VASAVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
Ibrahimbagh, Hyderabad-31
Approved by A.I.C.T.E., New Delhi and
Affiliated to Osmania University, Hyderabad-07

Sponsored
by
VASAVI ACADEMY OF EDUCATION
Hyderabad

SCHEME OF INSTRUCTION AND SYLLABI UNDER CBCS FOR B.E. (EEE) V and VI Semesters With effect from 2024-25 (For the batch admitted in 2022-23) (R-22)

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
Phones: +91-40-23146030, 23146031
Fax: +91-40-23146090

INSTITUTE VISION

Striving for a symbiosis of technological excellence and human values.

INSTITUTE MISSION

To arm young brains with competitive technology and nurture holistic development of the individuals for a better tomorrow.

DEPARTMENT VISION

Empowering Future Engineers in Electrical & Electronics Engineering with Technological Excellence and Human Values.

DEPARTMENT MISSION

To Arm Aspiring Engineers with Cutting-Edge Technology and Cultivate Holistic Development, Fostering a Synergy of Knowledge and Values for a Brighter Future.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO 1: Graduates will acquire technical competence to analyze, design and solve engineering problems in the field of Electrical and Electronics Engineering and use modern engineering tools, techniques and software.

PEO 2: Graduates will be able to acquire necessary skills and obtain employment and will be productive in the professional practice of Electrical and Electronics Engineering and related fields.

PEO 3: Graduates will be sensitive to professional and social contexts, committed to ethical action and engaged in lifelong learning skills.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO 1: EEE students will be able to design, analyze Power Systems & Electrical Machines to solve complex engineering problems.

PSO 2: EEE students will be able to design and analyze Electrical and Power Electronic Circuits.

PSO 3: EEE students will be able to use and apply modern software tools and techniques related to Electrical Engineering.

B.E. (EEE) PROGRAM OUTCOMES (PO's)	
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.
PO4	**Conduct investigations of complex problems:** Use research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
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 need for 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.
P1O	**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.
P11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
P12	**Lifelong learning:** Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS):: IBRAHIMBAGH, HYDERABAD – 500 031.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SCHEME OF INSTRUCTION AND EXAMINATION (R-22)::B.E. - EEE : FIFTH SEMESTER(2024-25)

B.E (EEE) V Semester								
Course Code	**Name of the Course**	**Scheme of Instruction**			**Scheme of Examination**			
		Hours per Week			**Duration in Hrs**	**Maximum Marks**		**Credits**
		L	**T**	**P/D**		**SEE**	**CIE**	
THEORY								
U22PC510EE	AC Machines	3	1	-	3	60	40	4
U22PC520EE	Digital Electronics	3	-	-	3	60	40	3
U22PC530EE	Control Systems	3	1	-	3	60	40	4
U22PC540EE	Linear Integrated Circuits & Applications	3	-	-	3	60	40	3
U22OE5X0XX	Open Elective -III	3	-	-	3	60	40	3
U22HS510EH	Skill Development Course-V (Communication Skills-II)	1	-	-	2	40	30	1
U22PE510EE	Skill Development Course-VI (Technical Skills-II)	1	-	-	2	40	30	1
PRACTICALS								
U22PC511EE	AC Machines Lab	-	-	2	3	50	30	1
U22PC531EE	Control Systems and Simulation Lab	-	-	2	3	50	30	1
U22PC541EE	Linear Integrated Circuits & Applications Lab	-	-	2	3	50	30	1
U22PW519EE	Mini Project			2	-	50	30	1
ECA-II		-	-	-	-	-	-	-
CCA-III (Paper Presentation)		-	-	-	-	-	-	-
Library/Sports/Mentor- Mentee Interaction		-	-	-	-	-	-	-
Total		**17**	**2**	**8**		**580**	**380**	**23**
Grand Total		**27**			**-**	**960**		**23**

B.E students shall complete one NPTEL Certificate equivalent Course of 8 weeks equivalent to 2 Credits by the end of VI semester

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

AC MACHINES

SYLLABUS FOR B.E. V SEMESTER

L:T: P (Hrs/Week):3:1:0	SEE Marks: 60	Course Code: **U22PC510EE**
Credits: 4	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES The course will enable the students to:	**COURSE OUTCOMES** On completion of the course, students will be able to
To study the performances and applications of AC machines like Induction machines and Synchronous machines.	1. Demonstrate basic concepts of AC machines windings, Analyze the concepts of constant magnetic field and rotating magnetic fields. 2. Analyze speed torque characteristics and control the speed of induction motors 3. Identify and analyze the operation of Single –phase machines. 4. Analyze the operation and characteristics of synchronous generator. 5. Analyze the operation and characteristics of synchronous motor.

UNIT-I:

Fundamentals of AC machine windings and generation of magnetic field:
Physical arrangement of windings in stator and cylindrical rotor; slots for windings; single-turn coil - active portion and overhang; full-pitch coils, concentrated winding, distributed winding, Air-gap MMF distribution with fixed current through winding - concentrated and distributed, winding distribution factor. Constant magnetic field, Conditions for the generation of RMF,

Generation of RMF by spatially displaced two windings and three phase windings.

UNIT-II:

Three Phase Induction Motors:

Construction, Types (squirrel cage and slip-ring), Torque Slip Characteristics, Starting and Maximum Torque, Equivalent circuit. Phasor Diagram, Power Flow diagram, Losses and Efficiency. No load and Blocked rotor test, Starting methods of squirrel cage and wound rotor induction motor, Modes of operation, Speed control methods – Resistance control, Voltage control, Variable frequency control,

UNIT-III:

Single-phase induction motors:

Constructional features, working principle, double revolving field theory, equivalent circuit, determination of equivalent circuit parameters. Split-phase starting methods and applications

UNIT-IV:

Synchronous machines:

Constructional features, Salient and non-salient pole synchronous machines

Synchronous Generator (Alternator)generated EMF, equivalent circuit and phasor diagram, armature reaction, synchronous impedance, voltage regulation-Synchronous impedance method, Ampere-turns and Z.P.F Method. Power angle characteristics, Slip test, V-curves power angle characteristics. Parallel operation of alternators - synchronization.

UNIT-V:

Synchronous Motors:

Operating Principle, Two reaction theory, Power flow equations of cylindrical and salient pole machines, Operating characteristics. Synchronous Motor-Starting methods, Effect of varying field current at different loads, V- curves, Hunting& damping, Synchronous condenser.

Suggested Books:

1. Nagarath I.J., Kothari D.P., Electrical Machines. 4th Edition 2010, Tata McGraw Hill.

2. Gupta J.B., Theory and Performance of Electrical Machines, 2003, S.K. Kataria.& Sons.

3. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", McGraw Hill Education, 2013.
4. A. S. Langsdorf, "Alternating current machines", McGraw Hill Education, 1984.
5. P. C. Sen, "Principles of Electric Machines and Power Electronics", John Wiley & Sons, 2007
6.Bhimbra P.S., Generalized Theory of Electrical Machines, Khanna Publications
7. Dr.P.SBimbhra, Electrical Machinery,7th Edition, Khanna Publishers
8. M.G. Say, The Performance and Design of A.C. Machines – Pitman Publications.
Online resources: http://nptel.ac.in/courses/; http://ocw.tufts.edu; http://ocw.upm.es; www.open.edu/openlearn/

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 Test: 90 minutes

With effect from the Academic Year 2024-25

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

DIGITAL ELECTRONICS

SYLLABUS FOR B.E. V SEMESTER

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code: **U22PC520EE**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES The course will enable the students to:	**COURSE OUTCOMES** On completion of the course, students will be able to
1. To understand number representation and conversion between different representation in digital electronic circuits. 2. To analyze logic processes and implement logical operations using combinational logic circuits. 3. To understand characteristics of memory, sequential circuits, Programmable Devices, PLA, PAL and FPGA and their classification, A/D, D/A Converters.	1. Understand working of logic families and logic gates. 2. Design and implement Combinational and Sequential logic circuits. 3. Understand the process of Analog to Digital conversion and Digital to Analog conversion. 4. Be able to use PLDs to implement the given logical problem.

UNIT-I:

Fundamentals of Digital Systems and logic families:

Digital circuits, AND, OR, NOT, NAND, NOR and Exclusive-OR operations, Boolean algebra, examples of IC gates, number systems-binary, signed binary, octal hexadecimal number, binary arithmetic, one's and two's complements arithmetic, codes, error detecting and correcting codes, characteristics of digital lCs, digital logic families, TTL, Schottky TTL and CMOS logic.

UNIT-II:

Combinational Digital Circuits :

Standard representation for logic functions, K-map representation,

simplification of logic functions using K-map, minimization of logical functions. Don't care conditions, Q-M method of function realization,

Multiplexer, DeMultiplexer/Decoders, Adders, Subtractors, BCD arithmetic, carry look ahead adder, serial adder, digital comparator, parity checker/generator, code converters, priority encoders.

UNIT-III:

Sequential circuits and systems:

The clocked SR flip flop, J- K-and D types flip flops, applications of flip flops, shift registers, applications of shift registers, serial to parallel converter, parallel to serial converter, ring counter, ripple (Asynchronous) counters, synchronous counters, counters design using flip flops.

UNIT-IV:

A/D and D/A Converters :

Digital to analog converters: weighted resistor/converter, R-2R Ladder D/A converter, specifications for D/A converters, examples of D/A converter lCs, Analog to digital converters: Successive approximation A/D converter, Dual slope A/D converter, specifications of A/D converters, example of A/D converter ICs

UNIT-V:

Semiconductor memories and Programmable logic devices.:

Memory organization and operation, expanding memory size, classification and characteristics of memories, sequential memory, read only memory (ROM), read and write memory(RAM), content addressable memory (CAM), commonly used memory chips, ROM as a PLD, Programmable logic array, Programmable array logic.

Learning Resources:

1. Morris Mano M., Digital Design, Prentice Hall of India, Second Edition, 1994.
2. ZviKohavi, Switching and Finite Automata Theory, Tata McGraw Hill, Second Edition, 1991
3. Tocci&Widmer_Digital Systems-Pearson Education-Eight Editiion, 2003.
4. Donald Pleach/Albert Paul Malvino/ GoutamSaha :Digital Principles and Applications" MCGraw-Hill, 2006.

5.B. Somnath Nair, Digital Elctronics and Logic Design, Prentice Hall, India, 2002
6.R. P. Jain, "Modern Digital Electronics", McGraw Hill Education, 2009.
7.A. Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, 2016.

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 Test: 90 minutes

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

CONTROL SYSTEMS

SYLLABUS FOR B.E. V SEMESTER

L:T: P (Hrs/Week):3:1:0	SEE Marks: 60	Course Code: **U22PC530EE**
Credits: 4	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES The course will enable the students to:	**COURSE OUTCOMES** On completion of the course, studentswill be able to
1.Control system modeling: modeling of electric, mechanical and electro mechanical systems, using differential equations, transfer functions, block diagrams, and state variables; 2. Control system analysis: analysis of properties of control systems, such as sensitivity, stability, controllability, tracking, in time and frequency domains; and 3. Control system design: design of feedback controllers, such as PID, lead and lag compen-sat or stomeet desired system performance specifications.	1. Model different electrical, mechanical and electromechanical systems using differential equations, transfer functions and block diagrams and also simplify the complex systems using signal Flow graphs 2. obtain the time response of systems and analyze the stability in time domain using Routh Hurwitz criterion and Root locus techniques and also design the feedback controller such as PID controller to meet the desired performance specifications. 3. Obtain the frequency response of systems and analyze the stability in frequency domain and also design the feedback controllers, such as lead and lag compensators to meet the desired performance specifications using bode plots and polar plots 4. Analyze the stability in frequency domain using Nyquist stability criterion 5. Obtain state space Models and response for various electrical and electromechanical systems and also analyze the systems controllability and observability of the systems.

UNIT – I:

Open and closed loop systems: Continuous time and discrete time control systems, Mathematical modelling of mechanical and electrical systems. control system components, AC – DC servo motors – Block diagram representation, Transfer function and impulse response – signal flow graphs.

UNIT – II:

Time Response: Types of input, Transient response of second order systems for step input. Time domain specifications – Types of system – static error coefficients, Error series – Routh-Hurwitz criterion of stability. Root locus technique – Typical systems analyzed by root locus technique – Effect of location of roots on system response, Effect of PID controllers -Tuning of PID using Ziegler-Nichlos rules for tuning PID Controllers .

UNIT – III:

Frequency Response – I: Introduction, Frequency domain specifications. MP, wP for a second order system, Frequency response analysis using Bode plots , Relative stability analysis, gain margin and phase margin, transfer function from Bode plot-Compensation: Lead, Lag, Lead – Lag Compensation using bode plot.

UNIT – IV:

Frequency Response – II: Polar plot, Nyquist plot, Mapping Theorem, Nyquist stability criterion, Principle of argument, Analysis of Typical systems using Nyquist stability criterion, Gain Margin , phase margin .

UNIT – V :

State Space Representation: Concept of state, State Variable, State Models of linear time invariant systems. Derivation of state models from transfer functions and differential equations. State transition matrix – solution of state equations by time domain method. Observability and Controllability.

Learning Resources:

1. I.J. Nagrath, M. Gopal, Control System Engineering, 6th edition, New Age International Publishers, 2017
2. M. Gopal, Control System Principles and Design – Tata McGraw Hill, 4th edition, 2012.
3. A.NagoorKani, Control systems Engineering-CBS pub &DistPvt Limited, June-2020

4. K. Ogata, Modern Control Engineering, 5th Edition, PHI, 2015
5. Farid Golnaraghi, Benjamin C.Kuo, Automatic Control Systems, tenth Edition, McGraw-Hill Education, 2017
6. Norman S. Nise Control Systems Engineering, Wiley 2018

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

1. No. of Internal Tests	:	2	Max. Markhs 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 Test: 90 minutes

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

LINEAR INTEGRATED CIRCUITS & APPLICATIONS

SYLLABUS FOR B.E. V SEMESTER

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code: **U22PC540EE**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES The course will enable the students to:	**COURSE OUTCOMES** On completion of the course, students will be able to
To impart fundamental concepts of linear and non linear devices and circuits namely Operational Amplifier, Multivibrator, 555 timer, voltage regulators and provide an overview on design of active filters for linear IC applications.	1. Demonstrate and understand fundamentals of linear integrated circuits. 2. Analyze the non-linear circuit applications based on particular linear integrated circuit. 3. Select and use an appropriate linear integrated circuit to build a given application. 4. Analyze the voltage regulators for a given linear circuit applications. 5. Select and design a second order active filter for IC applications.

UNIT-I:

Operation amplifiers: Internal structure of an operational amplifier, ideal op-amp Characteristics, non-idealities in an op-amp -Output offset voltage, input bias current, input offset current, effect of CMRR, slew rate, gain bandwidth product, Frequency response - Stability, frequency compensation of op-amp.

Linear applications of op-amp: Inverted summer, subtractor, add-subtractor, analog integrator, differentiator, multiplier, analog divider, V - I and I-V converter, voltage follower, AC amplifiers.

UNIT-II:

Instrumentation amplifier circuits using op-amps.

Nonlinear applications of op-amp: Voltage limiter, precision rectifiers, peak detector, clipper and clamper, comparator, zero crossing detector, hysteretic comparator, monostable, astable multi vibrator circuits using op-amps, logarithmic amplifiers.

UNIT-III:

Waveform generation using op-amps: sine, Square, Triangular, phase shift, Wein bridge and quadrature oscillators, voltage controlled oscillator, voltage to frequency converter, 555 timer functional diagram, operation as monostable and astable. phase locked loop- lock in range and captured range frequency.

UNIT-IV:

Voltage regulators using op-amps: Series voltage regulator, shunt regulators, and switching regulators using OP-amp, dual voltage regulator, fixed voltage regulators, dual tracking regulators, current sensing and current feedback protection.

UNIT-V:

RC Active filters using op-amps: Low pass, high pass and band pass, band reject, notch, first order, second order transformation, state variable filter , switched capacitor filter. P, PI and PID controllers and lead/lag compensator using an op-amp.

Learning Resources:

1. D.RoyChoudhury, Linear Integrated Circuits, ShailB.Jain, 4th Edition, New Age International(P) Ltd.,2010.
2. R.A. Gayakwad, Op-Amps and Linear Integrated Circuits, 4th Edition, Prentice Hall of India,2009.
3. Coughlin and Driscoll, Operational Amplifiers and Linear Integrated Circuits, 6th Edition, Prentice hall of India,2003.

4. Malvino Albert Paul, Electronic Principles, 7th Edition, Tata McGraw Hill, 2006.
5. S. Franco, "Design with Operational Amplifiers and Analog Integrated Circuits", McGraw Hill Inc.,2002

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 Test: 90 minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

SKILL DEVELOPMENT COURSE V -COMMUNICATION SKILLS -II

SYLLABUS FOR B.E. V-SEMESTER

L:T: P (Hrs/Week):1:0:0	SEE Marks: 40	Course Code: **U22HS510EH**
Credits: 1	CIE Marks: 30	Duration of SEE : 2 Hours

COURSE OBJECTVES	**COURSE OUTCOMES**
The course will enable the learners to: **1.** Get students proficient in both receptive and productive skills **2.** Enable students to build strategies for effective group interaction and help them in developing decisive awareness and personality while maintaining emotional balance. **3.** To introduce students to an ideal structure for a presentation **4.** To develop and improve writing and study skills needed for college work.	**At the end of the course the learners will be able to: -** **1.** Participate in group and forum discussions by providing factual information, possible solutions, and examples **2.** Present a topic by picking up the key points from the arguments placed. **3.** Read between the lines and write informed opinions. **4.** Prepare, present, and analyze reports

Unit 1: Delightful Discussions

1.1 Six Thinking Hats
1.2 Group Discussion Techniques (Initiation Techniques, Generating Points, Summarization techniques)
1.3 Case Study Based Group Discussions

Unit 2: Powerful Presentations

Concise Cogent Presentation
2.1 Persuasion skills

2.2 Toulmin Model
2.3 BikerB - JAM and Extempore

Unit 3: Fact, Observation and Inference

3.1 Discernment of fact and opinion
3.2 Note making and Inference
3.3 Main idea identification
3.4 Logical Conclusions

Unit 4: Effective Technical Writing

4.1 Report writing
4.2 Image Writing
4.3 Book Reviews
4.4 Movie Reviews

Learning Resources:

1. How to Win Friends and Influence People by Dale Carnegie. ...
2. Crucial Conversations: Tools for Talking When Stakes Are High by Kerry Patterson, Joseph Grenny, Ron McMillan, and Al Switzler. ...
3. Difficult Conversations: How to Have Conversations that Matter the Most by Douglas Stone, Bruce Patton, Sheila Heen, and Roger Fisher.

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	:	3	Max. Marks for each Assignment	:	5
3. No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Test: 90 minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Skill Development Course VI -Technical Skills-II

SYLLABUS FOR B.E. V SEMESTER

L:T:P (Hrs/Week): 1:0:0	SEE Marks: 40	Course Code: **U22PE510EE**
Credits: 1	CIE Marks: 30	Duration of SEE: 2 Hours

COURSE OBJECTIVES	COURSE OUTCOMES

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

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

Duration of Internal Test: 90 minutes

With effect from the Academic Year 2024-25

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

AC MACHINES LAB

SYLLABUS FOR B.E. V SEMESTER

L:T: P (Hrs/Week):0:0:2	SEE Marks: 50	Course Code: **U22PC511EE**
Credits: 1	CIE Marks: 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES The course will enable the students to:	**COURSE OUTCOMES** On completion of the course, students will be able to
To expose the students to practical experiments of AC machines.	1. Test the performance of 3-phase induction motor 2. Predetermine the voltage regulation of Non- salient and Salient Alternators by conducting suitable tests. 3. Test the performance of performance of 3-phase synchronous motor 4. Test the performance of Induction generator 5. Test the performance of 1-phase induction motor

List of Experiments:

1. No-load test, blocked rotor test and load test on 3-phase Induction motor
2. Voltage regulation of Alternator by Synchronous impedance method
3. Voltage regulation of Alternator by Ampere – turn method
4. Voltage regulation of Alternator by Z.P.F. method.
5. Regulation of Alternator by slip test.
6. Determination of V curves and inverted V curves of Synchronous motor.
7. Power angle characteristics of a Synchronous motor.
8. Load characteristics of Induction Generator.

9. P.F. improvement of Induction motor using capacitors.
10. Synchronization of Alternator using three dark lamp method.
11. Torque –speed characteristics of single phase Induction Motor.
12. Parallel operation of Alternators

Virtual lab Experiments:

- Speed control of slipring Induction Motor
- Motor forward and reverse direction control using PLC

From the above experiments, each student should perform at least 10 (Ten) experiments.

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for assessment of each experiment			18
Duration of Internal Test: **3 Hours**			

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

CONTROL SYSTEMS AND SIMULATION LAB

SYLLABUS FOR B.E. V SEMESTER

L:T: P (Hrs/Week):0:0:2	SEE Marks: 50	Course Code: **U22PC531EE**
Credits: 1	CIE Marks: 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** On completion of the course, students will be able to
The objective of the lab is to provide an experience in working with various control system components and control systems for understanding analyzing them and also enhance the analyzing capability by introducing simulation tools for control systems.	1. Demonstrate the characteristics of AC, DC servo motors, second order system and synchro pair. 2. Infer the effect of P,PI,PD and PID controllers on closed loop control system 3. Analyze AC and DC position control systems. 4. Design lead and lag compensators and obtain the frequency response characteristics.

LIST OF EXPERIMENTS:

1. Characteristics of DC and AC Servo motors.
2. Step response of second order system.
3. Closed loop P,PI,PD and PID controller.
4. ON/ OFF Temperature control system.
5. Water Level Control System using LabVIEW.
6. Simulation of Root locus, Nyquist plot, Bode plot using Matlab/Simulink & LabVIEW
7. Design of lead compensators using MATLAB
8. Conversion of state to transfer function and transfer function statespace using MATLAB
9. Time response of Second order system using MATLAB(Simulink)
10. Tuning of PID controller to meet required specifications

11. Frequency response of compensating network.
12. Implementation of PID Controllers using MATLAB
13. Inverted Pendulum Control using Quanser Control Board
14. Speed Control of Servo Motor , DC Motor , Stepper and BLDC Motor using Quanser Mechatronics Actuator Board.

Virtual Lab Experiments:

1. Study of Rectilinear Motion http://vlabs.iitkgp.ac.in/gps/ctrl/Exp1/index.html
2. Study and operation of Magnetic Levitation http://vlabs.iitkgp.ac.in/gps/ctrl/Exp7/index.html
3. Study and operation of Inverted Pendulum System http://vlabs.iitkgp.ac.in/gps/ctrl/Exp11/index.html
4. Two Tank Water Level Control http://vlabs.iitkgp.ac.in/gps/ctrl/Exp10/index.html

From the above experiments, each student should perform at least 10 (Ten) experiments.

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for assessment of each experiment			18
Duration of Internal Test: **3 Hours**			

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

LINEAR INTEGRATED CIRCUITS & APPLICATIONS LAB

SYLLABUS FOR B.E. V SEMESTER

L:T: P (Hrs/Week):0:0:2	SEE Marks: 50	Course Code: **U22PC541EE**
Credits: 1	CIE Marks: 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To acquire skills of designing and testing of digital and analog integrated circuits.	1. Analyze and design various applications of Op-Amp. 2. Construct and troubleshoot circuits containing linear integrated circuits. 3. Design combinational and sequential logic circuits using ICs. 4. Identify the suitable ICs in the applications of adders, counters, converters and multiplexers. 5. Compute the Triangle and square wave using op-amp and ICs.

LIST OF EXPERIMENTS:

1. Generation of Triangle and square wave using op-amp.
2. PLL (Phase locked loop).
3. Design of astable multi vibrator using 555 timer.
4. Active filters.
5. Design of integrator and differentiator using op-amp.
6. Multiplexer applications for logic Realization of combinational circuits.
7. Synchronous counter.
8. Asynchronous counter.
9. Study of clipping and clamping circuits using op-amps.
10. Design of mono stable multi vibrator using IC's.

11.Instrumentation amplifier using op-amp.

12.Study of half adder, full adder and subtractor using IC's.
13.D/A converters.
14.A/D converters

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for assessment of each experiment			18
Duration of Internal Test: **3 Hours**			

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Mini Project

SYLLABUS FOR B.E. V SEMESTER

L:T:P(Hrs./week):0:0:2	SEE Marks:50	Course Code: **U22PW519EE**
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. Learn contemporary technologies. 2. Design/Develop/Implement/Solve an engineering problem in the relevant areas of Electrical and Electronics Engineering.	1. Apply the knowledge acquired in the electrical engineering. 2. Demonstrate the ability to locate and use technical information from multiple sources. 3. Demonstrate the ability to communicate effectively through a technical report. 4. Demonstrate independent learning and professional ethics. 5. Demonstrate the project management capabilities.

The students are required to carry out mini projects irrelevant areas of Power Systems, Power Electronics, Electrical Machines, Measurements, Control Systems, Circuits, Micro Processors Controller and digital signal processing.

Students are required to submit a report on the mini project.

- Batch size shall be 2 (or) 3 students per batch.
- Allocation by department.
- Two reviews – One during 5th week and another during 10th week and final evaluation shall be conducted during 15th to 16th week.

- Students are required to give Presentations / Demonstration of the work during the reviews.
- Students are required to submit mini project report along with working model if applicable.

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for assessment of each experiment			18
Duration of Internal Test: **3 Hours**			

With effect from the Academic Year 2024-25

OPEN ELECTIVES OFFERED BY VARIOUS DEPARTMENTS IN B.E. V SEMESTER (2024-25)

Dept	Title	Code	credits
Civil	Spatial Information Technology	U22OE510CE	3
CSE	Introduction to Operating Systems	U22OE510CS	3
CSE	Fundamentals Of Artificial Intelligence (Stream- Artificial Intelligence & Machine Learning)	UI20OE520CS	3
ECE	Introduction to Biomedical Electronics	U22OE510EC	3
ECE	Signal Engineering	U22OE530PH	3
Mech.	Drives and Control Systems for Robotics (Stream: Robotics)	U22OE510ME	3
Mech.	Introduction to Robotics (General Pool)	U22OE520ME	3
Phy.	Fundamentals Of Thin Film Technology And Applications	U220E510PH	3
Phy.	Fundamentals Of Vacuum Technology And Applications	U220E520PH	3
H&SS	Design Thinking	U22OE530EH	3
H&SS	Basics of Entrepreneurship	U22OE540EH	3
IT	Essentials of Operating Systems	U22OE510IT	3
IT	Introduction to Artificial Intelligence	U22OE520IT	3

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OFCIVIL ENGINEERING

SPATIAL INFORMATION TECHNOLOGY (Open Elective-III)

SYLLABUS FOR B.E.V-SEMESTER

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U22OE510CE**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES The objectives of this course are to:	**COURSE OUTCOMES** Upon the completion of the course, students are expected to
1. To provide fundamental knowledge on geo spatial technology such as Remote sensing GPS and GIS.	1. Select the type of remote sensing technique/data, identify and analyze the earth surface features from the satellite images. 2. Identify GPS components, interpret the navigational message and signals received by the GPS satellites, Identify the error sources and apply corrections for accurate positioning. 3. Analyse the basic components of GIS, process spatial and attribute data, identify and rectify mapping inaccuracies and prepare thematic maps

Unit-I: Introduction and Basic Concepts of Remote Sensing : Introduction, Basic concepts of remote sensing, Airborne and space born sensors, Passive and active remote sensing, EMR Spectrum, Energy sources and radiation principles, Energy interactions in the atmosphere, Energy interactions with earth surface features, Atmospheric windows, Spectral reflectance curves

Unit-II: Remote Sensing Systems: Satellites and orbits, Polar orbiting satellites, Image characteristics and different resolutions in Remote Sensing, Multispectral, thermal and hyperspectral remote sensing. Some remote sensing satellites and their features, Map and Image, color composites,

introduction to digital data, elements of visual interpretation techniques. Applications of Remote sensing in various fields.

Unit-III: Global positioning Systems (GPS) : Overview of GNSS and Introduction to GPS, GLONASS, GALILEO, COMPASS, IRNSS systems , Applications of GPS.
GPS: Basic concepts, Functional system of GPS – Space segment, control segment and user segment, Working principle of GPS, Signal structure and code modulation, Pseudo-range measurements and navigation message

Unit-IV: Errors and Positioning methods of GPS: Errors and biases in GPS measurements, Accuracy of navigation position: UERE and DOP, Intentional degradation of GPS signals: Selective availability (SA) and Anti-spoofing (AS) Differential GPS: Space based augmentation systems (e.g., SBAS, GAGAN) and Ground based augmentation systems (e.g., WASS, EGNOS). GPS Carrier Phase measurements: Single Differencing, Double Differencing and Triple Differencing in GPS measurements.

Unit-V: Basic Concepts: Introduction to GIS, Areas of GIS application, Components of GIS, Overview of GIS Software packages, Current issues and Trends in GIS. Variables-Point, line, polygon, Map projections, Map Analysis.
GIS Data: Data types – spatial, non-spatial (attribute data) – data structure, data format – point line vector – Raster – Polygon
Data Input : Keyboard entry, Manual Digitizing, Scanner, Remotely sensed data, Existing Digital data Cartographic database, Digital elevation data
Data Editing: Detection and correction of errors, data reduction, edge matching

Learning Resources:

1. James B. Campbell & Randolph H. Wynne., Introduction to Remote Sensing, The Guilford Press, 2011
2. Lillesand, Kiefer, Chipman., Remote Sensing and Image Interpretation, Seventh Edition, 2015
3. Leick, A., GPS Satellite Survey, John Wiley: NJ, 2015
4. Hofmann, B., Lichtenegger H. and Collins J., Global Positioning System: Theory and Practice, Springer: Berlin, 2011.
5. Basudeb Bhatta, Remote Sensing and GIS, Oxford University Press, 2011.
6. Hofmann-Wellenh of, Bernhard, Lichtenegger, Herbert, Wasle, Elmar, GNSS – GPS, GLONASS, Galileo and more, 2013

7. Thanappan Subash., Geographical Information System, Lambert Academic Publishing, 2011.
8. Paul Longley., Geographic Information systems and Science, John Wiley & Sons, 2005
9. John E. Harmon & Steven J. Anderson., The design and implementation of Geographic Information Systems, John Wiley & Sons, 2003
10. ArcGIS 10.1 Manuals, 2013.
11. Kang Tsung Chang., Introduction to Geographic Information Systems, Tata Mc Graw Hill Publishing Company Ltd, New Delhi, 2008.
12. Burrough, P.A., Principles of GIS for Land Resource Assessment, Oxford Publications, 2005.
13. C.P.Lo & Albert K. W.Yeung, Concepts and Techniques of Geographic Information Systems, Prentice Hall India Pvt.Ltd, 2002.

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 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 Computer Science & Engineering

INTRODUCTION TO OPERATING SYSTEMS
(OPEN ELECTIVE-III)

SYLLABUS FOR B.E. V-SEMESTER

(COMMON FOR CIVIL, ECE, EEE & MECH)

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : **U22OE510CS**
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 Understand different Operating system Structures and Services.	1 Explain Operating system structures and internal structure of a process 2 Compare CPU scheduling algorithms. Analyze Disk scheduling algorithms 3 Apply different techniques for Main memory management. 4 Describe file management techniques. 5 Describe deadlock handling methods.

UNIT-I:

Introduction to operating systems: Definition, User view and System view of the Operating system, Operating system structure, Operating system services.
Process: Process concept, Process Control block, Context switching.

UNIT-II:

CPU Scheduling: Scheduling Criteria, Scheduling Algorithms: FCFS, SJF, Round Robin
Device Management: Disk Scheduling algorithms: FCFS, SSTF, SCAN.

UNIT –III:

Memory Management: Swapping, Contiguous memory allocation: Fixed Partitioning, Variable Partitioning. Non-Contiguous memory allocation: Paging.
Virtual memory: Demand paging, Page replacement Algorithms: FIFO,

Optimal, LRU.

UNIT –IV:

File System Interface: File Concept, Access Methods: Sequential, Indexed, and Direct

File System Implementation: File-System Structure, Allocation Methods: Contiguous, Linked and Indexed.

UNIT-V:

Deadlocks: System model, deadlock characterization: Mutual Exclusion, Hold and Wait, Non pre-emption, Circular wait. Deadlock Prevention, Deadlock Avoidance: Banker's algorithm.

Learning Resources:

1. Abraham Silberschatz, Peter B. Galvin, Greg Gagne, *Operating System Concepts*, 9th Edition (2016), Wiley India.
2. Andrew S. Tanenbaum, *Modern Operating Systems*, 2nd Edition (2001), Pearson Education, Asia.
3. Dhananjay, Dhamdhere.M, *Operating System-concept based approach*, 3rd edition (2009), Tata McGraw Hill, Asia
4. Robet Love: *Linux Kernel Development*, (2004)Pearson Education
5. Richard Stevens, Stephen Rago, *Advanced Programming in the UNIX Environment*, 3rd Edition(2013), Pearson Education
6. http://web.stanford.edu/~ouster/cgi-bin/cs140-spring19/index.php
7. https://nptel.ac.in/courses/106106144/

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 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 Computer Science & Engineering

FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE

Stream- Artificial Intelligence & Machine Learning

(OPEN ELECTIVE-III)

(COMMON for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E V SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code:**U22OE520CS**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVE	**COURSE OUTCOMES** *On completion of the course, students will be able to*	
derstand issues and techniques involved in the creation of intelligent systems.	1	ve searching problems using A*.
	2	velop an algorithm for playing games.
	3	present the knowledge using propositional logic and predicate logic
	4	derstand the Expert Systems
	5	nstruct Neural Network to solve problems

UNIT I:

Introduction: Intelligent Systems, Foundation of AI, Sub areas of AI, Applications.

Problem Solving – State – Space Search and Control Strategies: Introduction, General Problem Solving, Characteristics of problem, Exhaustive Searches, Heuristic Search Techniques, Iterative – Deepening A*.

UNIT II:

Problem Reduction & Game Playing: Game Playing, Bounded Look – Ahead Strategy and use of Evaluation Function, MINIMAX procedure, Alpha-Beta Pruning.

UNIT III:

Logic Concepts : Introduction, Propositional Calculus, Propositional Logic, Natural Deduction System, Axiomatic System, Semantic Tableau System in Propositional Logic, resolution Refutation in Propositional Logic, Predicate Logic.

UNIT IV:

Expert System and Applications: Introduction, Phases in Building Expert Systems, Expert System Architecture, Expert System versus Traditional Systems, Truth Maintenance Systems, Application of Expert Systems.

UNIT V:

Artificial Neural Networks: Introduction Artificial Neural Networks, Single – Layer Feed Forward Networks, Multi – Layer Feed Forward Networks.

Learning Resources:

1. Saroj Kaushik, "Artificial Intelligence", Cengage Learning, 2011.
2. Russell, Norvig," Artificial Intelligence, A Modern Approach ", Pearson Education, Second Edition, 2004.
3. Elaine Rich, Kevin Knight, Shivshankar B. Nair, "Artificial Intelligence", Tata McGraw Hill, Third Edition 2009.Stuart Russell, Peter Norvig, Artificial Intelligence – A Modern Approach, Third Edition (2019), Pearson
4. Nils J. Nilsson, Artificial Intelligence: A New Synthesis, (1998),Elsevier

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 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 ELECTRONICS AND COMMUNICATION ENGINEERING

Introduction to Biomedical Electronics

(Open Elective - III)

SYLLABUS FOR B.E. V – SEMESTER

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

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: **U22OE510EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To provide fundamental knowledge of biomedical signals, transducers and various instruments.	On completion of the course, students will be able to 1. recite the basic need of biomedical signals and basic instruments. 2. comprehend the principles of basic bioelectric signals, electrodes and transducers in biomedical electronics. 3. demonstrate the principle of various therapeutic, prosthetic and non invasive instruments for use and prediction of diseases. 4. understand the mathematical, physical and computational principles underlying modern medical imaging system for visualization and analysis of medical image data.

UNIT - I :

Basics of Biomedical Electronics: Physiological systems of the body, sources of biomedical signals, basic medical instrumentation system, performance requirements of medical instrumentation systems, Intelligent medical instrumentation systems, General constraints in design of medical instrumentation systems.

UNIT - II :

Bioelectric Signals, Electrodes, Transducers: Origin of bioelectrical signals, recording electrodes, electrodes for ECG, EEG, EMG, micro-electrodes. Transducer: Introduction, classification of transducers, performance characteristics of transducers, displacement position and motion transducers, pressure transducers, photoelectric transducer.

UNIT - III :

Therapeutic and Prosthetic Devices: Cardiac pacemaker, defibrillators, hemodynamic & haemodialysis, ventilators, infant incubators, surgical instruments, therapeutic applications of laser.

UNIT - IV :

Non-invasive Instrumentation: Temperature measurements, principles of ultrasonic measurements and its applications in medicine, medical thermography, physics of thermography infrared detectors and thermographic detectors.

UNIT - V :

Modern Medical Imaging System: Radiography: Production of X-rays, units of X-radiation, block diagram of X-ray machine, MRI, computed tomography: Block diagram and working.

Learning Resources:

1. L. Cromwell, Biomedical Instrumentation and Measurements, Prentice Hall.
2. Handbook of Biomedical Instrumentation by R.S. Khandpur.
3. S.K. Venkata Ram, Bio-medical Electronics and Instrumentation, Galgotia Publications, Pvt. Ltd.

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

Signal Engineering

(Open Elective - III)

SYLLABUS FOR B.E. V – SEMESTER (CSE, CSE(AI&ML), ECE, EEE, IT & Mechanical)

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: **U22OE530PH**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To Provide the fundamental knowledge of Signaling and interlocking to control and regulate the movement of trains safely & efficiently.	On completion of the course, students will be able to 1. Acquire knowledge on railway signaling principles. 2. Acquire the working of railway signals &their failsafe and safety aspects. 3. Understand various systems of train working, interlocking features and general requirements of signaling.

UNIT – I: Introduction to General Signaling (8 Hours)

Opening of Railways: Duties of Commissioners, Sanction to Open Railway for Public Carriage of Passengers, Requirements & Recommendations for Signaling and Interlocking Installations, Catechism for Signaling and Interlocking Installations, for25KV AC, Spl layouts: Isolation, Ruling gradients, Slip, Catch sidings

Schedule of Dimensions: General, Station Yards, Electric Traction 25KV AC 50 Cycles, Clearances required for 25KV single phase AC Electric Traction.

General Rules: Definitions, Type of Signals; Adequate Distance, System of Working, Absolute Block system, Automatic Block System, Block Working, Level Crossings, Station Working Rules.

UNIT – II: Railway Signaling (6 Hours)

Station Layouts: MACLS, Signal Aspects, Location of Signals; StationLayouts: Single Line, Double Line, 2-Road, 3-Road, 4-Road.

Signaling Elements: Track Circuits & Axle Counters, Block Instruments, point machines, Relays, Relay Interlocking and Electronic Interlocking, Requirement of Signaling in 25KV AC Electrified Area.

Signaling Interlocking Plan: Essentials of Interlocking, Train Detection, Point Switching, Signal, Block Control, Aspect Control Chart.

UNIT – III: Signaling Equipment – I (8 Hours)

Details of Relays, Signal Cables. Signals, Control Panel & Operation – Safety features, Working.

Details of Point Machines – Components, Working, Circuit Progression, Testing, Safety features,

Level Crossing Gates – Working, Circuit Progression, Safety features

Details of Track Circuits, Axle Counters - Single section, Multi-section, Subsystems; Working and Application.

UNIT – IV: Signaling Equipment – II (8 Hours)

Details about Block Instruments – Types, Working, Circuit Progression, safety features Data Acquisition System – Interfaces, Fault Logic.

Details of Integrated Power Supply, CLS Panel, Lightning and Surge Protection.

Practicals at IRISET Laboratory (12 Hours)

1. Relays, Signal Cables. Signals, Control Panel & Operation.
2. Point Machines - Components, Working, Circuit Progression, Testing.
3. Level Crossing Gates - Working, Circuit Progression.
4. Track Circuits, Axle Counters - Single section, Multi-section, Subsystems; Working and Application.
5. Block Instruments - Types, Working, Circuit Progression.
6. Data Acquisition System - Interfaces, Fault Logic.
7. Integrated Power Supply, CLS Panel, Lightning and Surge Protection.

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)

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF MECHANICAL ENGINEERING

Drives control systems for Robotics

(Stream: Robotics) (Open Elective-III)

SYLLABUS FOR B.E.V-SEMESTER

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U22OE510ME**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES The objectives of this course are to:	**COURSE OUTCOMES** On completion of the course, students will be able to
To provide students with a fundamental understanding of control systems and their applications in robotics.	1. Understand basic control system types and analyze block diagrams using transfer functions. 2. Interpret transient and steady-state responses and understand system stability concepts. 3. Represent control systems using state-space models and convert between state-space and transfer functions. 4. Understand control techniques to achieve precise and stable joint control in robotic systems. 5. Implement advanced control strategies to enhance the performance and interaction of robotic systems.

UNIT-I

Introduction to Control Systems: Examples of control systems, Open Loop & Closed Loop Systems. Transfer function of spring-mass-damper system, Transfer function of simple RLC circuit. Block diagrams, Block diagram reduction.

UNIT-II

Steady-State and Transient Response: Transient Response of first order and second order system to step input. Concept of steady-state error. Stability: Introduction to the concept of stability using Routh-Hurwicz criterion.

UNIT-III

State–space representation of linear control systems: Basic concepts. State–space representation of spring-mass-damper system, State–space representation of simple RLC circuit. Conversion of Transfer function into State Space, Conversion of State-Space in to Transfer Function.

UNIT-IV

Independent Joint Control: Transfer function of Armature Controlled DC Motor, Proportional (P) Control, Proportional-Integral (PI) Control, Proportional-Derivative (PD) Control, Proportional-Integral-Derivative (PID) Control.

UNIT-V

Computed Torque Feed-forward Control, Force Control: Compliance Control, Impedance Control, Hybrid Force/Motion Control.

Learning Resources:

1. Norman S. Nise, "Control Systems Engineering", John Wiley & Sons, Inc., 2001.
2. Ogata, K. "Modern Control Engineering", Prentice Hall, 2004
3. Bruno Siciliano, Lorenzo Sciavicco, Luigi Villani, Giuseppe Oriolo, Robotics: Modelling, Planning and Control, Springer Science & Business Media, 2008
4. Spong, Mark W., and M. Vidyasagar, Robot dynamics and control. John Wiley & Sons, 2008.

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 Test: 90 minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF MECHANICAL ENGINEERING

INTRODUCTION TO ROBOTICS (OE-III)

(GENREAL POOL)

SYLLABUS FOR B.E.V-SEMESTER

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U22OE520ME**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES The objectives of this course are to:	**COURSE OUTCOMES** On completion of the course, students will be able to
Identify robots and its peripherals for satisfactory operation and control of robots for industrial and non-industrial applications.	1. understand the anatomy of the robot and various robot configurations for it's selection depending on the task. 2. classify the end effectors , understand different types of joints, various types of robot drive systems for carrying out the assigned job effectively. 3. analyze a planar manipulator through forward kinematics and understand the control of robot manipulator for better reliability and efficiency using python programming. 4. Classify the various sensors used in robots for proper selection to an application. 5. summarize various industrial and non-industrial applications of robots for their selection to a particular task.

UNIT-I

ROBOT BASICS

Robot-Basic concepts, Definition, Need, Law, History, Anatomy, specifications.
Robot configurations-cartesian, cylindrical, polar ,articulated and SCARA, Serial manipulator &ParallelManipulator
Robot wrist mechanism, Precision and accuracy of robot.

UNIT-II

ROBOT ELEMENTS

End effectors-Classification, Robot drive system types: Electrical, pneumatic and hydraulic. Robot joints and links-Types, Motion interpolation, Robot trajectories2D and 3D Transformation- Scaling, Rotation and Translation, Homogeneous transformation

UNIT-III

ROBOT KINEMATICS AND CONTROL

Robot kinematics – Basics of direct and inverse kinematics. D-H matrix. Forward kinematics for a 2-link RR planar manipulator.
Control of robot manipulators – Point to point and Continuous Path Control. Robot programming methods.Introduction to solve any robotic kinematic problem using python programming.

UNIT-IV

ROBOT SENSORS

Sensors in robots – Touch sensors-Tactile sensors – Proximity and range sensors. Force sensors, Light sensors, Pressure sensors, position and velocity feedback devices.
Introduction to Machine Vision and Artificial Intelligence.

UNIT-V

ROBOT APPLICATIONS

Applications of robots in Industries, Medical, Household, Entertainment, Space, Underwater, Defense, and Disaster management.
Applications of Micro and Nanorobots, Future Applications of robots.

Learning Resources:

1. Mikell P. Groover, Mitchell Weiss, Roger N Nagel and Nicholas G Odrey, "Industrial Robotics Technology, Programming and Applications", TataMcGraw-Hill Publishing Company Limited , 2008.
2. Deb.S.R and Sankha Deb, "Robotics Technology and Flexible Automation", Tata McGraw HillPublishing Company Limited, 2010.
3. KlafterR.D, Chmielewski T.A, and Negin. M, "Robotic Engineering: An Integrated Approach", Prentice Hall of India Pvt. Ltd.,1994.
4. K.S. Fu,R.C. Gonzalez and C.S.G.Lee , "Robotics control, sensing, vision and intelligence",TataMcGraw-Hill Publishing Company Limited, 2008
5. R.K. Mittal and I.J.Nagrath"Robotics and Control", Tata McGraw-Hill Publishing Company Limited, 2003.

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 Test: 90 minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF PHYSICS

FUNDAMENTALS OF THIN FILM TECHNOLOGY AND APPLICATIONS (OE)

SYLLABUS FOR B.E.V-SEMESTER

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U22OE510PH**
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. Learn the fundamental atomistic mechanisms. 2. Narrate thin film deposition techniques. 3. Acquire knowledge on thin film devices. 4. Appreciate applications of thin films	1. State fundamental definitions of thin film technology. 2. Describe thin film deposition techniques. 3. Illustrate thin film devices and their use. 4. Use thin films coatings in industrial applications

UNIT-I: THIN FILM GROWTH

Classification of films- formation of thin films- Condensation and nucleation, growth and coalescence of islands, -nucleation theories: capillarity and atomistic models, sticking coefficient, adhesion, substrate effect, film thickness effect.

UNIT-II: DEPOSITION TECHNIQUES

Thin film deposition techniques- spin coating, simple thermal evaporation- Chemical vapor deposition technique-Advantages and disadvantages of Chemical Vapor deposition (CVD), Physical vapour deposition electron beam evaporation, RF sputtering, Ion beam sputtering, Laser ablation, molecular beam epitaxy (MBE).

UNIT-III: THIN FILM MATERIAL CHARACTERIZATION TECHNIQUES

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

UNIT-IV: PROPERTIES OF THIN FILMS

Electrical conduction in continuous and discontinuous metallic thin films. Transport and optical properties of metallic, semiconducting, and dielectric films.

UNIT-V: THIN FILM DEVICES AND APPLICATIONS

Anti-reflection coatings, fabrication of thin film gas and temperature sensors, Thin film solar cells, Quantum dot solar cells, Applications of thin films in electronics, medical, defense, automobiles.

Learning resources:

1. Kasturi Chopra Thin Film Device Applications, Mac Graw Hill, New York, 2012
2. A. Goswami, thin film fundamentals, New Age International, 2006
3. NPTEL: Fundamentals of Material Processing - Part 2, IIT Kanpur Prof. Shashank Shekhar, Prof. Jitesh J Thakkar

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 Test: 90 minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF PHYSICS

FUNDAMENTALS OF VACUUM TECHNOLOGY AND APPLICATIONS (OE)

SYLLABUS FOR B.E.V-SEMESTER

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U22OE520PH**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES The objectives of this course are to:	**COURSE OUTCOMES** On completion of the course, students will be able to
1. Learn basics definitions of vacuum technology. 2. Acquire principles of vacuum pump parameters. 3. Gain insight of vacuum production methods 4. Learn measurement of vacuum 5. Known various applications of vacuum.	1. Define various vacuum ranges and terms related to vacuum technology. 2. List out vacuum pump parameters. 3. Narrate working of various types of vacuum pumps. 4. Explain working of different vacuum measuring devices. 5. List applications of vacuum in various fields.

UNIT-I: FUNDAMENTALS OF VACUUM

Vacuum Nomenclature and Definitions, units of vacuum, Vacuum ranges, Types of flow: turbulent flow, viscous or laminar flow, molecular flow, Knudsen flow, out gassing, Mean free path of the molecules, adsorption, desorption, evaporation theory-rate of evaporation, Hertz- Knudsen equation, types of evaporation.

UNIT-II: VACUUM TERMINOLOGY

Methods of production of vacuum, vacuum pump function basics, throughput, pumping speed, conductance, evacuation rate, fore vacuum and high-vacuum pumping, Pump Choice, valve less, valved pumping system, Positive Displacement Vacuum Pumps, Momentum Transfer Vacuum Pumps, Entrapment Pumps, traps and baffles. Function of the oil in oil-sealed vacuum pumps. Effects of condensable vapours on mechanical pump performance, Water vapour tolerance of a pump, Back-streaming

UNIT-III: VACUUM PUMPS

Systems construction and working of vacuum pumps: Roots vacuum pumps, Rotary vane pump, multistage rotary pumps, diffusion pump, Turbomolecular pumps, cryo-pump, ion getter pumps,

UNIT-IV: VACUUM MEASUREMENT

Overview of gauges, direct reading and indirect reading gauges, classification of pressure gauge, Vacuum gauges: thermocouple gauge, Pirani gauge, cold cathode and hot cathode ionization gauge, Penning gauge, leak detection, Leak detection methods-leak rate.

UNIT-V: VACUUM APPLICATIONS

Deposition of thin films, Vacuum technology in the semiconductor industry, Vacuum technology in metallurgical processes, Vacuum technology in the chemical industry,

SUGGESTED BOOKS:

1. Dorothy M. Hoffman and Bawa Singh, Handbook of Vacuum Science and Technology, Academic Press, 1998
2. M. N. Avadhanulu and P.G. Kshirsagar, Textbook of Engineering Physics, Revised Edition, S.Chand, 2015
3. John F. O'HanlonA User's Guide to Vacuum Technology, Jhon Willey and sons, 2006

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Duration of Internal Test: 90 minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF H&SS
Design Thinking (Open Elective-III)
SYLLABUS FOR B.E.V-SEMESTER

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U22OE530EH**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES The objectives of this course are to:	**COURSE OUTCOMES** On completion of the course, students will be able to
1. Understand the critical design thinking skills needed to either improve an existing product or think about designing a new product. **2.** Learn to identify customer needs and draft customer needs statements as your first step toward user innovations. **3.** Learn how to translate user needs into product specifications quantitatively, and how establishing product metrics can help to define those specifications. **4.** Learn to apply creativity, brainstorming, and concept generation process in designing needs solutions. **5.** Learn to select and implement a product development process that's aligned with your project needs. Explore prototyping methods, strategies, and real-life examples where these have been applied to create a design that represents customer needs and product specifications.	**1.** Learn the concepts that drive design thinking. **2.** Submit project ideas around user Innovations. **3.** Identify prospective customer needs and user groups. **4.** Translate needs into product specifications **5.** Build out the product architecture, Create a prototype and present the prototype.

Unit 1: Design Thinking Skills

Understand the critical design thinking skills needed to either improve an existing product or design a new product.

1.1 The Need for Design Thinking
1.2 What makes design thinking unique?
1.3 Design thinking checklist

Unit 2: Identifying Customer Needs

Learn to identify customer needs and draft customer needs statements as your first step towards user innovations.

2.1 Think Users' First
2.2 Users' inherent needs
2.3 Empathy and Design Thinking
2.4 Asking the Right Questions
2.5 Persona Empathy map

Unit 3: Product Specifications

Learn how to translate user needs into product specifications quantitatively, and how establishing product metrics can help define those specifications

3.1 Creating a Design Brief Template
3.2 Stakeholder map template
3.3 Customer journey template
3.4 Context map template
3.5 Opportunity map template

Unit 4: Applied Creativity

Learn to apply creativity, brainstorming, and concept generation process in designing needs solutions.

4.1 The need to ideate
4.2 The Rules of ideation
4.3 Participating in an ideation session
4.4 Building a Creative Culture
4.5 Divergent—5 common ideation techniques

Unit 5: Product Development Processes and Prototyping

Learn to select and implement a product development process that's aligned to your project needs. Explore prototyping methods, strategies, and real-life examples where these have been applied to create a design that represents customer needs and product specifications.

5.1 The need for a prototype
5.2 The Need to Test and how to conduct a structured test
5.3 How to conduct the observers' debrief

METHODOLOGY

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

ASSESSMENTS

- Online assignments
- Individual and Group

Suggested Books

The Art of Innovation, by Tom Kelley*
Insight Out, by Tina Seelig*
Change by Design, Tim Brown
Weird Ideas That Work, by Robert Sutton*
Wired to Care, by Dev Patnaik
Rapid Viz, by Kurt Hanks and Larry Belliston

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

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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 Test: 90 minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF H&SS

Basics of Entrepreneurship (Open Elective-III)

SYLLABUS FOR B.E.V-SEMESTER

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U22OE540EH**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES The objectives of this course are to:	**COURSE OUTCOMES** On completion of the course, students will be able to
1. Deeply understand and discover entrepreneurship 2. Build a strong foundation for the students to start, build, and grow a viable and sustainable venture 3. Develop an entrepreneurial mind-set equipped with the critical skills and knowledge required	1. Take-up entrepreneurship as a career choice 2. Create and Validate business models. Build a Minimum Viable Product (MVP). 3. Identify various costs and revenue streams for a venture. 4. Build successful teams and acquire sales skills. 5. Understand the business regulations and various Government schemes available.

UNIT-I

Introduction to Entrepreneurship: Definition of Entrepreneurship, Entrepreneurship as a career choice, Benefits and Myths of Entrepreneurship; Characteristics, Qualities and Skills of an Entrepreneur. Impact of entrepreneurship on the Economy and Society.

Opportunity and Customer Analysis: Identify your Entrepreneurial Style, Identify Business Opportunities, Methods of finding and understanding Customer Problems, Process of Design Thinking, Identify Potential Problems, Customer Segmentation and Targeting, Customer Adoption Process, Crafting your Value Proportions, Customer-Driven Innovation.

UNIT-II

Business Model and its Validation: Types of Business Models, Lean Approach, the Problem-Solution Test, Solution Interview Method, Difference between Start-up Venture and small Business, Industry Analysis, Identify Minimum Viable Product (MVP), Build-Measure-Lean Feedback Loop, Product-market fit test.

UNIT-III

Economics and Financial Analysis: Revenue streams and pricing, Income analysis and Cost Analysis-Product Cost and Operation Cost, Basics of Unit Costing, Profit Analysis, Customer Value Analysis, Different Pricing Strategies, Investors' Expectations, Pitching to Investors and Corporate.

UNIT-IV

Team Building and Project Management: Leadership Styles, Team Building in Venture, Role of good team in Venture, Roles and Respondents, Explore Collaboration Tools and Techniques-brainstorming, Mind Mapping. Importance of Project Management, Time Management, Work Flow, Network Analysis Techniques.

UNIT-V

Marketing& Business Regulations: Positioning, Positioning Strategies, Building Digital Presence and Leveraging Social Media, Measuring effectiveness of Channels, Customer Decision-making Process, Sales plans and Targets, Unique Sales Proposition (USP), Follow-up and Close Sales. Business Regulations of starting and operating a Business, Start-up Ecosystem, Government schemes.

Learning Resources:

1. Robert D. Hisrich, Michael P Peters, "Entrepreneurship", Sixth edition, McGraw-Hill Education.
2. Thomas W. Zimmerer, Norman M. Scarborough, "Essentials of Entrepreneurship and small businessManagement", Fourth edition, Pearson, New Delhi, 2006.

3. Alfred E. Osborne, "Entrepreneurs Toolkit", Harvard Business Essentials, HBS Press, USA, 2005
4. MadhurimaLall and ShikhaSahai, "Entrepreneurship", Excel Books, First Edition, New Delhi,2006

Web Resource: http://www.learnwise.org

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3. No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Test: 90 minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF INFORMATION TECHNOLOGY

Essentials of Operating Systems

(Open Elective-III)

SYLLABUS OF B.E V- SEMESTER

(Common for CIVIL, ECE, EEE & MECH)

L:T:P(Hrs./week): 3:0:0	SEE Marks :60	Course Code : **U22OE510IT**
Credits :3	CIE Marks: 40	Duration of SEE :3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
Learn the principles of modern operating systems i.e various functionalities provided by an operating system such as process management, memory management, Storage and I/O management.	1. Analyze the importance and its key principles by differentiating and categorizing the functionalities of an operatingsystem 2. Examine mechanisms involved in memory management to handle processes and threads. 3. Evaluate and solve deadlocks by assessing various handling strategies related to each of the conditions for deadlock. 4. Interpret the mechanisms adopted for storage organization and access. 5. Interpret the mechanisms adopted for I/O organization and access.

UNIT-I: Introduction and Process Management:

Operating System Functionalities, Types of Operating Systems, User Operating System Interface, System calls, System Boot. Process Concept: Overview, Threads. Process Scheduling - Uniprocessor scheduling algorithms, Multiprocessor and Real-time scheduling algorithms.

UNIT-II: Memory Management:

Background, Swapping, Contiguous Memory Allocation, Paging, Segmentation. Virtual Memory Management: Demand Paging, Page replacement algorithms, Thrashing.

UNIT-III: Process Synchronization:

Inter Process Communication, Process Synchronization - Peterson's Solution, Bakery Algorithm, Semaphores, Critical Section, Monitors. Classical problems of synchronization. Deadlocks: Deadlock prevention, deadlock avoidance and Deadlock Detection and Recovery - Bankers Algorithm.

UNIT-IV: Storage Management:

File System-Basic Concepts, File System Structure, File System Mounting, Directory Structure, Allocation Methods, Free Space Management.

UNIT-V: I/O Management:

I/O Management: Disk Structure, RAID Structure, Disk Scheduling, Protection: Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix.

Learning Resources:

1. Operating System Concepts - Operating System Concepts, Tenth Edition, Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, John Wiley & Sons Inc.
2. Modern Operating Systems- Andrew S Tanenbaum, Prentice Hall
3. Operating Systems - Operating System: Internals and Design Principles , William Stallings
4. Operating Systems - System Programming and Operating Systmes D M Dhamdhere, Tata Mc Graw Hill
5. Operating Systems - Operating Systems: A Modern Perspective, Gary Nutt, Addison Wesley
6. Operating Systems - Operating Systems, Achyut S Godbole, Tata Mc Graw Hill
7. https://nptel.ac.in/courses/106108101/
8. https://www.classcentral.com/course/udacity-introduction-to-operating-systems-3419

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Duration of Internal Test: 90 minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF INFORMATION TECHNOLOGY

Introduction to Artificial Intelligence

(AI&ML TRACK : OPEN ELECTIVE-III)

(Common for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E. V SEMESTER

L : T : P (Hrs./week): 3:0:0	SEE Marks :60	Course Code :**U22OE520IT**
Credits :3	CIE Marks: 40	Duration of SEE :3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** On completion of the course, students will be able to
The objective of this course is to provide the necessary fundamentals, approaches in Artificial intelligence for problem solving for a goal-based single or multi agents with or without constraints and formalise soft computing techniques for better optimization for intelligent systems.	1. Investigate applications of AI techniques in intelligent agents. 2. Apply various search algorithms for demonstrating agents, searching and inferencing 3. Analyse searching beyond classical search and adversarial Techniques. 4. Identify problem types which might have constraints and evolutionary computation. 5. Define the fuzzy systems, ethics and risks of AI.

UNIT-I:

Introduction to AI: What is AI, Foundations of AI, History of AI, State of the Art, Applications of AI.

Intelligent Agents: Agents and Environments, Good Behaviour: The Concept of Rationality, The Nature of Environments, The Structure of Agents.

UNIT-II:

Solving Problems by Search: Problem Solving Agents, Example problems, Searching for Solutions, Uninformed Search Strategies: Breadth first search, Depth-first search, Depth limited search, Iterative deepening depth first search

Informed (Heuristic) Search Strategies: Greedy best first search, A* Search, Optimality of A*, Heuristic Functions.

UNIT-III:

Beyond Classical Search: Local search and optimization problems, Local search in continuous spaces, Searching with non-deterministic actions and partial observations.

Adversarial Search: Games, Optimal decisions in games, Alpha-Beta Pruning, Imperfect real time decisions.

UNIT-IV:

Constraint Satisfaction Problems: Defining Constraint Satisfaction Problems, Constraint Propagation, Backtracking Search for CSPs, Local Search for CSPs, The Structure of Problems.

Introduction to Evolutionary Computation: Representation – The Chromosome, Initial Population, Fitness Function, Selection, Reproduction Operators, Stopping Conditions, Evolutionary Computation versus Classical Optimization.

UNIT-V:

FUZZY Systems, Logic and Reasoning: Fuzzy Sets- Formal Definitions, Membership Functions, Fuzzy Operators, Fuzzy Set Characteristics, Fuzziness and Probability, Fuzzy Inferencing.

Philosophical foundations: Weak AI, Strong AI, Ethics of AI and Risks of AI.

Learning Resources:

1. Artificial Intelligence A Modern Approach Third Edition – Russell & Norvig
2. Computational Intelligence: An Introduction, 2nd Edition - Andries P. Engelbrecht
3. https://online.stanford.edu/courses/cs221-artificial-intelligence-principles-and-techniques
4. https://nptel.ac.in/courses/106105077
5. https://ocw.mit.edu/courses/6-034-artificial-intelligence-spring-2005/

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3. No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Test: 90 minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS) :: IBRAHIMBAGH, HYDERABAD – 500 031.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SCHEME OF INSTRUCTION AND EXAMINATION (R-22) :: B.E. - EEE : SIXTH SEMESTER (2024-25)

B.E (EEE) VI Semester								
Course Code	**Name of the Course**	**Scheme of Instruction**			**Scheme of Examination**			
		Hours per Week			**Duration in Hrs**	**Maximum Marks**		**Credits**
		L	**T**	**P/D**		**SEE**	**CIE**	
T HEORY								
U22HS040EH	Economics and Finance for Engineers	2	-	-	3	60	40	2
U22PC610EE	Power Systems -II	3	-	-	3	60	40	3
U22PC620EE	Power Electronics	3	1	-	3	60	40	4
U22PC630EE	Microprocessor and Microcontrollers Applications	3	-	-	3	60	40	3
U22PC640EE	Signals & Systems	3	-	-	3	60	40	3
U22OE6XXXX	Open Elective -IV	3	-	-	3	60	40	3
U22HS610EH	Skill Development Course-VII (Verbal Aptitude)	1	-	-	2	40	30	1
U22PE610EE	Skill Development Course-VIII (Technical Skills-III)	1	-	-	2	40	30	1
PRACTICALS								
U22PC621EE	Power Electronics and Simulation Lab	-	-	2	-	50	30	1
U22PC631EE	Microprocessor and Microcontrollers Applications Lab	-	-	2	-	50	30	1
U22PW619EE	Theme Based Project	-	-	2	-	50	30	1
	Online NPTEL certification course 8 weeks/ 12 weeks	-	-	-	-	-	-	2
Library/Sports/Mentor- Mentee Interaction		-	-	-				
	Total	**19**	**1**	**6**		**590**	**390**	**25**
	Grand Total	**26**				**980**		**25**

B.E students shall complete one NPTEL Certificate equivalent Course of 8 weeks equivalent to 2 Credits by the end of VI semester

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State
DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

ECONOMICS AND FINANCE FOR ENGINEERS
SYLLABUS FOR B.E. VI SEMESTER

L:T: P (Hrs/Week):2:0:0	SEE Marks: 60	Course Code:**U22HS040EH**
Credits: 2	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the learners to: Understand the concepts and tools of economics, cost and finance that will equip them for decision making.	**The end of the course the learner will be able to :** 1. Gain a conceptual understanding economics as a discipline. 2. Construct a cost sheet and classify costs and make use of break-even analysis in decision making. 3. Evaluate the accounting cycle and explain its importance in recording business transactions 4. Interpret the ratios and dissect comparative and common size statements 5. Compare the sources of finance and evaluate them

Unit I: Concepts in Economics
Scarcity of Resources-Relevance of Economics for Engineers- Scope of Managerial Economics
Law of Demand- assumptions and exceptions - Price elasticity of demand (Application-oriented approach)

Unit II: **Cost Analysis and Profit Planning**
Concept of Cost -Costing –Classification of Costs – Preparation of Cost Sheet (Simple Problems)
–Breakeven Analysis (Application-oriented approach)

Unit III: **Conceptual Understanding of Accounting**
Accounting Cycle-Journal-Subsidiary Books- Ledger-Trial Balance-Final Accounts (Manufacturing/Trading, Profit and Loss Account, Balance Sheet (Theory Only)

UNIT IV: **Financial Statement Analysis**

Financial Statements- Meaning - Types –Purpose-Comparative and Common Size Statements

Ratio Analysis-Liquidity, Solvency, Activity & Profitability Ratios(including simple problems on Ratio Analysis)

Unit V: **Long Term Sources and Uses of Finance**

Long term sources of finance-Debt, Equity, Hybrid, Start- Up finances, Crowd Funding, Peer to Peer lending platforms.

Capital Budgeting –Traditional and DCF Techniques (including simple problems)

Learning Resources for students:

1. S.P.Jain and K.L Narang., "Financial Accounting", Kalyani Publishers –Latest edition.
2. S.P.Jain and K.LNarang., "Cost Accounting", Kalyani Publishers, Latest edition.
3. M.Y.Khan and P.K. Jain., "Financial Management – Text, Problems and Cases", Mc Graw Hill Education Private Limited, New Delhi. Latest edition
4. M. Kasi Reddy &Saraswathi, Managerial Economics and Financial Analysis, PHI New Delhi, Latest edition.

Reference books:

1. Mehta P.L.,"Managerial Economics: Analysis,Problems and Cases", Sultan Chand and Sons. Latest edition.
2. Narayanaswamy, "Financial Accounting: A Managerial Perspective", Prentice Hall India
3. *M. L. Seth., "Micro Economics", Lakshmi Narain Agarwal.* Latest edition
4. Dr. R.P. Rustagi., "Fundamentals of Financial Management"Taxmann Publications. Latest edition

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Duration of Internal Test: 90 minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Power Systems - II

SYLLABUS FOR B.E. VI SEMESTER

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U22PC610EE**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES The course will enable the students:	**COURSE OUTCOMES** On completion of the course, students will be able to
1. Have a fair knowledge about the fundamentals of various conventional power plants like Thermal, Hydel, Nuclear and Gas. 2. Acquire the knowledge of different types of Non conventional energy generation methods like Solar, Wind, Ocean Thermal Energy Conversion (OTEC), Tidal and Geo thermal. 3. Understand the Economics of Power Generation, Types of costs, Depreciation, methods of P.f. improvement, Tariffs 4. Have the knowledge of construction of Over head lines, materials, Supports, insulators and Underground cables.	1. Identify and select the proper type of Power Plant for the Power Generation. 2. Estimate the Energy generated by Different Non conventional Generating stations. 3. Assess the depreciation methods, Tariffs 4. Test and categorize the insulators and calculate the Sag & Tension in Over head lines.

UNIT – I

Thermal, Hydel, Nuclear Power Generation Principles, Choice of site, layout and various parts of generating stations. Estimation of power in Hydel, flow duration curve, hydrograph, mass curve etc. Types of Hydel stations. Nuclear Stations, PWR, BWR, FBR. GAS Turbines, GAS power stations, MAJOR DISASTERS around the world in power plants-lessons learnt.

UNIT – II

Non-Conventional energy generation methods: Solar, Wind, Ocean Thermal Energy Conversion (OTEC), Tidal, Solar cells, Efficiency, Solar collectors, Concentrators. Wind generators, Wind turbine types, rotors construction, Hybrid power generation.

UNIT – III

Economics of Power Generation : Load Curve, load demand and diversity factors, base load and peak load operation, types of costs and depreciation fund calculations, tariffs.

UNIT- IV

Construction of Overhead lines - Overhead line materials – Supports – types, Vibration Dampers, Arcing Horns, Sag / Tension calculations, Equal / Unequal supports, Effects of Wind, ICE/Erection Conditions Stringing Ch arts Insulators-Types –Material for construction – potential distribution over string of insulators, Equalizing of potential-Methods, Insulators testing. Underground cables –Insulating Materials, Mechanical Protection, EHV / HV / LV cables, grading of cables, capacitance of 3 core cables.

Learning Resources

1. C.L. Wadhwa, Electrical Power Systems, Wiley Eastern Ltd. 5thEdition, 2005

2. C.L.Wadhwa, Generation, Distribution and Utilization of Electrical Energy, Wiley Eastern Ltd., 5thEdition, 2005.

3. S.N.Singh- Electrical Power Generation, Transmission and Distribution-Prentice Hall pvt.ltd.New-2003.

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Duration of Internal Test: 90 minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Power Electronics

SYLLABUS FOR B.E. VI SEMESTER

L:T: P (Hrs/Week):3:1:0	SEE Marks: 60	Course Code:**U22PC620EE**
Credits: 4	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES The course will enable the students:	**COURSE OUTCOMES** On completion of the course, students will be able to
To provide the fundamentals of power semiconductor devices and inculcate the knowledge of controlled rectifiers, DC-DC converters, Inverters, AC Voltage controllers and Cyclo-converters	1. Apply power switching devices for power conversion. 2. Analyze controlled rectifier circuits. 3. Analyze the operation of DC-DC Converters. 4. Analyze the operation of inverters. 5. Analyze the operation of Single phase AC Voltage controllers and Single phase Cyclo-converters.

UNIT-I: Power switching devices:

Diode, Thyristor, GTO, TRIAC, MOSFET, IGBT: I-V Characteristics; Firing circuit for thyristor; Voltage and current commutation of a thyristor; Gate drive circuits for MOSFET and IGBT.

UNIT-II: Phase Controlled Rectifiers:

Single-phase half-wave and full-wave rectifiers, Single-phase full-bridge thyristor rectifier with R-load and highly inductive load; Three-phase fully controlled thyristor rectifier and three phase semi-converter with R-load and highly inductive load; Input current wave shape and power factor and THD.

UNIT-III: DC-DC converters

DC-DC buck converter:

Elementary chopper with an active switch and diode, concepts of duty ratio and average voltage, power circuit of a buck converter, analysis and waveforms at steady state, duty ratio control of output voltage.

DC-DC boost converter:

Power circuit of a boost converter, analysis and waveforms at steady state, relation between duty ratio and average output voltage.

DC-DC buck-boost converter:

Power circuit of a buck-boost converter, analysis and waveforms atsteady state, relation between duty ratio and average output voltage.

UNIT-IV: Inverters

Introduction, principle of operation, performance parameters; single phase bridge inverters with R and RL loads; three phase bridge inverters with 180^0 and 120^0 modes of operation; voltage control of single phase inverters – Single pulse width modulation, multiple pulse width modulation, sinusoidal pulse width modulation, three-phase sinusoidal pulse width modulation; fundamentals of multi level inverters.

UNIT-V: AC -AC and Bidirectional Converters:

Principle of operation of single-phase ac voltage controllers for R and RL loads; Principle of operation of single phase cyclo-converter; Bidirectional converter; Applications of power electronics.

Learning Resources:

1. M. H. Rashid, "*Power electronics: circuits, devices, and applications*", Pearson Education India, 4th Edition, 2018.
2. N. Mohan and T. M. Undeland, "Power Electronics: Converters, Applications and Design", John Wiley & Sons, 3rd Edition, 2007.
3. L. Umanand, "Power Electronics: Essentials and Applications", Wiley India, 2009.

4. Dr. P. S. Bimbhra,"Power Electronics", Khanna Publishers, 2009
5. M.D Singh and K.B Khanchandani, " Power Electronics", Tata McGraw Hill, 2nd Edition, 2006.

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 Test: 90 minutes

With effect from the Academic Year 2023-24

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

MICROPROCESSORS & MICROCONTROLLERS APPLICATIONS

SYLLABUS FOR B.E. VI SEMESTER

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code: **U22PC630EE**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

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 become familiar with the architecture and instruction sets of 8086 and 8051 processors and as well as interfacing an external device to these processors	1. Applying the basic concepts of digital fundamentals to Intel 8086 architecture. 2. Apply the know ledge of 8086 instruction set and identify a detail software and hardware structure of the microprocessor. 3. Illustrate the different peripherals (8255, 8257, 8259 etc) interfacing with the microprocessor. 4. Design, Develop and interface microcontroller base systems to peripheral devices and systems at the chip level.

UNIT I

Over view of microcomputer structure and operation- Microprocessor Architecture of 8086- segmented memory, addressing modes, Introduction set, Minimum and Maximum mode operations.

UNIT II

Construction of machine codes for MOVE 8086 instruction- Assembly language programming , Assembler directives, simple programs using Assembler, strings, procedures, macros, timing.

UNIT III

Memory and I/O interfacing, A/D and D/A interfacing, 8255 (PPI), Keyboard and display interface, interrupts of 8086, seven segment display, 8237 DMA controller, 8251 USART

UNIT IV

Microcontrollers- 8051 microcontroller, architecture, I/O ports, connecting external memory, Instruction set, Assembly language programming.

UNIT V

Interrupts programming concepts with examples, serial communication programming concepts with examples, timers, counters, applications of micro controllers interfacing LEDs, seven segment display, keyboard interfacing, LCD interfacing, stepper motor interfacing.

Learning Resources

1. Douglas.V.Hall-Microprocessors and Interfacing-RaraMcgraw Hill-Revised 2nd edition, 2006.
2. Krishna Kant – Microprocessors and Microcontrollers – Architecture, Programming and System Design 8085, 8086 8051, 80996, Prentice-Hall India-2007.
3. Kenneth.J.Ayala _ "the 8051 , Microprocessors Architecture , Programming and Application, Thomson publishers, 2nd edition.
4. Walter A. TRiebel& Avatar Singh- The 8088 and 8086 Microprocessor – Fourth Edition, pearson

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 Test: 90 minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

SIGNALS AND SYSTEMS

SYLLABUS FOR B.E. VI SEMESTER

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code: **U22PC640EE**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES The course will enable the students to:	**COURSE OUTCOMES** On completion of the course, students will be able to
1. To define and classify continuous and discrete time signals & systems 2. To determine the frequency domain characteristics of continuous and discrete time signals using transform techniques. 3. To verify the causality and stability of LTI system and find its response using convolution.	1. Analyze continuous time signals and systems and transform them to frequency domain. 2. Convert continuous time signals to discrete time signals using sampling. 3. Analyze discrete time signals and systems and transform them to frequency domain using ZT. 4. Determine the convolution and Correlation of signals.

UNIT - I

Continuous Time Signals & Systems: Introduction, elementary signals, classification of signals and basic operations on signals. Introduction to systems and its classification.

Fourier Series: Review of Fourier series, existence and convergence, trigonometric and exponential Fourier series representations and their relations, symmetry conditions, properties, complex Fourier spectrum.

UNIT - II

Signal Representation by Continuous Exponentials: Introduction to Fourier Transform, existence, Fourier transform of singularity functions

and signals, properties, Fourier transform of a periodic function. Introduction to Linear Time Invariant (LTI) system, Unit impulse and step response, Transfer function of an LTI system.

UNIT - III

Sampling: Introduction to sampling, sampling theorem, aliasing, sampling Techniques, reconstruction, quantizing and encoding.

Signal Representation by Generalized Exponentials: Introduction to Laplace transforms, Existence, Region of convergence (ROC) and it properties. Properties of Laplace transform. Inverse Laplace transform, analysis and characterization of continuous LTI systems using Laplace Transform.

UNIT - IV

Discrete Time Signals & Systems: Introduction, elementary signals, classification of signals and basic operations on signals. Introduction to systems and its classification. Linear shift invariant systems, Stability and Causality. Discrete Fourier Series (DFS), Discrete Time Fourier Transform (DTFT).

Z-Transforms: Introduction to Z-Transform, existence, Region of Convergence (ROC) and its properties. S-plane and Z-plane correspondence, properties of Z-Transform, Inverse Z-Transform, analysis and characterization of discrete LTI systems using Z-Transform.

UNIT - V

Convolution & Correlation: Continuous convolution - graphical interpretation and convolution properties. discrete convolution- graphical interpretation and convolution properties. Continuous correlation-cross correlation and auto correlation, their graphical interpretation and properties. Discrete correlation- cross correlation and auto correlation, their graphical interpretation and properties, Power Spectral Density (PSD), Energy Spectral Density (ESD).

Learning Resources:

1. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, 2 Ed., PHI, 2013.
2. Signals, Systems & Communications - B.P. Lathi, 2013, BSP.

3. Signals and Systems – A.Anand Kumar, PHI, 2012.
4. Signals & Systems - Simon Haykin and Van Veen,Wiley, 2 Ed. 2003.
5. "Fundamentals of signals and systems", M.J. Robert , McGraw Hill, 2008.

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 Test: 90 minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

SKILL DEVELOPMENT COURSE VII - VERBAL APTITUDE
(Common to all branches) SYLLABUS FOR B.E. 3/4 – VI SEMESTER

L:T: P (Hrs/Week):2:0:0	SEE Marks: 40	Course Code: **U22HS630EH**
Credits: 1	CIE Marks: 30	Duration of SEE : 2 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 Test: 90 minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
Skill Development Course VIII - Technical Skills – III

SYLLABUS FOR B.E. VI SEMESTER

L:T: P (Hrs/Week):1:0:0	SEE Marks: 40	Course Code:**U22PE610EE**
Credits: 1	CIE Marks: 30	Duration of SEE : 2 Hours

COURSE OBJECTIVES The course will enable the students to:	**COURSE OUTCOMES** On completion of the course, students will be able to

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

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

Duration of Internal Test: 90 minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Power Electronics and Simulation Lab

SYLLABUS FOR B.E. VI SEMESTER

L:T: P (Hrs/Week):0:0:2	SEE Marks: 50	Course Code:**U22PC621EE**
Credits: 1	CIE Marks: 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES** On completion of the course, studentswill be able to
The objective of the power electronics and simulation lab is to provide an experience in working with power converters and enhance the analyzing capability by introducing simulation tools for power converters.	1. Examine the characteristics of power switching devices. 2. Analyze thyristor controlled rectifiers. 3. Analyze DC-DC converters. 4. Analyze voltage source inverters and bidirectional converter 5. Analyze AC-AC Controller

List of experiments:

1. I-V Characteristics of SCR, BJT, MOSFET and IGBT
2. Gate trigging circuits of thyristor: R, R – C and UJT triggering circuits.
3. Study of Voltage and current commutation techniques of thyristor.
4. 1 – Ø bridge rectifiers: Full converter and Semi-converter with R & R – L loads
5. Buck-Boost Converter
6. Single phase diode bridge rectifier- R, RL and RC load
7. Three phase diode bridge rectifier- R, RL and RC load
8. Single phase inverter- R and RL load
9. Three phase inverter– R and RL load
10. PSPICE Simulation of Single phase full-bridge thyristor rectifier with R-load and highly inductive load.
11. PSPICE Simulation of three phase full-bridge thyristor rectifier with R-load and highly inductive load.
12. PSPICE Simulation of Single phase voltage source inverters
13. PSPICE Simulation of three phase voltage source inverters.

14. MATLAB Simulation of Buck and Boost Converters.
15. Study and simulation of bidirectional power converters.

From the above experiments, each student should perform at least 10 (Ten) experiments.

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for assessment of each experiment			18
Duration of Internal Test: **3 Hours**			

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Microprocessors & Microcontrollers Applications Lab

SYLLABUS FOR B.E. VI SEMESTER

L:T: P (Hrs/Week):0:0:2	SEE Marks: 50	Course Code: **U22PC631EE**
Credits: 1	CIE Marks: 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES The course will enable the students to:	**COURSE OUTCOMES** On completion of the course, students will be able to
To introduce to students the basics of microprocessor and microcontroller programming and their applications.	1. Apply the fundamentals of assembly level programming of microprocessors and microcontrollers. 2. Design circuits for various applications using microprocessor and microcontrollers. 3. An in-depth know ledge of applying the concepts on real- time applications. 4. Use Real time programming software to interface hardware.

List of Experiments:

I. Microprocessor 8086 : using MASM/TASM

1. Programs for signed/unsigned multiplication and division
2. Program for finding average of N 16 bit
3. Program for finding largest number in an array
4. Program for code conversion like BCD to 7-segment
5. Program for compute factorial of a positive integer number.
6. String Manipulation instructions
7. Use of JUMP and CALL instructions 8. Macro and Procedure instructions

II. Interfacing :using 8086 Kit

1. 8255– PPI : Write an ALP to generate triangular wave, square wave, sawtoothe waveform using DAC.
2. LCD interfacing

3. ADC interfacing
4. Stepper motor interfacing
5. Traffic signal controller

III. Microcontroller 8051 :

1. Data transfer- Block of move, exchange, sorting, finding largest element in an array.
2. Arithmetic instructions: Multi byte operations
3. Boolean & logical instructions(Bit manipulations)
4. Programs to generate delay, programs using serial port and onchip timer/counter.
5. Use of JUMP and CALL instructions

IV .Proteus Software

1. Introduction to Proteus software
2. LED Interfacing
3. LCD Interfacing
4. Keyboard Interfacing
5. Stepper Motor Interfacing
6. DC motor Interfacing

Virtual Lab Experiments:

S.No	Title of the expt	Link
1	ADC triggering through timer(On Chip Timer)	http://vlabs.iitkgp.ac.in/rtes/exp5/index.html#
2	DAC interfacing and generation of ramp wave	http://vlabs.iitkgp.ac.in/rtes/exp3/index.html
3	Interfacing of ADC and data trasnfer by software polling, study of aliasing	http://vlabs.iitkgp.ac.in/rtes/exp4/index.html#
4	Interrupt driven data transfer from ADC	http://vlabs.iitkgp.ac.in/rtes/exp6/index.html#
5	program of Flashing LED connected to port 1 of the 8051 Micro Controller	http://ebootathon.com/labs/beta/ec/MicroprocessorAndMicrocontrollerLab/exp1/index.html

From the above experiments, each student should perform at least 10 (Ten) experiments.

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for assessment of each experiment			18
Duration of Internal Test: **3 Hours**			

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Theme Based Project

SYLLABUS FOR B.E. VI SEMESTER

L:T:P(Hrs./week):0:0:2	SEE Marks:50	Course Code: **U22PW619EE**
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. Learn contemporary technologies. 2. Design/Develop/Implement/Solve an engineering problem in the relevant areas of Electrical and Electronics Engineering.	1. Apply the knowledge acquired in the electrical engineering. 2. Demonstrate the ability to locate and use technical information from multiple sources. 3. Demonstrate the ability to communicate effectively through a technical report. 4. Demonstrate independent learning and professional ethics. 5. Demonstrate the project management capabilities.

The students are required to carry out mini projects irrelevant areas of Power Systems, Power Electronics, Electrical Machines, Measurements, Control Systems, Circuits, Micro Processors Controller and digital signal processing.

Students are required to submit a report on the miniproject.

- Batch size shall be 2 (or) 3 students per batch.
- Allocation by department.
- Two reviews – One during 5th week and another during 10th week and final evaluation shall be conducted during 15th to 16th week.
- Students are required to give Presentations / Demonstration ofthe work during the reviews.
- Students are required to submit mini project report along with working model if applicable.

No. of Internal Tests:	01	Max. Marks for Internal Test:	12
Marks for assessment of each experiment			18
Duration of Internal Test: **3 Hours**			

With effect from the Academic Year 2024-25

OPEN ELECTIVES OFFERED BY VARIOUS DEPARTMENTS IN B.E. VI SEMESTER (2024-25)

Dept	Title	Code	credits
Civil	Project Management	U22OE610CE	3
CSE	Introduction To Database Management System (General Pool)	U22OE610CS	3
CSE	Fundamentals Of Machine Learning (Stream- Artificial Intelligence & Machine Learning	U22OE620CS	3
ECE	Internet Of Things And Applications	U22OE610EC	3
ECE	Automatic Train Protection System-Kavach	U22OE620PH	3
IT	Web application development & Security	U22OE610IT	3
IT	Introduction To Machine Learning	U22OE620IT	3
Mech.	Industry 4.O (Stream : Robotics)	U22OE610ME	3
Mech.	Additive Manufacturing and its Applications (General Pool)	U22OE620ME	3
H&SS	Advanced course in Entrepreneurship	U22OE630EH	3
Phy.	Introduction To Nanotechnology	U22OE610PH	3

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF CIVIL ENGINEERING

PROJECT MANAGEMENT (Open Elective-IV)

SYLLABUS FOR B.E.VI-SEMESTER

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U22OE610CE**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES The objectives of this course are to:	**COURSE OUTCOMES** On completion of the course, students will be able to
1. Learn the concept of project management along with function and objectives. 2. Understand the various techniques used for project planning such as bar charts, CPM, PERT and crashing of networks. 3. Acquire knowledge on various types of contracts, tenders.	1. Understand the objectives, functions and principles of management in projects. 2. Practice the network techniques like CPM and PERT for better planning and scheduling of engineering works. 3. Analyse the importance of cost and time in network analysis and planning the work accordingly. 4. Knowledge on Contracts, Tenders, and Work orders related to the projects. 5. Interpret the concept of Linear Programming and solve problems by Graphical and Simplex methods.

UNIT-I: Significance of Project Management: Importance of Project Management, Types of projects, Project Management Cycle, Objectives and functions of project management, management team, principles of organization and types of organization.

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 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 Computer Science & Engineering

FUNDAMENTALS OF MACHINE LEARNING

Stream- Artificial Intelligence & Machine Learning

(OPEN ELECTIVE-IV)

(COMMON for CIVIL, ECE, EEE & MECH)

SYLLABUS FOR B.E VI SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code:**U22OE620CS**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVE	**COURSE OUTCOMES** *On completion of the course, students will be able to*
To formulate machine learning problems corresponding to an application.	1. Explain the basics machine learning.
	2. Prepare the data for learning
	3. Select the feature and transform it .
	4. Classify the data using classification models
	5. Solve problems using Unsupervised learning models

UNIT I:

Introduction to Machine Learning: Introduction, types of Human learning, types of learning, Problems not to be solved by Machine learning , applications of machine learning , Issues in machine learning,

UNIT II:

Preparing to Model : Introduction, Machine Learning Activities, Basic Data types in machine learning , Exploring Structures of Data.

UNIT III:

Basics of Feature Engineering: Introduction, feature transformation: feature Construction .

UNIT IV:

Supervised Learning – Classification: Introduction**,** Example of supervised learning, classification model, classification learning steps, common classification algorithms: KNN and Decision Tree,

Regression : Introduction , Simple Linear regression.

UNIT V:

Unsupervised Learning – Introduction**,** Unsupervised vs supervised learning, Application of Unsupervised Learning , types of Clustering techniques, Partitioning methods, k-medoids.

Learning Resources:

1. Saikat Dutt, Subramanian Chandramouli, Amit Kumar Das, -Machine Learning, Pearson Education
2. Tom Mitchell, —Machine Learning‖, McGraw-Hill Science, First edition.
3. Christopher Bishop, —Pattern Recognition and Machine learning‖, Springer (2006).
4. Stephen Marsland,‖Machine Learning –an algorithmic perspective‖, CRC Press.
5. Daniela witten, Trevor Hastie Robert Tibshirani and Gareth James, —An introduction to statistical Learning with applications in R, Springer 2013
6. https://onlinecourses.nptel.ac.in/noc18_cs26/preview
7. https://www.coursera.org/learn/machine-learning

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 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 Computer Science & Engineering

INTRODUCTION TO DATABASE MANAGEMENT SYSTEM (OPEN ELECTIVE-IV)

SYLLABUS FOR B.E. VI-SEMESTER

(COMMON FOR CIVIL, ECE, EEE & MECH)

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code :**U22OE610CS**
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 Identify different issues involved in the design and implementation of a database system. 2 Understand transaction processing.	1 Identify the functional components of database management system. Create conceptual data model using Entity Relationship Diagram 2 Transform a conceptual data model into a relational model 3 Design database using normalization techniques 4 Apply indexing and hashing techniques for effective data retrieval 5 Explain transaction processing.

UNIT-I

Introduction: Database System Application, Purpose of Database Systems, View of Data, Database Languages, Relational Database, Database Architecture, Database Users and Administrators.

Database Design and E-R Model: Overview of the Design Process, the E-R Model, Constraints, E-R Diagrams.

UNIT-II

Relational Model: Structure of Relation Database, Relational Algebra Operations, Modification of the Database.

Structured Query Language: Introduction, Basic Structure of SQL Queries, Set Operations, Aggregate Functions, Null Values, Nested Sub queries, Views.

UNIT-III

Relational Database Design: Features of Good Relational Designs, Atomic Domains and first Normal form, Decomposition Using Functional Dependencies.

UNIT-IV

Indexing and Hashing: Basic Concepts, Ordered Indices, B+ Tree Index Files, Static Hashing, Dynamic Hashing, Comparison of Ordered Indexing and Hashing.

UNIT-V

Transaction Management: Transaction concept, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation and Atomicity, Serializability, Recoverability.

Learning Resources:

1. Abraham Silberschatz, Henry F Korth, Sudharshan S, Database System Concepts, 6th Edition(2011), McGraw-Hill International Edition.
2. Date CJ, Kannan A, Swamynathan S, An Introduction to Database System , 8th Edition(2006) Pearson Education.
3. Raghu Ramakrishna, and Johannes Gehrke, Database Management Systems, 3rd Edition(2003), McGraw Hill.
4. RamezElmasri, Durvasul VLN Somyazulu, Shamkant B Navathe, Shyam K Gupta, Fundamentals of Database Systems, 4th Edition(2006), Pearson Education.
5. Peter rob, Carlos coronel, Database Systems, (2007), Thomoson.
6. http://nptel.ac.in/courses/106106093/

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Internet of Things and Applications (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** On completion of the course, students will be able to
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	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 Test: 90 minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Automatic Train Protection System- Kavach

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** On completion of the course, students will be able to
To Provide the knowledge of Kavach technology which is used for an anti-collision system for trains.	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, BrakingInterface, 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, Modesof Onboard subsystem, Train Characteristics, Mode Transitions, Braking Curves, SpeedProfiles, Speed Limits, SpeedMonitoring, 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, RadioSignal 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, SpeedSensors, RFID Reader, Onboard Computer, Brake Interface Unit,Pre-commissioning Checklist, Testing

<u>Practicals at IRISET Laboratory (12 Hours)</u>

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

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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 Test: 90 minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF INFORMATION TECHNOLOGY

WEB APPLICATION DEVELOPMENT AND SECURITY

(GENERAL TRACK : OPEN ELECTIVE-IV)
(Common for CIVIL, ECE, EEE & MECH)
SYLLABUS FOR B.E VI- SEMESTER

L:T:P(Hrs./week): 3:0:0	SEE Marks : 60	Course Code : **U22OE610IT**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hrs

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
1) Acquire basic skills for designing static and dynamic Web Applications using HTML, CSS, Java Script, Bootstrap and XML. 2) Acquire fundamental knowledge of Web Security concepts	1. Design a static web pages using HTML, CSS. 2. Create dynamic web pages and client side validation using JavaScript. 3. Develop responsive web applications using Bootstrap. 4. Build an application using an MVC Framework and XML 5. Analyze and evaluate web security attacks.

UNIT-I: Introduction
Introduction: World Wide Web, Web Browsers, Web Servers, URL, HTTP, TCP Port. HTML: Standard HTML document structure, Basic Tags, Images, Hypertext Links, Lists, Tables, Frames. CSS: In-line style sheets, Internal Style sheets and External Style sheets.

UNIT-II: Basics of JavaScript
JavaScript: Introduction, Basics of JavaScript-variables, data types and operators, Control Structures, Arrays, Functions, HTML Forms, Events and event handling.

UNIT-III: Bootstrap
Bootstrap: The Grid system, Layout components: Tables, Images, alerts, buttons, badges, progress bars, cards, drop downs, pagination, Collapse, Navbar, Carousel.

UNIT-IV: XML

XML- The Syntax of XML, XML Document Structure, Document Type Definitions.

Introduction to MVC - Introduction to Model View Controller Architecture

UNIT-V: Web Security Fundamentals

Web Hacking Basics, HTTP & HTTPS URL, Evolution of Web Applications - Web Application Security - Core Defence Mechanisms - Handling User Access - Handling User Input- Handling Attackers - Managing the Application, Introduction to Web 2.0

Learning Resources:

1. Robert W. Sebesta, Programming the World Wide Web, 7th Edition (2014), Pearson Education.
2. "Web Technologies", 7th Edition, Uttam K.Roy,2012.
3. Paul J. Deitel, Harvey M. Deitel, Abbey Deitel, Internet & World Wide Web How to Program, 5th Edition, Pearson Education.
4. http://getbootstrap.com/

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

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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 Test: 90 minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF INFORMATION TECHNOLOGY

INTRODUCTION TO MACHINE LEARNING

(AI&ML TRACK : OPEN ELECTIVE-IV)
(Common for ECE, EEE, MECH & CIVIL)
SYLLABUS FOR B.E VI- SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks :60	Course Code: **U22OE620IT**
Credits: 3	CIE Marks: 40	Duration of SEE :3Hrs

COURSE OBJECTIVES	**COURSE OUTCOMES** *On completion of the course, students will be able to*
Introduce the fundamental concepts, techniques and modern tools in Artificial intelligence and Machine Learning field to effectively apply it to the real-world problems.	1.Demonstrate knowledge of the Artificial intelligence and machine learning literature. 2.Understand and apply latest Python libraries for Machine learning models. 3.Apply an appropriate algorithm for a given problem. 4.Apply machine learning techniques in the design of computer systems. 5.Explain the relative strengths and weaknesses of different machine learning methods and approaches.

UNIT-I:
Introduction to AIML: Foundations of AI, Sub areas of AI, Applications. Introduction to learning, Types of Learning: Supervised Learning, Unsupervised Learning, Reinforcement Learning.
Introduction to Python and ML libraries: intro to python data types, control flow, loops, functions, modules & packages. Intro to NumPy & Scikit-learn.

UNIT-II:
Supervised learning: ML Task, ML Experience or Data, ML Performance metric, Linear Regression, Linear regression Simulator, Logistic Regression.
Supervised Non-parametric learning: Introduction to Decision Trees, K-Nearest Neighbor, Feature Selection.

UNIT-III:
Supervised Parametric learning (Neural networks): Perceptron, Multilayer Neural Network, Playground Simulator, Backpropagation.

UNIT-IV:

Supervised Parametric learning: Support Vector Machine, Kernel function and Kernel SVM.

Supervised Parametric Bayesian learning: Introduction, Naive Bayes Classification, Bayesian Network.

UNIT-V:

Unsupervised leaning: Clustering, K-means Clustering, DBSCAN

Learning Resources:

1. Tom Mitchell, Machine Learning,First Edition, McGraw-Hill, 1997
2. Christopher Bishop. Pattern Recognition and Machine Learning. Second Edition.
3. EthemAlpaydin , Introduction to Machine Learning, Second Edition
4. T. Hastie, R. Tibshirani, J. Friedman. The Elements of Statistical Learning, 2e, 2008.
5. http://nptel.ac.in/courses/106106139/
6. https://www.w3schools.com/python/
7. https://www.w3schools.com/python/numpy/default.asp
8. https://scikit-learn.org/stable/
9. Linear Regression Simulator (mladdict.com)
10. Neural Network Playground simulator
11. https://www.mladdict.com/neural-network-simulator

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

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3. No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Test: 90 minutes

With effect from the Academic Year 2024-25

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

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 this course are 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

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Duration of Internal Test: 90 minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

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:**U22OE620ME**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES The objectives of this course are to:	**COURSE OUTCOMES** On completion of the course, students will be able to
The objectives of this course are to: understand the fundamentals of various additive manufacturing technologies and their applications in Engineering Industry.	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	:	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 Test: 90 minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD-31

Department of H&SS

ADVANCED COURSE IN ENTREPRENEURSHIP (OE-IV)

SYLLABUS FOR B.E.VI-SEMESTER

L:T:P(Hrs/week):3:0:0	SEE Marks:60	Course Code:**U20OE630EH**
Credits :03	CIE Marks:40	Duration of SEE:03Hours

Courseobjectives *The objectives of this course are to*	**CourseOutcomes** *On completion of the course the student will be able to*
1. Acquire additional knowledge and skills for developing early customer traction into a repeatable business. 2. 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 ofregistering 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. http://www.learnwise.org
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: 90 minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD-31

DEPARTMENT OF PHYSICS

INTRODUCTION TO NANOTECHNOLOGY (OE)

SYLLABUS FOR B.E.VI-SEMESTER

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

Courseobjectives *The objectives of this course are to*	**CourseOutcomes** *On completion of the course the student will be able 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

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Duration of Internal Test: 90 minutes