcoin: Unlocking Digital Crypto currencies (1st Edition), O'Reilly Media

Course Outcomes

After completion of the course student will be able to

- Define and explain the fundamentals of Block chain technology.
- Illustrate the technologies of block chain.
- Describe the models of block chain Technology.
- Demonstrate the Block chain Technology using Ethereum.

Course Outcomes	Programme Outcomes (POs)												Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	1		2		2							3	2	1	
CO2	2		3		1						2	2		2	
CO3			2	1	1						1		2		1
CO4	1	1	1		2						2	3	1	1	

UCS005E	Information and Network Security	Credits: 3
L:T:P - 3 : 0: 0		CIE Marks: 50
Total Hours/Week: 3		SEE Marks: 100

UNIT-I	10 Hrs.

Information Security: Introduction, what is security? Critical Characteristics of Information; NSTISSC Security Model; Approaches to Information Security Implementation, The Security System Development Life Cycle : Security Professionals and Organization, Information Security: Is it an Art or a Science.

Planning for Security: Introduction; Information Security Policy, Standards and Practices: The Information Security Blueprint.

UNIT–II	10 Hrs.

Introduction to Network Security: The OSI Security Architecture: Attacks, Services, and Mechanisms; Security Attacks; Security Services; A model for Network Security.

Security Technology 1: Firewalls and VPNs: Introduction, Physical design, Firewalls: Processing Modes of Firewalls, Firewall Architectures, Protecting Remote Connections: Remote Access, RADIUS, TACACS and Diameter, Virtual Private Networks (VPNs).

Security Technology 2: Intrusion Detection, Access control and Other Security Tools: Introduction, Intrusion Detection Systems (IDS); Honey Pots, Honey Nets, and Padded Cell systems; Scanning and Analysis Tools; Access Control Devices.

UNIT–III	10 Hrs.

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Authentication: Authentication Applications Kerberos, X.509DirectoryAuthentication Service, Electronic Mail Security: Pretty Good Privacy (PGP), S/MIME.

IP Security: Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations, Key Management.

UNIT–IV	10 Hrs.

Web Security: Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET)

Information Security Maintenance: Introduction; Security Management Models; The Maintenance Model, Digital Forensics.

Network Management Security: Basics Concepts of SNMP, SNMPv1 community facility, SNMPv3

Reference Books

1. Whiteman, Mattord, 2016, Principles and Practices of Information Security (4th Edition), Cengage Learning India Private Limited
2. Stallings, 2017, Cryptography and Network Security, Pearson Education Limited (7Th Edition), Pearson Education Limited

Course Outcomes

After completion of the course student will be able to

1. Understand the definition of network security, attacks, services, mechanisms.
2. Describe model of security architecture, security technology, firewalls and VPNs.
3. Analyze IP security and Web Security.
4. Evaluate the information security maintenance and networks security management.

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Course Outcomes	Programme Outcomes (POs)												Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1				1	2	2									1	2
CO2				1	2		3	2	1		3				1	2
CO3			1	3	2	1	2	3				1	1	3	2
CO4			1	1	2	3	2	1				1	1	1	1