IoT Ecosystem Using Wireless Technologies : Architecture for IoT Using Mobile Devices, Mobile Technologies, 5G, Software-Defined Networking, Ultra Wide Band Technology, Near Field Communication Technology, Low Power Wide Area Networking Technologies – Sigfox, Weightless, LoRa.

UNIT-III: Infrastructure and Service Discovery Protocols for the IoT Ecosystem : Layered Architecture for IoT, Protocol Architecture of IoT, IEEE 802.15.4, IPv6 over Low-Power Wireless Personal Area Networks (6LoWPAN), Bluetooth Low Energy, Long Term Evolution-Advanced, RFID, Z-Wave, Zigbee, Device or Service Discovery for IoT- Bluetooth Beacons, Wi-Fi aware, Open Hybrid.

UNIT-IV:

Integration Technologies and Tools for IoT Environments : Sensor and Actuator Networks, Sensor-to-Cloud Integration, IoT Device Integration Concepts, Standards, and Implementations – Service Oriented Device Architecture, Device Profile for Web Services, Open Service Gateway Initiative (OSGi), REST Paradigm, Message Queue Telemetry Transport (MQTT), Advanced Message Queuing Protocol (AMQP), Constrained Application Protocol (CoAP).

Next-Generation Clouds for IoT Applications and Analytics : Hybrid and Federated Clouds, Edge or Fog Clouds, Software-Defined Clouds, Cognitive Clouds, Amazon Web services for IoT.

UNIT-V:

Industry 4.0: Industrial Internet of Things (IIoT), Reference Architecture, Characteristics of Industry 4.0.

Case Studies: Introduction, Smart Cities, Smart Homes, Smart Lighting, Smart Transportation, Industrial Automation, Smart Healthcare, Agriculture.

Learning Resources:

1. Pethuru Raj and Anupama C. Raman , “The Internet of Things: Enabling Technologies, Platforms, and Use Cases", CRC Press.
2. ArshdeepBahga, Vijay Madisetti, “Internet of Things: A Hands-on Approach”, Universities Press, 2014.
3. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, “From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence”, 1st Edition, Academic Press, 2014.

4. Srinivasa K.G., Siddesh G.M., Hanumantha Raju R., "Internet of Things", 1st Edition, Cengage, 2018.
5. "IoT Fundamentals: Networking Technologies, Protocols and Use Cases for the Internet of Things", Pearson, 2017.
6. Jean-Philippe Vasseur, Adam Dunkles, "Interconnecting Smart Objects with IP", Morgan Kaufmann, 2010.
7. Peter Waher, "Learning Internet of Things", PACKT Publishing, 2015.
8. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", Springer
9. Daniel Minoli, "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", Wiley Publications.
10. https://www.postscapes.com/internet-of-things-protocols/
11. https://nptel.ac.in/courses/106105166/

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

SOFTWARE ENGINEERING

SYLLABUS FOR B.E. VI-SEMESTER

L:T:P(Hrs./week):3:0:0	SEE Marks : 60	Course Code:**UII22PC620CS**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Explain the concepts involved in the lifecycle of software development 2 Design Software Requirements Specifications, analyze risks and apply DevOps to develop, test and maintain software project	1 State the software process, compare prescriptive and evolutionary process models 2 Explain Agile software process methodology and design Software Requirements Specifications (SRS) document 3 Apply DevOps lifecycle for developing an application 4 Develop test cases and apply relevant testing strategies for various applications 5 Analyze security requirements of a given application and choose the appropriate product metric for quality assurance

UNIT-I:

Introduction to Software Engineering

The Nature of Software: Defining Software, Software Application Domain, Legacy Software, The changing Nature of the software : WebApps, Mobile Applications, Cloud Computing, Product line software

Software Engineering : The Process Frame work, Umbrella Activities, Process Adaption, Software development myths

The Software Process: Defining framework activities, Identifying a task set, Process patterns, Process Assessment and improvement
Process Models: Prescriptive models, Waterfall Model, Incremental Process Models, Evolutionary Process Models, Specialized Process Models, The Unified Process, personal software process, Team Software Process.

UNIT-II:
Agile Development: What is Agility, Agility and the cost of change, What is an Agile Process, Agile Process Extreme programming, SCRUM, Dynamic Systems Development Method, Agile Unified Process.

Requirements Engineering: Establishing the ground work, Eliciting requirements, Developing use cases, Building the Analysis model, Negotiating Requirements, Requirement Monitoring, Validating Requirements.
Design concepts: The Design Process, Design Concepts, The Design Model.

UNIT-III:
DevOps: Introduction to DevOps, why DevOps DevOps process and continues delivery, Pipeline, Release management, Kanban DevOps Architecture, DevOps life cycle for business Agility and Continuous testing.

UNIT-IV:
Testing Strategies: A Strategic approach to software testing ,Strategic issues, Test strategies for Object Oriented Software, Test strategies for WebApps, Test strategies for MobileApps, Validation testing, System testing, the art of debugging.
Testing Conventional Applications: Software testing fundamentals, Black box and White box testing, Basis path testing, Control Structure, O-O testing methods, Class level testing methods, Inter class test case design, Testing for specialized environments, architectures and Applications testing patterns.

UNIT-V:
Software Configuration Management : Software Configuration Management, The SCM Repository, The SCM process, Configuration Management for Web and Mobile Apps
Product Metrics: Software quality, A frame work for Product metrics , Metric for the analysis model, Metrics for the Design Model , Metrics for Source code, Metrics for testing, Metrics for maintenance

Learning Resources:

1. Roger S. Pressman, Software Engineering: A Practitioner's Approach, 8th Edition (2005), Tata McGrawHill.
2. Joakin Verona " Practical DevOps" , 2nd Edition, Ingram short Title; 2nd Edition, 2018
3. Deepak Gaikwad, Viral Thakkar, "DevOps Tools from Practioner's viewpoint" Wiley Publications, 2019.
4. Shari Lawrence Pfleeger, Software engineering Theory and Practices, 4th Edition (2011), Pearson Education, India.
5. Pankaj Jalote, An Integrated Approach to Software Engineering, 3rd Edition (2005), Narosa Publishing House.
6. http://nptel.ac.in/courses/106101061/
7. http://freevideolectures.com/Course/2318/Software-Engineering
8. http://www.ece.rutgers.edu/~marsic/books/SE/instructor/slides/
9. https://ocw.mit.edu/courses/aeronautics-and-astronautics/16-355j-software-engineering-concepts-fall-2005/lecture-notes/

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING(Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

DEEP LEARNING

SYLLABUS FOR B.E. VI-SEMESTER

L:T:P(Hrs./week):3:0:0	SEE Marks : 60	Course Code:**UII22PC630CS**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVE	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1. Understand issues and Techniques involved in the creation of Deep Learning Models.	1. Identify the deep learning algorithms which are appropriate for various types of learning tasks in various domains. Apply regularization technique to generalize the model. 2. Design deep learning systems by applying convolution, pooling operations in convolution neural network. 3. Implement sequence modelling algorithms to solve real-world problems. 4. Ability to apply Optimization strategies for large scale applications, GAN's 5. Understand Transformer Architecture and apply the transformer models using deep learning framework.

UNIT I:

Introduction: Introduction to DL, **Regularization for Deep Learning**: Parameter Norm Penalties, Norm Penalties as constrained optimization, Regularization and under Constrained problem, Dataset Augmentation, Noise Robustness, Semi Supervised Learning, Multi Task Learning, Early stopping, Bagging and other ensemble methods, Dropouts.

UNIT II:

Convolutional Networks: The Convolution Operations, Motivation, Pooling, Convolution and Pooling as an infinitely strong prior, Variants of Basic Convolution Function, Structured outputs, Data Types, Efficient Convolution Algorithms, Random or unsupervised features.

UNIT III:

Sequence Modelling: Recurrent and Recursive Nets: Unfolding Computational Graphs, Recurrent Neural Networks, Bidirectional RNNs, Encoder Decoder

Sequence-to –Sequence Architecture, Deep Recurrent Networks, Recursive Neural Network, The Long-Term short memory (LSTM).

UNIT IV:

Optimization for Learning Deep Models: How learning Differs from pure optimization, Challenges in Neural Network Optimization, Basic Algorithms-SGD, Momentum, Nesterov Momentum, Parameter initialization strategy, Algorithm with adaptive Learning Rates- AdaGrad, RMSProp, Adam.

Introduction to Generative Adversarial Network(GAN'S)

UNIT V:

Transformers- A Self-Attention, Network parameters, scaled Self attention, Multi-head Attention, Transformer Layers, Transformer Language Models, Decoder Transformer, Sampling Strategies, Encoder Transformer, Sequence to sequence transformer, Large Language Models.

Learning Resources:

1. Ian Goodfellow, YoshuaBengio, Aaron Courville, Deep Learning: Adaptive Computations and Machine Learning Series, 2016 edition, An MIT Press Book
2. Eugene Charniak, Introduction to Deep Learning, 2019 Edition.
3. Bishop, C. ,M., Pattern Recognition and Machine Learning, Springer, 2006
4. Raúl Rojas, Neural Networks : A Systematic Introduction, Springer, 1996
5. Michael Nielsen, Neural Networks and Deep Learning, Determination Press , 2015
6. https://www.bishopbook.com-Deep Learning Foundations and Concepts
7. https://nptel.ac.in/courses/106106184
8. https://www.deeplearning.ai/program/deep-learning-specialization/
9. https://www.coursera.org/specializations/deeplearning?action=enroll&utm_campaign=WebsiteCoursesDLSTopButton&utm_medium=institutions&utm_source=deeplearningai
10. https://www.udemy.com/course/basics-of-deep-learning/
11. https://www.udemy.com/course/tensorflow-20-recurrent-neural-networks-lstms-grus/
12. http://neuralnetworksanddeeplearning.com/

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

COMPUTER VISION

SYLLABUS FOR B.E. VI-SEMESTER

L:T:P(Hrs./week):3:0:0	SEE Marks : 60	Course Code: **UII22PC640CS**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** On Successful completion of this course, student will be able to
1 To introduce the fundamentals of image formation, Image Processing	1 Recognize the basic fundamentals of computer vision and image processing.
2 To gain knowledge on major ideas, methods, and techniques of computer vision and object recognition. To understand	2 Develop algorithms to analyze feature detection and feature alignment. 3 Analyze images and videos for problems such as tracking and structure from motion. 4 Explain Image stitching and computational photography methods.
3 Morphological operations, Computational photography.	5 Analyze image-based rendering, object detection and recognition methods

UNIT-I:

Introduction to Computer Vision and Image Formation: Introduction, Geometric primitives and transformations, Photometric image formation, the Digital Camera.

Image Processing: Point operators, Linear filtering, More neighborhood operators, Fourier transforms, Pyramids and wavelets, Geometric transformations.

UNIT-II:

Feature detection and matching: Points and patches, Edges, Lines.

Segmentation: Active contours, Split and merge, Mean shift and mode finding, Normalized cuts.

UNIT-II: Planning: Project Planning, bar charts, network techniques in project management – CPM Expected likely, pessimistic and optimistic time, normal distribution curve and network problems of PERT.

UNIT-III: Time Cost Analysis: Cost time analysis in network planning, updating

UNIT-IV: Contracts: Introduction, types of contracts and their advantages and disadvantages, conditions of contracts, Introduction to Indian contract act.
Lender: Lender form, Lender documents, Lender notice, work order.

UNIT-V: Linear Programming and Optimization Techniques: Introduction to optimization-Linear programming, Importance of optimization, Simple problems on formulation of LP. Graphical method, Simplex method.

Learning Resources:

1. SrinathL.S., PERT and CPM., Principles and Application, East – West Press, 2001.
2. Peret, F., Construction Project Management an Integrated Approach, Taylor and Francis, Taylor and Francis Group, London & New York, 2009.
3. Punmia B.C. and Khandelwal, PERT and CPM, Laxmi Publications, 2006
4. Gahloj. P.S. and Dhiv. B.M., Construction Planning and Management, Wiley Eastern Ltd., 2018.
5. Kumar NeerajJha., Construction Project Management: Theory and Practice, Pearson Education, India, 2015.
6. Seetharaman S., Construction Engineering and Management, Umesh Publications, 2012.

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 90 Minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Internet of Things and Applications
(General Pool : Open Elective - IV)

SYLLABUS FOR B.E. VI - SEMESTER (EEE & IT)

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: **U22OE610EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. The purpose of this course is to impart knowledge on IoT Architecture, practical constrains. 2. To study various protocols And to study their implementations	On completion of the course, students will be able to 1. Understand the Architectural Overview of IoT 2. Enumerate the need and the challenges in Real World Design Constraints 3. Compare various IoT Protocols. 4. Build basic IoT applications using Raspberry Pi. 5. Understand IoT usage in various applications.

UNIT - I : OVERVIEW

Introduction to IoT – Improving Quality of life.

IoT-An Architectural Overview, M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT.

UNIT - II : Real-World Design Constraints

Real-World Design Constraints- Introduction, Technical Design constraints-hardware is popular again, Data representation and visualization, Interaction and remote control. Power Management in IoT device, Power conditioning using energy harvesting.

UNIT - III : IOT PROTOCOLS

Introduction to MQTT, Quality of services in MQTT,standards and security in MQTT.

Introduction and implementation of AMQP, Implementation of CoAP and MDNS.

UNIT - IV : Device for IoT

Choice of Microcontroller, Introduction to Raspberry Pi, Features of Pi, Programming platform, Phython programming for Pi. Building basic IoT Applications using Raspberry Pi.

UNIT - V : IoT case studies

Smart Cities and Smart Homes, Connected Vehicles, Agriculture, Healthcare, Activity Monitoring.

Learning Resources:

1. Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, StamatisKarnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1 st Edition, Academic Press, 2014.
2. Peter Waher, "Learning Internet of Things", PACKT publishing, BIRMINGHAM – MUMBAI
3. Bernd Scholz-Reiter, Florian Michahelles, "Architecting the Internet of Things", ISBN 978-3-642-19156-5 e-ISBN 978-3-642-19157-2, Springer
4. Daniel Minoli, "Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications", ISBN: 978-1-118-47347-4, Willy Publications
5. https://nptel.ac.in/courses/106105166/5
6. https://nptel.ac.in/courses/108108098/4

The break-up of CIE : Internal Tests + Assignments + Quizzes

1. No. of Internal Tests	: 2	Max. Marks for each Internal Test	:	30
2. No. of Assignments	: 3	Max. Marks for each Assignment	:	5
3. No. of Quizzes	: 3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests: 90 Minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Automatic Train Protection System – Kavach

(General Pool : Open Elective - IV)

SYLLABUS FOR B.E. VI – SEMESTER

(CSE, CSE(AI&ML), ECE, EEE, IT & Mechanical)

L:T:P (Hrs./week) : 2:0:1	SEE Marks : 60	Course Code:**U22OE630PH**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To Provide the knowledge of Kavach technology which is used for an anti-collision system for trains.	On completion of the course, students will be able to 1. Acquire knowledge about the Train Protection Systems in general and Kavach - Indian Railways Automatic Train Protection System in detail. 2. Acquire knowledge about various elements, subsystems associated with Kavach, those on the ground - wayside, those on the train - onboard and related concepts. 3. Design various plans & diagrams required for implementation of Kavach for typical station layout. 4. Simulate & validate the system designs on the testbench.

UNIT – I: Introduction to Train Protection Systems (8 Hours)

Train Protection Systems: Auxiliary Warning Systems, European Train Control Systems Communication Based Interlocking System, Spot and Continuous Relay of Information

Working of Train Protection System – Kavach: Overview of Kavach and its Working, Features, Subsystems, Communication Interfaces, Signalling Interfaces

Subsystem: Onboard Kavach: Driver Machine Interlocking, Braking Interface, Radio Equipment, Onboard Computer, Transponder Receiver, Odometry, GNSS, GPRS, GSM

Subsystem: Stationary Kavach Station Kavach, Track Side Equipment, Signalling Interface, Radio & Tower, GNSS, Transponders, Network Monitoring System

UNIT – II: (6 Hours)

Concepts : Location Referencing - Train position, Modes of Onboard subsystem, Train Characteristics, Mode Transitions, Braking Curves, Speed Profiles, Speed Limits, Speed Monitoring, Target Speed, Target Distance, Movement Authority, Communication Protocols, Key Management System (KMS), Messages & Language

UNIT – III: Design –Kavach: (8 Hours)

Survey, Assessment & Estimation: Station Layout, Radio Signal Strength, Tower Location, Power Requirement, Cable Survey, Loco Fitment Survey

Station Design: Kavach Scheme Plan, Kavach Control Table, Signalling Interface Diagram, Connectivity Plans for Remote Interface Units (RIUs), Power Supply Plan

Tower Design: Soil Testing, Foundation design, Super Structure Design

UNIT – IV: Installation, Deployment & Testing (8 Hours)

Stationary Kavach: Interlocking Interface, RFID Tags, Station Master Operation Console Indication Panel (SM_OCIP), GPS/GSM Antennas, Pre-commissioning Checklist, Testing

Onboard Kavach: DMI, Speed Sensors, RFID Reader, Onboard Computer, Brake Interface Unit, Pre-commissioning Checklist, Testing

Practicals at IRISET Laboratory (12 Hours)

1. Testbench, Preparation and deployment of Stationary Kavach Data : Configuration involving Topographical Information - Arrangement of Signals/Markers, Transponders, Inter signal Distances, Signal Routes, Gradients, Speed Restrictions
2. Verification and Validation of Onboard Data – Ceiling

The break-up of CIE : Internal Tests + Assignments + Quizzes

1. No. of Internal Tests	: 2	Max. Marks for each Internal Tests	:	30
2. No. of Assignments	: 3	Max. Marks for each Assignment	:	5
3. No. of Quizzes	: 3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests: 90 Minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Introduction to Mobile and Cellular Communications

(Communication Engineering Stream: Open Elective - IV)

SYLLABUS FOR B.E. VI - SEMESTER (CSE & IT branches)

L:T:P (Hrs./week) :3:0:0	SEE Marks : 60	Course Code: **U23OE640EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To understand the technology trends changing from generation to generation. 2. To have an insight into the various propagation models and the effects of fading. 3. To understand the multiple access techniques and Mobile communication system specifications.	On completion of the course, students will be able to 1. Analyze various methodologies to improve the cellular capacity. 2. Identify various Propagation effects. 3. Identify the effects of fading and multi path propagation. 4. Categorize various multiple access techniques for Mobile Communications. 5. Analyze the specifications of GSM based Mobile Communication Systems.

UNIT - I:

Introduction to Wireless Communication Systems: Evolution of Mobile Radio Communications, Examples of Wireless Communications Systems, Trends in Cellular Radio and Personal Communication Systems.

The Cellular Concept – System Design Fundamentals: Introduction, Frequency Reuse, Channel Assignment Strategies, Handoff Strategies, Interference and System Capacity, Improving Coverage and Capacity in Cellular Systems.

Lab Activity: Calculation of frequencies for cellular system design using MATLAB

UNIT - II:

Mobile Radio Propagation - Large Scale Path Loss: Introduction to Radio wave Propagation, Free Space Propagation Model, Reflection,

Ground Reflection (Two-Ray) Model, Diffraction, Scattering.
Lab Activity: Path loss calculations using MATLAB

UNIT - III:
Mobile Radio Propagation - Small Scale Fading and Multipath: Small Scale Multipath Propagation, Small – Scale Multipath Measurements, Parameters of Mobile Multipath Channels, Types of Small-Scale Fading, Rayleigh and Ricean Distributions.
Lab Activity: Small scale fading parameter calculations using MATLAB

UNIT -IV:
Multiple Access Techniques for Wireless Communications: Introduction, Frequency Division Multiple Access (FDMA), Time Division Multiple Access (TDMA), Code Division Multiple Access (CDMA), Space Division Multiple Access (SDMA).
Lab Activity: Demonstrating multiple access techniques using MATLAB.

UNIT -V:
Wireless Systems and Standards: Global System for Mobile (GSM) – Services and features, System architecture, GSM Radio subsystem, channel types, Frame structure for GSM.

Learning Resources:

1. Theodore S. Rappaport, Wireless Communications Principles and Practices, 2nd edition, Pearson Education.
2. David Tse, Pramodh Viswanath, Fundamentals of Wireless Communication, 2005, Cambridge University Press.
3. Name of the course: Introduction to Wireless and Cellular Communications
   Course url: https://swayam.gov.in/nd1_noc19_ee48/preview

The break-up of CIE : Internal Tests + Assignments + Quizzes

1. No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2. No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3. No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests: 90 Minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (Autonomous)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

INTRODUCTION TO BATTERIES AND BATTERY MANAGEMENT SYSTEM
Open Elective-IV
SYLLABUS FOR B.E. VI SEMESTER

L: T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U22OE610EE**
Credits:3	CIE Marks: 40	Duration of SEE: 3Hours

COURSE OBJECTIVES **The course will enable the students to:**	**COURSE OUTCOMES** **On completion of the course, students will be able to**
The objective of this course is to introduce learner to batteries, its parameters, modeling and charging requirements. The course will help learner to develop battery management algorithms for batteries.	1. Interpret the role of battery management system. 2. Identify the requirements of Battery Management System. 3. Interpret the concept associated with battery charging / discharging process. 4. Calculate the various parameters of battery and battery pack. 5. Design the model of battery pack

UNIT -I: Introduction to Battery Management System:
Cells & Batteries, Nominal voltage and capacity, C rate, Energy and power, Cells connected in series, Cells connected in parallel, Electrochemical and lithium-ion cells, Rechargeable cell, Charging and Discharging Process, Overcharge and Undercharge, Modes of Charging.

UNIT -II: Battery Management System Requirement:
Introduction and BMS functionality, Battery pack topology, BMS Functionality, Voltage Sensing, Temperature Sensing, Current Sensing, High-voltage contactor control, Isolation sensing, Thermal control, Protection, Communication Interface, Range estimation, State-of-charge estimation, Cell total energy and cell total power.

UNIT –III: Battery State of Charge and State of Health Estimation, Cell Balancing:
Battery state of charge estimation (SOC), voltage-based methods to estimate SOC, Model-based state estimation, Battery Health Estimation,

Lithium-ionaging: Negative electrode, Lithium-ion aging: Positive electrode, Cell Balancing, Causes of imbalance, Circuits for balancing.

UNIT –IV: Modelling and Simulation:

Equivalent-circuit models (ECMs), Physics-based models (PBMs), Empirical modelling approach, Physics-based modelling approach, simulating an electric vehicle, Vehicle range calculations, simulating constant power and voltage, Simulating battery packs.

UNIT -V: Design of battery BMS:

Design principles of battery BMS, Effect of distance, load, and force on batterylife and BMS, energy balancing with multi-battery system.

Learning Resources:

1. Plett, Gregory L. Battery management systems, Volume I: Battery modeling. ArtechHouse, 2015.
2. Plett, Gregory L. Battery management systems, Volume II: Equivalent-circuitmethods. Artech House, 2015.
3. Bergveld, H.J., Kruijt, W.S., Notten, P.H.L "Battery Management Systems -Design byModelling" Philips Research Book Series 2002.
4. Davide Andrea," Battery Management Systems for Large Lithium-ion Battery Packs"Artech House, 2010.

The break-up of CIE : Internal Tests+Assignments+Quizzes

1.	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2.	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3.	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 90 Minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEEING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF MECHANICAL ENGINEERING

INDUSTRY 4.O
(Stream: Robotics)

(Open Elective-IV)

SYLLABUS FOR B.E VI Semester

L:T: P (Hrs./week):3: 0 : 0	SEE Marks:60	Course Code : **U22OE610ME**
Credits: 3	CIE Marks:40	Duration of SEE : 3 Hours

COURSE OBJECTIVES The objectives of the course is to	**COURSE OUTCOMES** On completion of the course, students will be able to
provide an overview of Industry 4.O and its impact on modern manufacturing and develop skills for implementing industry 4.O technologies in production processes.	1. analyse the basic principles and technologies for smart factories and identify their applications in modern manufacturing. 2. evaluate the concepts of Cyber-Physical Systems (CPS) and Cyber-Physical Production Systems (CPPS) and their role in creating new business models. 3. apply the concepts of Digital Twins and Assistance Systems in production processes and their benefits. 4. develop strategies for ensuring safety and security in networked production environments and analyse the challenges and opportunities of Human-Robot Collaboration (HRC). 5. analyse the benefits and challenges of Cloud Manufacturing and the Connected Factory and develop strategies for implementing smart work pieces.

UNIT – I
Introduction to Industry 4.0

Definition of Industry 4.0, Comparison of Industry 4.0 Factory and today's Factory, Difference between conventional automation and Industry 4.0.

Basic principles and technologies of a Smart Factory

Internet of Things (IoT) & Industrial Internet of Things (IIoT) & Internet of Services, Big Data, Cyber-Physical Systems, Value chains in manufacturing companies, Customization of products, Digital Twins, Cloud Computing / Cloud Manufacturing, Security issues within Industry 4.0 networks.

UNIT – II

Cyber-Physical Systems (CPS) and Cyber-Physical Production Systems (CPPS)

Definition of Cyber-Physical System, Core elements of Cyber-Physical Systems and Cyber-Physical Production Systems, Control theory and real-time requirements, Self-organization principles, Communication in cyber-physical systems, Design Methods for Cyber-physical Systems, Applications for cyber-physical systems.

Cyber-Physical Systems and new Business Models

How CPS can induce new Business Models, The Role of horizontal and vertical value streams, New Business Models for the Smart Factory, Characteristics of Business Models within the Smart Factory, Examples of new Business Models: Service provider, Data provider, Technology provider, Platform provider.

UNIT – III

Digital Twins in Production

Basic concepts of Digital Twins, Benefits, impact and challenges of Digital Twins, Features and Implementation of Digital Twins, Types of Digital Twins, Digital Twin use cases, Applications for digital twins in production.

Assistance systems for production

The connected worker within the Industry 4.0 scenario, Diversity-driven workplaces, Human-and task-centered assistance systems, Technical tools ("Ambient Assisted Working" (AAW)), Mobile information technologies, Shop floor information systems, Production line support systems, Manipulator systems and intelligent chairs, Human work support by using exoskeletons, Applications of assistance systems in production.

UNIT –IV

Human-Robot Collaboration

Human-Robot Collaboration in Industry, Collaborative Robots: tasks, examples, Types of Human-Robot Collaboration, Safety of Human-Robot Collaboration, Applications with Collaborative Robots.

Safety and Security in networked Production Environments

Definition of Safety with Industry 4.0, Safety for connected Machines and Systems, Safety in Human Robot cooperation, Optimizing Safety with Industry 4.0, Security & Security Risks with Industry 4.0.

UNIT – V

Cloud Manufacturing and the connected factory

Virtualization, Cloud Platforms, Big data in production, Cloud-based ERP and MES solutions, Connected factory applications, IT security for cloud applications.

The smart workpiece

Intelligent work piece, Work piece tagging, QR codes and RFID, Communication between work piece and environment, Multi-agent systems in production, Applications for smart work pieces.

Learning Resources:

1. Alasdair Gilchrist, Industry 4.0: The Industrial Internet of Things, Apress, 2016.
2. Ibrahim Garbie, Sustainability in Manufacturing Enterprises: Concepts, Analyses and Assessments for Industry 4.0, Illustrated Edition, Springer, 2016.
3. Klaus Schwab, The Fourth Industrial Revolution, Crown, 2017.

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	10
3	No. of Quizzes:	0	Max. Marks for each Quiz Test:	--

Duration of Internal Test: 90 Minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEEING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF MECHANICAL ENGINEERING

ADDITIVE MANUFACTURING AND ITS APPLICATIONS
(General Pool)
(Open Elective-IV)

SYLLABUS FOR B.E VI Semester

L:T: P(Hrs./week):3: 0 : 0	SEE Marks:60	Course Code : **U22OE610ME**
Credits: 3	CIE Marks:40	Duration of SEE : 3 Hours

Course objectives	Course Outcomes
The objectives of this course are to: understand the fundamentals of various additive manufacturing technologies and their applications in Engineering Industry.	**On completion of the course the student will be able to:** 1. Understand the fundamentals of prototyping and the various data formats used in Additive Manufacturing. 2. Study the principle, process, advantages, limitations and case studies of liquid based AM systems. 3. Study the principle, process, advantages, limitations and case studies of solid based AM systems. 4. Study the principle, process, advantages, limitations and case studies of powder based AM systems. 5. Study the applications of AM in various engineering industries as well as the medical field.

Unit-I

Introduction, Prototyping fundamentals, Historical development, Advantages of AMT, Commonly used terms, **Fundamental Automated Processes,** process chain, 3D modeling, Data Conversion, and transmission, Checking and preparing, Building, Post processing, RP data formats, **Newly Proposed formats,** Classification of AMT process.

Unit-II

Liquid based systems: Stereo lithography apparatus (SLA): Models and specifications, process, working principle, photopolymers, photo polymerization,

layering technology, laser and laser scanning, applications, advantages and disadvantages, case studies.
Solid ground curing (SGC): Models and specifications, process, working, principle, applications, advantages and disadvantages, case studies.

UNIT III

Solid based systems: Laminated object manufacturing (LOM): Models and specifications, Process, Working principle, Applications, Advantages and disadvantages, Case studies.
Fused Deposition Modeling (FDM): Models and specifications, Process, Working principle, Applications, Advantages and disadvantages, Case studies.

Unit-IV

Powder Based Systems: Selective laser sintering (SLS): Models and specifications, process, **materials,** working principle, applications, advantages and disadvantages, case studies.
Three dimensional printing (3DP): Models and specification, process, working principle, applications, advantages and disadvantages, case studies.

UNIT-V

Applications of AM systems: Applications in **Design,** aerospace industry, automotive industry, jewellery industry, coin industry, GIS Application, arts and architecture.
RP medical and bio engineering Application: planning and simulation of complex surgery, customized implant and prosthesis, design and production of medical devices, forensic science and anthropology, visualization of bio-molecules.

Learning Resources:

1. Chua C.K., Leong K.F. and LIM C.S Rapid prototyping: Principles an Applications, World Scientific publications, 3rdEd., 2010
2. D.T. Pham and S.S. Dimov, "Rapid Manufacturing", Springer, 2001
3. Terry Wohlers, " Wholers Report 2000", Wohlers Associates, 2000
4. Paul F. Jacobs, " Rapid Prototyping and Manufacturing"–, ASME Press, 1996
5. Ian Gibson, Davin Rosen, Brent Stucker "Additive Manufacturing Technologies, Springer, 2nd Ed, 2014.

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max.Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **1 Hour 30 Minutes**

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD-31

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

ADVANCED COURSE IN ENTREPRENEURSHIP
(Open Elective-IV)

SYLLABUS FOR B.E.VI-SEMESTER

L:T:P(Hrs/week):3:0:0	SEE Marks:60	Course Code: **U22OE630EH**
Credits :03	CIE Marks:40	Duration of SEE: 03Hours

Course objectives **The objectives of this**	**Course Outcomes** **On completion of the course the student**
1. Acquire additional knowledge and skills for developing early customer traction into a repeatable business. 2. They will learn the tools and methods for achieving sustainable growth, such as refining the product or service and business models, building brand strategy, making a sales and financial plan etc.	1. Develop an A-team 2. Refine business models and expand customer segments, brand strategy and create digital presence, channel strategy for customer outreach 3. Develop strategies to grow revenues and markets, understand Advance Concepts of business finance, do Financial Planning, find Funding for growth 4. Leverage technologies and platforms for growth stage companies 5. Develop key metrics to track progress, understand Basics of registering a company.

Unit I: Pivoting and New Business Model

Introduction to Advance Course and Recapping the key concepts; Revisit of idea/ solution, business model and team members, Need for a mentor; Pivoting and its need; Types of Business models; Refining business model; Analyzing the Business Model of Competitors; Adding new customer segments to existing business model.

Unit II: Business Planning

Product Management: Need for a product management with examples; Making a sales plan; Building sales organization: Entrepreneur interview, Hiring sales team; Making a people plan for the venture; Introduction and understanding financial planning and forecasting template; Discussing

financial planning and revisiting business model; Creating a procurement plan; Negotiation.

Unit III: Customer Life cycle and Building the A-team

Customer life cycle; identifying secondary revenue streams; Funding Landscape: Funding options for an entrepreneur; Investor hunt: Creating funding plan and designing the pitch deck; Attracting right talent – I: Intro to building the A-team; Examples; Setting the team for success.

Unit IV: Branding and Channel Strategy, Leveraging Technologies

Creating brand Strategy: Drawing venture's golden circle; Defining the positioning statement: values; Creating a Public Image and Presence of the Venture; Identifying the right channel; Platforms for Marketing and Promotion; Platforms for Communication and Collaboration; Making the Tech Plan.

Unit V: Measuring Progress, Legal Matters and Role of Mentors & Advisors

Metrics for Customer Acquisition and Retention; Financial Metrics: Finding new revenue streams based on key financial metrics; Re-forecasting financial plan to increase margin; Professional Help and Legal & Compliance Requirements; Selecting IP for organization; Identifying mentors and advisors; Scouting board of directors; Capstone Project.

Learning Resources:

1. Rajeev Roy, Entrepreneurship, 3E 3rd Edition, Oxford University Press, India, 2020
2. Clancy, Ann L. & Binkert, Jacqueline, "Pivoting- A coach's guide to igniting substantial change" Palgrave Macmillan US 2017.
3. Porter, Michael, E., "Competitive Advantage: Creating and Sustaining Superior Performance", Free press, 1st edi.
4. Schwetje, Gerald & Vaseghi Sam, "The Business Plan", Springer-Verlag Berlin Heidelberg.
5. LeMay, Matt, "Product Management in Practice", O'Reilly Media Inc.
6. Smart, Geoff & Randy, Street., "Who: The A method of hiring", Ballantine books, 2008.
7. Blokdyk, Gerardus., "Customer Lifecycle Management - A complete guide", 5starcooks, 2018

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **1 Hour 30 Minutes**

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF PHYSICS

INTRODUCTION TO NANOTECHNOLOGY
(Open Elective-IV)

SYLLABUS FOR B.E. VI-SEMESTER

L:T:P (Hrs/Week):3:0:0	SEE Marks:60	Course Code: **U22OE610PH**
Credits: 3	CIE Marks:40	Duration of SEE:Hours:03

Course Objectives	Course Outcomes
Students are able to	**The students acquire the ability to**
1. Learn bulk, thin and nano structures. 2. Acquire knowledge on properties of nano materials. 3. Appreciate fabrication techniques of nano materials. 4. Learn nanomaterial characterization techniques.	1. Distinguish bulk, thin and nano materials from the point of view of size effects. 2. List various properties of nano materials. 3. Narrate various nanomaterial preparation techniques. 4. Describe characterization techniques of nano materials. 5. Write various applications of CNTs & nano structures.

UNIT-I: INTRODUCTION TO NANOSCIENCE

The distinction between bulk, thin films and nano materials-surface to volume ratio, change of electronic structure, density of states of nano materials, quantum confinement-quantum size effect, Quantum wells, Quantum wires, Quantum dots.

UNIT-II: PROPERTIES OF NANO MATERIALS

Electrical properties: conductivity, ballistic transport, Magnetic properties: soft and permanent magnetic nano materials, Giant Magneto Resistance (GMR), chemical properties, optical properties and thermal properties.

UNIT-III: NANOMATERIALS PREPARATION TECHNIQUES

Bottom-up and Top-down approaches. Preparation techniques Bottom-up methods: Physical Vapor Deposition, Laser Ablation, Chemical Vapor Deposition, Molecular Beam Epitaxy, Sol-gel method, top-down methods: ball milling, Nanolithography.

UNIT-IV: NANO MATERIAL CHARACTERIZATION TECHNIQUES

Characterization techniques: X-Ray Diffraction (XRD), working principles of Scanning Electron Microscopy (SEM), working of Transmission Electron Microscopy (TEM), Atomic Force Microscopy (AFM), Scanning Tunneling Microscope (STM), Field Emission Microscope (FEM).

UNIT-V: CARBON NANO MATERIALS AND APPLICATIONS

Graphene, Elementary ideas on Carbon nanotubes, types of CNTs-single wall (SWCNT) and multiwall carbon nanotubes (MWCNT), properties and characteristics of SWCNTS and MWCNTS. Applications of nano materials in cosmetic sector, food, agricultural, engineering, automotive Industry, environment, medical applications, textiles, paints, energy, and space Applications.

Learning Resources:

1. K.K. Chattopadhyay and A.N. Benerjee, Introduction to Nanoscience and Nanotechnology, PHI, 2019.
2. Nanomaterials and their Properties, IIT-Kanpur, NPTEL Course

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max.Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: 90 Minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF MATHEMATICS

ADVANCED PROBABILITY & STATISTICAL METHODS

OPEN ELECTIVE –IV, B.E. VI Semester

(for CSE, AI & ML and IT only)

L:T: P (Hrs/Week):3	SEE Marks:60	Course Code: **U22OE610MA**
Credits: 3	CIE Marks:40	Duration of SEE:Hours:03

COURSE OBJECTIVES	**COURSE OUTCOMES**
The course will enable the students to:	*At the end of the course students will be able to:*
1. **Understand** fitting of a straight line to a given data and measuring Correlation between variables. 2. **Study** the concepts and application of Time series. 3. **Distinguish** the various methods of Designs of Experiments 4. **Provide** the knowledge to the students about Prediction and control by statistical methods Regression and SQC. 5. **Learn** the concept of pure birth and death models of Queuing theory.	1. **Solve** problems on fitting of a straight line to the given data and also to find co-efficient of correlation and to determine regression lines and their application problems. 2. **Apply** concept of Time series to solve the real time problems. 3. **Apply** the methods of Designs of Experiments 4. **Evaluate** the performance measures of the systems in networks, transportation systems, production lines. 5. **Apply** the comprehensive levels of Queuing theory for calculating service time, traffic intensity, queue length etc. in special and general queues.

Unit-I (8 Classes)

Correlation & Regression Analysis:

Correlation –Scatter diagrams-Spearman's Rank of Correlation-Curve fitting by the Method of Least Squares - Fitting of Straight line - Second degreeparabolas – Regression - Lines of Regression - Multiple Regression-Curvilinear regression.

Unit-II (8 Classes)
Time series:
Time series and Forecasting: Introduction-Moving averages, weighted average method smoothening of curves forecasting models and Methods.

Unit-III (8 Classes)
Design of Experiments:
Introduction to Design of experiments-Aim of the Design of experiments-Randomized Block Design (R.B.D)-Latin Square Design (L.S.D)-Comparison of RBD and LSD-Related problems.

Unit-IV (8 Classes)
Queuing Theory:
Introduction, Input pattern, service pattern, queue discipline, Queue behavior, Kendal's notation, Pure Birth and Death Models, Traffic intensity; (M/M/1: ∞/FIFO)-Model: (M/M/: N/FIFO)-Model.

Unit-V (8 Classes)
Statistical Quality Control
Introduction, Methods for preparing control charts, variable charts – mean and range charts, Attribute charts- np, p and c charts.

TEXT BOOKS:
1. Probability, Statistics and Random Processes, T Veera Rajan, Tata McGraw-Hill companies
   (Seventh edition)
2. Probability & statistics and Random Processes; K.Murugesan & P.Gurusamy -Anuradha publishers
3. Probability & Statistics for Engineers, Miller& John E. Freund, Prentice Hall of India (Third edition)

REFERENCE BOOKS:
1. T.K.V. Iyengar et al, Probability and Statistics, S. Chand Publications, Revised edition.
2. Probability & Statistics for Engineers, Antony J. Hayter, CENGAGE Learning (India edition)

ONLINE SOURCES:
1. https://onlinecourses.nptel.ac.in/noc24_ch03
2. https://onlinecourses.nptel.ac.in/noc24_ma28

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max.Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: 90 Minutes

VASAVI COLLEGE OF ENGINEERING(Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

Skill Development Course-VII - Verbal Aptitude

SYLLABUS FOR B.E. VI-SEMESTER

L:T:P(Hrs/Week):2	SEE Marks:40	Course Code: **U22HS630EH**
Credits: 1	CIE Marks :30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the learners to:	**At the end of the course the learners will be able to:**
1. Introduce students to higher order thinking and problem solving via vocabulary and its various components 2. Train students to understand context & theme and use it to complete sentences. 3. Train students to identify the structure of sentences & paragraphs 4. Train students to analyze text, e.g., simple outlining and note taking, summarize, draw conclusions, and apply information to personal experiences 5. Train students to improve the quality of sentences by fixing errors	1. Use vocabulary as a tool to solve questions in verbal ability 2. Identify meanings of words using theme and context 3. Solve questions based on jumbles- sentences and paragraphs 4. Develop skills to critically analyze texts and then the ability to identify its theme 5. Improve the quality of their writing by being aware of the common errors

Unit 1: Vocabulary- Reading for Content and Context

Overview:

This course is designed for students to not just understand the importance of vocabulary but also to build on it by using the appropriate tools and methods. After which they will be able to solve vocabulary based questions and also use vocabulary as a tool to solve problems.

1.1 Concepts & Context Rules: Collocations & Phrasal Verbs
1.2 Prefixes/ Suffixes & Root Words
1.3 Phrases & Idioms; Questions based on it
1.4 One Word Substitution; Questions based on it
1.5 Antonyms, Synonyms & Incorrect Word Usage

Unit 2: Fill in the Blanks- Applying Content and Context
Overview:
This course is designed for students to identify the clue/ theme words in sentences, then understand the context in which the words are used and finally apply concepts like collocation, antonyms, and synonyms to solve questions.
2.1 Concepts & Rules: Single Fill in the Blanks
2.2 Double/ Triple Fill in the Blanks
2.3 Cloze Test

Unit 3: Jumbles
Overview:
This course is designed to develop and improve reading and study skills needed for college work. Topics include identifying main idea and supporting details, determining author's purpose and tone, distinguishing between fact and opinion, identifying patterns of organization in a sentence or passage and the transition words associated with each pattern, recognizing the relationships between words and sentences, identifying and using context clues to determine the meanings of words, identifying logical inferences and conclusions.
3.1 Concepts- Purpose, Tone, Point of view
3.2 Parajumbles
3.3 Jumbled Sentences

Unit 4: Critical Reading Skills
Overview:
Research shows that good reading skills can lead to well written assignments. In this unit, students will learn, develop and improve reading and study skills needed for college work. Building on these basic strategies, students will develop skills to critically analyze texts and then the ability to identify its theme.
4.1 Concepts- Basic Introduction & Short Passages
4.2 Article & Article Based Passages
4.3 Theme Detection

Unit 5: Spotting the Errors

Overview:

In this unit students will focus on identifying errors in sentences, rectifying them and improving the quality of sentences. Building on these skills will also have an impact on the written and spoken skills of students since they will be aware of the common and often made errors and therefore be able to avoid them while using language.

5.1 Concepts- Basic Introduction & Sentence Fillers
5.2 Spot the Errors
5.3 Sentence Improvement

METHODOLOGY

- Demonstration
- Presentations
- Expert lectures
- Writing and Audio-visual lessons

ASSESSMENTS

- Online assignments
- Individual and Group

Learning Resources:

learn.talentsprint.com

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	20
2	No. of Assignments	:	2	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	2	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

Skill Development Course-VIII (Technical Skills-IV)

Industry Standard Coding Practices – 2024

SYLLABUS FOR B.E. VI-SEMESTER

L:T:P(Hrs./week):1:0:0	SEE Marks : 40	Course Code:**UII22PE610CS**
Credits : 1	CIE Marks : 30	Duration of SEE : 2 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1. Understand importance of problem solving approaches for programming complex data structure problems. 2. Understand importance of optimized solutions for problems solving and its relevance to industry. 3. Implement mathematical and logical understanding approaches to implement test driven development practices. 4. Start participating in global coding competitions relevant to the syllabus 5. Write Efficient coding solutions using appropriate algorithm	1. Choose the right data structure based on the requirements of the problem. 2. Design algorithm for a given problem by choosing appropriate design technique and provide optimal solution.

Algorithms – Greedy Methods - II

Review of Greedy Strategies, Problem solving on greedy problems: Job sequencing solutions, Activity selection problem, Scenario based problem solving implementing Greedy Methods

Algorithms - Dynamic Programming - I

Introduction to Dynamic programming, Coding solutions to form Sub structures, Problem solving on Dynamic Knapsack, Trip optimization

problem, Scenario based problem solving using Dynamic Programming approaches, Coding solutions on Coin-change sub structure, Comparison of Greedy Vs DP for Coin change, Sum of sub sets problem

Algorithms - Dynamic Programming - II
Problem solving using Grid Memo, Problem solving on Longest Common Sub string, Longest Common subsequence, Minimum Edit Distance problems, Longest Increasing Sub sequences, Min sum path matrix, Max sum Sub square, Scenario based problem solving using Dynamic Programming approaches

Non-Linear Data structures – Graph Theory Introduction to Graphs Problems, Types of graphs, Problem solving on graph traversals, Checking the degree sequence, , DFS, BFS, Scenario based problem solving implementing graphs, Practice Problems

Non-Linear Data structures – Graph Algorithms
Problem solving on Graph Coloring, Introduction to DAG, Topological sorting on DAGs, Spanning Tree, Graph
Reduction, Kahn's Algorithm, Practice Problems

Backtrack Algorithms
Introduction to Backtracking, Differences between backtracking and brute force methods, State space diagram, N Queens problem, Finding a way, Solving Grid based backtracking problems, practice problems

String Algorithms
TRIE Data structure, Finite state machine for pattern matching, KMP algorithm, Example problem solving

Operating Systems
Operating Systems Overview, Process Management, CPU Scheduling algorithms, Deadlocks, Memory Management, Examples.

Networking
The OSI Model, The TCP/IP Model, Network typologies and Ethernet, Internet Protocol v4 and v6, Media Access Control and Address Resolution Protocols, IP Addressing, Examples.

Introduction to Java and Expressions and control Statements

Introduction to Java, Java Setup, first Java program, Variable and data type, Primitive Data Types, String basics, Type casting, Operators in Java, Control Statements: If Statements, Switch case, For loop, While loop, Do while loop, Break and continue, Nested loops, Modulo operator, Methods parameters and return type, Method overloading, Naming convention, BigDecimal class

Object Oriented Programming Through Java - 1

Orientation to Object oriented programming, Classes, Constructors, introducing inheritance, Type of inheritance, Composition Introduction Encapsulation, Polymorphism, Concepts of Java: Interfaces, Abstract class, Example Problems

Object Oriented Programming Through Java - 2

Introduction, Multiple inheritance using interfaces, Inner classes, Types of nested class, Local inner class, Anonymous object, Anonymous inner class, Advantages of inner class, User input, Static elements, Final keyword, Final keyword with method and class, Packages, Access modifier

Exception Handling through Java

Introduction to Exception handling, Multiple catch blocks, Finally block, Throw and throws, User defined exception, Checked and unchecked exceptions

Strings through Java

Introduction to Strings, Difference between String literal and String Object, String methods, String formatting, String functions, manipulating strings, example problems

DBMS

Introduction to DBMS, SQL Queries, ER And Relational Models, Data Definition And Querying, Transactions
And Concurrency, Normalization, case studies, Example Problems.

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	1	Max. Marks for each Internal Test	:	20
2	No. of Quizzes	:	1	Max. Marks for each Quiz	:	10

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

INTERNET OF THINGS LAB

SYLLABUS FOR B.E. VI-SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks:50	Course Code: **UII22PC611CS**
Credits : 1	CIE Marks:30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Develop programs to interface sensors & actuators with Raspberry PI and Arduino Uno.	1 Implement programs on Arduino Uno board 2 Develop application programs to interface sensors and actuators with Raspberry PI.
2 Develop applications for smart home.	3 Implement programs to demonstrate communication protocols 4 Develop applications to publish data on to the cloud 5 Build an IoT prototype

Programming Exercise:

1. Experiments using Arduino Uno Board
2. Programming Raspberry PI to read data from onboard sensors
3. Interfacing ultrasonic, IR sensors to Raspberry PI
4. Interfacing Soil Moisture sensor for Agriculture based Application
5. Developing Control applications to interface servo motor
6. Developing Control applications to interface stepper motor
7. Demonstrate communication protocol Bluetooth
8. Demonstrate communication protocol LoRa
9. Develop an application using MQTT Protocol

10. Demonstration of Zigbee protocol for IoT applications
11. Publishing data on to the Cloud
12. Develop a project that addresses a specific domain.

Learning Resources:

1. ArshdeepBahga, Vijay Madisetti, “Internet of Things: A Hands-on Approach”, Universities Press, 2014.
2. https://www.raspberrypi.org/.
3. https://www.arduino.cc/.
4. http://electronicsforu.com/resources/embedded-systems-overview/.

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18
Duration of Internal Test: 2 Hours			

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

SOFTWARE ENGINEERING LAB

SYLLABUS FOR B.E. VI-SEMESTER

L:T:P(Hrs./week):0:0:2	SEE Marks :50	Course Code: **UII22PC621CS**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Apply software engineering principles for analyzing, visualizing, specifying, constructing for software intensive system. 2 Document the artifacts of software system.	1 Identity the functional and non functional requirements and estimate effort /cost for the given system. 2 Design the Data/Work/Control flow in the modules of the intended system. 3 Construct the Structural, Behavioural, Interaction & State aspects for the intended system. 4 Develop the artifacts of the intended system through forward and reverse engineering. 5 Build test cases and evaluate the software project quality.

Programming Exercise:
Select one large information system/Approach and device the following using CASE TOOL.

1. Systems software Requirements and related analysis documents as per the guidance in ANSI/IEEE Std 830-1984.
2. Design documents representing the complete design of the software system using Data flow diagram.
3. Functional Decomposition and structure.

4. Behavioral Modeling- use case diagram demonstration using UML.
5. Behavioral Modeling- Interaction diagram demonstration using UML.
6. Behavioral Modeling- State machine diagram demonstration using UML.
7. Structural Modeling- Class diagram demonstration using UML.
8. Familiarization of Forward and reverse engineering the class diagram using tools.
9. Architectural Modeling-component and deployment diagram demonstration using UML.
10. Git installation and create a repository and perform fetch, pull, branching operations.
11. Jenkins Installation and implement continues Integration and Continues deployment, build a job using Jenkins.
12. Demonstration on functional testing using RFT.
13. Build a design model for a given application.

Learning Resources:

1. Roger S. Pressman, Software Engineering: A Practitioner's Approach, 6th Edition, (2005) Tata McGrawHill.
2. Grady Booch, James Rumbagu, Ivor Jacobson, The Unified Modeling Language-User guide , 2nd Edition, (2007), Pearson Education, India.
3. Joakim Verona. "Practical Devops", Second Edition. Ingram short title; 2nd edition, 2018.
4. 2. Deepak Gaikwad, Viral Thakkar, "DevOps Tools from Practitioner's Viewpoint". Wiley publications, 2019.
5. http://www.nyu.edu/classes/jcf/g22.2440-001_sp09/handouts/UMLBasics.pdf
6. https://courses.cs.washington.edu/courses/cse403/11sp/lectures/lecture08-uml1.pdf
7. https://www.coursera.org/learn/intro-to-devops

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18
Duration of Internal Test: 2 Hours			

VASAVI COLLEGE OF ENGINEERING(Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

DEEP LEARNING LAB

SYLLABUS FOR B.E. VI - SEMESTER

L:T:P(Hrs./week):0:0:2	SEE Marks:50	Course Code : **UII22PC631CS**
Credits : 1	CIE Marks:30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1.Understand issues and techniques involved in the creation of intelligent systems	1 Understanding basics of Deep Learning Libraries 2 Implement the real time applications. 3 Build a model for Classification. 4 Build a model to predict the real world applications using CNN. 5 Develop a model for prediction using RNN.

Programming Exercise:

1. Install and work on simple operations on python libraries like Tensorflow, Keras, PyTorch.
2. Human Face Recognition on Real Time(Video) and Image(JPEG) using OpenCV and Haarcascade.
3. Data preprocessing techniques for training a deep learning model.
   Reading the Dataset, Handling Missing Data, Conversion to the Tensor Format
4. Building Python GUI Application with Tkinter.
5. Build a Model to binary classify a given image using deep learning model.
6. Apply dimensionality reduction techniques using PCA on dataset.
7. Develop a CNN for MNIST Handwritten Digit Classification.
8. Build a Model to classify the images of Clothing using Fashion MNIST Dataset.

9. Build a Model for Multi Class Classification for CIFAR-10 Dataset.
10. Build a Model to predict Stock Price Predictions using LSTM.

Learning Resources:

1. Ian Goodfellow, YoshuaBengio, Aaron Courville, Deep Learning: Adaptive Computations and Machine Learning Series, 2016 edition, An MIT Press Book
2. Nikhil Buduma, Nicholas Locascio, “Fundamentals of Deep Learning: Designing Next-Generation Machine Intelligence Algorithms”, O'Reilly Media, 2017
3. Eugene Charniak, Introduction to Deep Learning, 2019 Edition.
4. Michael Nielsen,“Neural Networks and Deep Learning”, Determination Press 2015
5. Bishop, C. ,M., Pattern Recognition and Machine Learning, Springer, 2006
6. Raúl Rojas, Neural Networks : A Systematic Introduction, Springer, 1996
7. https://nptel.ac.in/courses/106106184
8. https://www.deeplearning.ai/program/deep-learning-specialization/
9. https://www.coursera.org/specializations/deeplearning?action=enroll&utm_campaign=WebsiteCoursesDLSTopButton&utm_medium=institutions&utm_source=deeplearningai
10. https://www.udemy.com/course/basics-of-deep-learning/
11. https://www.udemy.com/course/tensorflow-20-recurrent-neural-networks-lstms-grus/

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work			18
Duration of Internal Test: 2 Hours			

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

THEME BASED PROJECT

SYLLABUS FOR B.E. VI-SEMESTER

L:T:P(Hrs./week):0:0:2	SEE Marks : 50	Course Code:**UII22PW619CS**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1 Develop an application in the relevant area of Computer Science	1 Review the literature survey to identify the problem.
2 Learn contemporary technologies.	2 Design a model to address the proposed problem. 3 Develop and test the solution. 4 Demonstrate the work done in the project through presentation and documentation. 5 Adapt to contemporary technologies.

The students are required to carry out a theme based project by selecting any one of themes like Smart Home, Smart Parking, Smart Transport, Smart Waste Management, Smart Healthcare, Smart Agriculture, Smart Lighting, Smart Logistics and Smart Security in the area of Internet of Things or themes in any other area relevant to Computer Science.

Students are required to submit a report on the theme based project at the end of the semester.