With effect from the Academic Year 2025-26

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 2025-26
(For the batch admitted in 2023-24)
(R-23)

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.

With effect from the Academic Year 2025-26

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 Hours per Week**			**Duration in Hrs**	**Scheme of Examination Maximum Marks**		**Credits**
		L	**T**	**P/D**		**SEE**	**CIE**	
	THEORY							
U23PC510EE	AC Machines	3	1	-	3	60	40	4
U23PC520EE	Digital Electronics	3	-	-	3	60	40	3
U23PC540EE	Control Systems	3	1	-	3	60	40	4
U23PC550EE	Linear Integrated Circuits & Applications	3	-	-	3	60	40	3
U23OE5X0XX	Open Elective -III	3	-	-	3	60	40	3
U23HS510EH	Skill Development Course-V (Communication Skills-II)	1	-	-	2	40	30	1
U23PE510EE	Skill Development Course-VI (Technical Skills-II)	1	-	-	2	40	30	1
	PRACTICALS							
U23PC511EE	AC Machines Lab	-	-	2	3	50	30	1
U23PC541EE	Control Systems Lab	-	-	2	3	50	30	1
U23PC521EE	Linear Integrated Circuits & Applications Lab	-	-	2	3	50	30	1
U23PW519EE	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 minimum 8 weeks equivalent to 2 Credits by the end of VI semester

With effect from the Academic Year 2025-26

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: **U23PC510EE**
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. Analyze speed torque characteristics and performance of the 3-phase induction motor, identify the applications. 2. Start and Control the speed of 3-phase induction motors based on applications. 3. analyze the operation of Single –phase induction motors and Identify the applications. 4. Analyze the operation and characteristics of synchronous generator. 5. Analyze the operation and characteristics of synchronous motor.

UNIT-I:

Three Phase Induction Motors:

Construction, Types (squirrel cage and slip-ring), generation of RMF, principle of operation of IM, Torque Slip Characteristics, Starting and Maximum Torque, Equivalent circuit. Phasor Diagram, Power Flow diagram, Losses and Efficiency. No load and Blocked rotor test, Circle diagram.

UNIT-II:

Starting & Speed Control Methods: Starting methods of 3-phase induction motor –DOL, Autotransformer, Star delta Starter, rotor resistance. Double cage

machine, Speed control methods – Pole changing, Voltage Control, frequency control, Resistance control. Induction Generator - Principle of operation, Applications of 3-phase IM.

UNIT-III:
Single-phase induction motors:
Constructional features of single phase induction motor, working principle, double revolving field theory, No load and Blocked rotor test on single phase induction motor, determination of equivalent circuit parameters. speed torque characteristics of Split-phase and capacitor start motors, stepper, BLDC motors and applications.

UNIT-IV:
Synchronous machines:
Constructional features, Salient and non-salient pole synchronous machines Types of AC windings, short pitch and full pitch coil, pitch factor, concentrated winding, distributed winding, winding distribution factor,
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.
AI Applications to Machines: Fault Detection and Diagnosis using AI.

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, 7^{th} 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 2025-26

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

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: **U23PC520EE**
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

With effect from the Academic Year 2025-26

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

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: **U23PC540EE**
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

With effect from the Academic Year 2025-26

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

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: **U23PC550EE**
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 2025-26

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: **U23HS510EH**
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

Equips participants with group discussion strategies using Six Thinking Hats, point generation, and summarization techniques, along with case study-based discussions to enhance analytical thinking.

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

Develops the ability to deliver clear, persuasive, and structured presentations using the Toulmin model, with practical exposure to JAM (Just A Minute) and extempore speaking exercises.

2.1 Concise Cogent Presentation
2.2 Persuasion skills
2.3 Toulmin Model
2.4 Biker B - JAM and Extempore

Unit 3: Fact, Observation and Inference

Builds critical reading and thinking skills to differentiate facts from opinions, make accurate inferences, identify main ideas, and draw logical conclusions from various texts.

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

Trains learners in crafting technical reports, descriptive image-based writing, and composing insightful book and movie reviews with clarity and coherence.

1.1 Report writing
1.2 Image Writing
1.3 Book Reviews
1.4 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 2025-26

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: **U23PE510EE**
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 2025-26

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

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

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: **U23PC511EE**
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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9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

CONTROL SYSTEMS LAB

SYLLABUS FOR B.E. V SEMESTER

L:T: P (Hrs/Week):0:0:2	SEE Marks: 50	Course Code: **U23PC541EE**
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 2025-26

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: **U23PC521EE**
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 2025-26

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: **U23PW519EE**
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 2025-26

OPEN ELECTIVES OFFERED BY VARIOUS DEPARTMENTS IN B.E. V SEMESTER (2025-26)

Dept	Code	Title
Civil	U23OE510CE	Geo Spatial Information Technologies
CSE	U23OE510CS	Introduction to Operating Systems
MECH	U23OE520ME	Introduction to Robotics
IT	U23OE510IT	Essentials of Operating Systems
IT	U23OE520IT	Introduction to Artificial Intelligence (Stream based (AI&ML))
EEE	U23OE510EE	Modelling and Simulation of Basic Photovoltaic Systems
ECE	U23OE510EC	Introduction to Biomedical Electronics
ECE	U23OE530PH	Signal Engineering
MATHS	U23OE510MA	Transform Techniques
H&SS	U23OE530EH	Introduction to philosophy
H&SS	U23OE540EH	Basics of Entrepreneurship
H&SS	U23OE520EH	Introduction to Financial Analytics (BFSI Stream)

With effect from the Academic Year 2025-26

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 2025-26

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 : **U23OE510CS**
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 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF INFORMATION TECHNOLOGY

Essentials of Operating Systems

(GENERAL TRACK: OPEN ELECTIVE-III)

(Common for CIVIL, ECE, EEE & MECH) SYLLABUS OF B.E V- SEMESTER

L:T:P(Hrs./week): 3:0:0	SEE Marks :60	Course Code: **U23OE510IT**
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

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

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30

With effect from the Academic Year 2025-26

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 2025-26

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 OF B.E V- SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: U23OE520IT
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hrs

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/

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

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

Duration of Internal Test: 90 Minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF MECHANICAL ENGINEERING

INTRODUCTION TO ROBOTICS

(General Pool : (Open Elective-III) SYLLABUS FOR B.E. V-SEMESTER

L:T:P(Hrs./week):3	SEE Marks : 60	Course Code: U23OE520ME
Credits : 3	CIE Marks: : 40	Duration of SEE: 3 Hours

Course objectives	**Course Outcomes**
The objectives of this course are to: Identify robots and its peripherals for satisfactory operation and control of robots for industrial and non-industrial applications.	On completion of the course, the student will be able to 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,

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, 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.

UNIT-IV ROBOT SENSORS

Sensors in robots – Touch sensors-Tactile sensors – Proximity and range sensors. Force sensors, Light
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:	02	Max.Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: 90 Minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Modelling and Simulation of Photovoltaic Systems

(Open Elective-III) SYLLABUS FOR B.E. V SEMESTER

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code: **U23OE510EE**
Credits:3	CIE Marks: 40	Duration of SEE: 3Hours

COURSE OBJECTIVES The course will enable the students to:	**COURSE OUTCOMES** On completion of the course, students will be able to
1. Understand photovoltaic systems concepts, design criteria and conclusions, 2. Verify model of photovoltaic systems using PSpice.	1. Understand basics of solar radiation and PSpice software. 2. Use a simplified analytical model of solar cell which can be implemented in PSpice. 3. Examine basic equations of a solar cell and develop PSpice models 4. Describe the association of solar cells to form PV arrays and PV modules. 5. Interface PV systems to supply either DC or AC loads.

Unit-1 Introduction to Photovoltaic Systems and PSpice

Photovoltaic system: Introduction, Important definitions: irradiance and solar radiation, Learning some of PSpice basics, Using PSpice subcircuits to simplify portability, PSpice piecewise linear (PWL) sources and controlled voltage sources, Energy input to the PV system: solar radiation availability, Problems

Unit-2 Spectral Response and Short-Circuit Current
Introduction: Absorption coefficient and Reflectance, Analytical solar cell model, PSpice model for the short-circuit spectral current density, Short-circuit current, Effects of solar cell material, DC sweep plots and I(V) solar cell characteristics, Ideal circuit model: series and shunt resistances and recombination terms, Problems

Unit-3 Electrical Characteristics of the Solar Cell
Ideal equivalent circuit, PSpice model of the ideal solar cell, Open circuit voltage, Maximum power point, Fill factor (FF) and power conversion efficiency, Generalized model of a solar cell, Effects of the series resistance on the short-circuit current and the open-circuit voltage, Effects of the shunt resistance, Effects of the recombination diode, Temperature effects, Problems

Unit-4 Solar Cell Arrays, PV Modules and PV Generators
Introduction, Series connection of solar cells, Identical solar cells in series, Bypass diode in series strings of solar cells, Shunt connection of solar cells, Shadow effects, The terrestrial PV module, Photovoltaic arrays, Photovoltaic generators and PV plants, Problems

Unit-5 Interfacing PV Modules to Loads and Battery Modelling
DC loads directly connected to PV modules, Photovoltaic pump systems, DC series motor PSpice circuit, Centrifugal pump PSpice model, PSpice simulation of a PV array-series DC motor-centrifugal pump system, PV modules connected to a battery and load, Lead–Acid battery PSpice model, PSpice model to commercial batteries, Simplified PSpice battery model, Problems

Learning Resources:
1. Luis Castaner and Santiago Silvestre, Modelling Photovoltaic Systems using PSpice, John Wiley & Sons Ltd, 2002
2. Paul Tobin, PSpice for Circuit Theory and Electronic Devices, Morgan & Claypool Publishers, 2007.

3. Muhammad H. Rashid, Introduction to Pspice Using Orcad for Circuits and Electronics, Prentice-Hall of India Pvt.Ltd, 2004.
4. Orcad Capture User's Guide, Cadence Design Systems, Second edition 2000.

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 2025-26

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: **U23OE510EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
1. To provide foundational knowledge of physiological systems and the origin of biomedical signals relevant to medical instrumentation. 2. To introduce the basic components and performance requirements of medical instrumentation systems, including intelligent and non-invasive systems. 3. To familiarize students with various electrodes and transducers used in biomedical applications, including their working principles and characteristics. 4. To develop understanding of therapeutic and prosthetic devices such as pacemakers, defibrillators, and ventilators, and their role in patient care. 5. To explore modern medical	On completion of the course, students will be able to 1. Recognize the fundamental need for biomedical signal acquisition and describe the structure and function of basic biomedical instrumentation systems. 2. Explain the principles and applications of bioelectric signals, and evaluate the use of electrodes and transducers in biomedical measurements. 3. Demonstrate the working principles and clinical relevance of therapeutic, prosthetic, and non-invasive biomedical instruments used in diagnosis and treatment. 4. Apply mathematical, physical, and computational principles to interpret and analyze data from modern medical imaging

imaging technologies such as X-ray, CT, MRI, and thermography, and their applications in diagnostic medicine.	systems such as X-ray, CT, and MRI. 5. Integrate knowledge of biomedical instrumentation systems to analyze constraints and design considerations for safe, reliable, and intelligent healthcare solutions.

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 2025-26

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Signal Engineering

(Open Elective - III)

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

L:T:P (Hrs./week) : 2:0:1	SEE Marks : 60	Course Code:**U23OE530PH**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
1. To provide foundational knowledge of railway signaling systems and interlocking principles for the safe and efficient movement of trains. 2. To familiarize students with the operation and safety aspects of various signaling equipment such as signals, point machines, relays, and track circuits. 3. To impart an understanding of train working systems, station layouts, and modern interlocking techniques, supported by hands-on practical sessions at IRISET.	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, for 25KV 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; Station Layouts: 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.

<u>Practicals at IRISET Laboratory (12 Hours)</u>
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 Tests	: 30
2. No. of Assignments	: 3	Max. Marks for each Assignment	: 5
3. No. of Quizzes	: 3	Max. Marks for each Quiz Test	: 5

Duration of Internal Tests: 90 Minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

Accredited by NAAC with A++ Grade

DEPARTMENT OF MATHEMATICS

TRANSFORM TECHNIQUES

(OPEN ELECTIVE)

For B.E., V - Semester – CBCS (Common to CSE, AIML & IT Branches)

L:T: P (Hrs/Week): 3:0:0	SEE Marks: 60	Course Code: U23OE510MA
Credits:3	CIE Marks: 40	Duration of SEE: 3Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to: 1. Understand the Definition of Laplace and its Properties. 2. Understand the Definition of inverse Laplace Transforms- Properties. 3. Understand the applications of Laplace Transforms. 4. Study the Definition of Z-Transforms and its properties. 5. Understand the applications of Z-Transforms	At the end of the course students will be able to: 1. Evaluate Laplace transforms of functions. 2. Evaluate Inverse Laplace transforms of functions. 3. Apply Laplace transforms to evaluate integrals and to solve ordinary differential equations arising in engineering problems. 4. Evaluate Z- transforms of Sequences 5. Apply Z-transforms to solve ordinary difference equations arising in engineering problems.

UNIT – I: (8 Hours)

LAPLACE TRANSFORMS

Introduction to Laplace transforms - Existence of Laplace Transform – Properties of Laplace Transform-First shifting theorem - Second shifting theorem -Change of scale property –Differentiation of Laplace transform –Integration of Laplace Transform – Laplace Transform of Derivatives - Laplace Transform of Integrals

UNIT – II: (8 Hours)

INVERSE LAPLACE TRANSFORMS

Introduction to Inverse Laplace transforms -Properties of Inverse Laplace Transform-First shifting theorem - Second shifting theorem - Change of scale property- Multiplication with s - Division by s – Convolution Theorem (without proof).

UNIT – III: (8 Hours)

APPLICATIONS OF LAPLACE TRANSFORMS

Applications of Laplace transforms to Initial and Boundary Value Problems upto second order –Laplace transform of periodic functions – Triangular wave – Square wave – Saw tooth wave.

UNIT – IV: (8 Hours)

Z-TRANSFORMS

Introduction - Z-transforms of Standard sequences - Linearity Property – Scaling Property - Shifting Properties- Initial value theorem - Final value theorem – Differentiation of Z-transform.

UNIT – V: (8 Hours)

INVERSE Z-TRANSFORMS

Introduction –Inverse Z-transforms of Standard functions - Convolution Theorem – Application of Z-Transforms to solve Difference Equations.

Text Books:

1. Advanced Engineering Mathematics, Third Edition, R. K. Jain and S. R. K. Iyengar, Narosa Publishing House.
2. Higher Engineering Mathematics, Dr.B.S Grewal 40th Edition, Khanna Publishers.

Reference Books:

1. Advanced Engineering Mathematics, Kreyszig E, 8 th Edition, John Wiley & Sons Ltd, 2006.
2. A text book of Engineering Mathematics by N.P.Bali & Manish Goyal, Laxmi Publication.

Online Resources:
https://onlinecourses.nptel.ac.in/noc24_ma17/preview

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

1	No. of Internal	:	2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5
4	Duration of Internal	:	90 Minutes			

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGNEERING (AUTONOMOUS)

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

INTRODUCTION TO PHILOSOPHY

B.E-V SEMESTER GENERAL POOL-OE

Instruction: 3 Hrs/week	SEE Marks: 60	Course Code: U23OE330EH
Credits: 3	CIE Marks:40	SEE: 3 hrs.

Course Objectives	Course Outcomes
What the course aims to achieve 1. To introduce students to the major branches, questions, and methods of philosophy. 2. To develop critical and logical thinking through philosophical analysis. 3. To explore key philosophical texts and thinkers from various traditions. 4. To encourage reflection on ethical, metaphysical, and epistemological issues. 5. To cultivate the ability to construct and evaluate arguments.	What students should be able to demonstrate after completing the course 1. Define and explain foundational philosophical concepts and theories. 2. Analyze and critique philosophical arguments using logical reasoning. 3. Compare perspectives from different philosophical traditions and historical periods. 4. Apply philosophical thinking to contemporary ethical and social issues. 5. Formulate clear, coherent arguments in both oral and written form.

Unit 1: What Is Philosophy?

Definition and scope of philosophy

Branches of philosophy: metaphysics, epistemology, ethics, logic, aesthetics

Philosophical methods and the role of reasoning

Unit 2: Knowledge and Reality (Epistemology and Metaphysics)

What can we know? (Skepticism, rationalism, empiricism)
Appearance vs. reality
The mind-body problem

Unit 3: Ethics and Moral Philosophy
What is the good life?
Major ethical theories: utilitarianism, deontology, virtue ethics
Moral dilemmas and applied ethics

Unit 4: Political and Social Philosophy
The state and justice
Liberty, rights, and social contract theory
Civil disobedience and authority

Unit 5: Logic and Critical Thinking
Arguments, premises, and conclusions
Fallacies and sound reasoning
Introduction to symbolic logic

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

1	No. of Internal tests	:	2	Max.Marks	:	30
2	No. of assignments	:	3	Max. Marks	:	5
3	No. of Quizzes	:	3	Max. Marks	:	5

Duration of Internal Tests : 90 Minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGINEEING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

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: 60	Course Code: U23OE540EH
Credits: 3	CIE: 40	Duration of SEE : 3 Hours

Course objectives	Course Outcomes
The objectives of this course are to: **1.**	**On completion of the course the student will be able to:** **1.**

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

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

1	No. of Internal tests	:	2	Max.Marks	:	30
2	No. of assignments	:	3	Max. Marks	:	5
3	No. of Quizzes	:	3	Max. Marks	:	5

Duration of Internal Tests : 90 Minutes

With effect from the Academic Year 2025-26

VASAVI COLLEGE OF ENGNEERING (AUTONOMOUS)

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

Introduction to Financial Analytics

(Stream based Open Elective)

Instruction: 3 Hrs/week	SEE Marks: 60	Course Code: U23OE520EH
Credits: 3	CIE Marks:40	SEE: 3 hrs.

COURSE OBJECTIVES	**COURSE OUTCOMES**
The course will enable the learners to: 1. To gain knowledge of tools of financial analysis 2. To understand valuation methodologies of Financial Debt instruments 3. To understand corporate valuation methodologies	On completion of the course, students will be able to: 1. Differentiate effective rates of interest vs normal rates of interest. Understand time value of money 2. Analyse financial statements of a company. Understand efficient usage of capital. 3. To understand the impact of debt on the capital structure and valuations of a company. 4. Understand basis of financial projections, Valuation methods etc.

This course gives an overview of key inputs, covering time value of money, interest rates and others, required to take rational financial decisions. This course gives an insight of tools used to analyse and interpret financial statements of a company and thereby value a company's worth.

This is a theory cum numerical/case-study based paper. Provides exposure to students regarding Profit & Loss statement, Balance sheet & cash flow statement. Objectives of capital structure etc

Creates awareness about analysing a company from an investment perspective.

Unit 1 (5 hours)
introduction to Financial Management - Meaning - Financial Decisions- lnterrelation between Financial decisions - Time Value of Money - concept of Present Value and Future value - Effective Vs Nominal rates of interest - Amortization (including simple numerical problems)

Unit 2 (10 hours)
Financial statement Analysis - Financial statements- components of financial statements- Profit and Loss - Balance sheet - cashflow statement- building blocks of financial statements- sensitivity of various components on the profitability - lnter and lntra Company comparision - Ratio Analysis, common Size statements.(lncludingnumericals on lnter and lntra company comparison)

Unit 3 (8 hours)
Debt Securities - Types of Bonds - Bond lndenture -Valuation of Bonds - Bonds witirAnnual and Semi AnnuallnterestpaymentS - Current Yield- Yield to Maturity and Yield to Call - Bond Duration importance and Computation - Bond Portfolio management

Unit 4 (5 hours)
Capital Structure - Concept - Sources of Finance - Determinants of capital Structure - EBlr - EPS Analysis - Effect of Taxation - consideration of Management control.

Unit 5 (15 hours)
Business Valuation - concept -purpose and Hindrances -Projected Financials- Methods of Valuation Discounted Free cash Flow Method- Net Assets Based - comparable company- Market multiples Business Valuation in Mergers- Real life Examples

Text Books Units 1,2,3,4 -Financial Management by M Y Khan
Unit 5 * Institute of Company Secretaries Study book
Websites: Wikipedia.com; Investopedia.com;
Newspaper: Business Standard; Economic Times
The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal tests	:	2	Max.Marks	:	30
2	No. of assignments	:	3	Max. Marks	:	5
3	No. of Quizzes	:	3	Max. Marks	:	5

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 Hours per Week**			**Duration in Hrs**	**Scheme of Examination Maximum Marks**		**Credits**
		L	**T**	**P/D**		**SEE**	**CIE**	
THEORY								
U23HS040EH	Economics and Finance for Engineers	2	-	-	3	60	40	2
U23PC610EE	Power Systems -II	3	-	-	3	60	40	3
U23PC620EE	Power Electronics	3	1	-	3	60	40	4
U23PC630EE	Microprocessor and Microcontrollers Applications	3	-	-	3	60	40	3
U23PC640EE	Signals & Systems	3	-	-	3	60	40	3
U23OE6XXXX	Open Elective -IV	3	-	-	3	60	40	3
U23HS630EH	Skill Development Course-VII (Verbal Ability)	1	-	-	2	40	30	1
U23PE610EE	Skill Development Course-VIII (Technical Skills-III)	1	-	-	2	40	30	1
PRACTICALS								
U23PC651EE	Microprocessor and Microcontrollers Applications Lab	-	-	2	-	50	30	1
U23PC631EE	Power Electronics Lab	-	-	2	-	50	30	1
U23PW619EE	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

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:**U23HS040EH**
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
Definition of Managerial Economics - Scope of Managerial Economics - Relevance of Economics for Engineers - Demand function - Determinants of Demand - Law of Demand - assumptions and exceptions – Elasticity of demand (Price, Income and cross elasticity)- numericals on elasticity of demand - Application-oriented approach of Elasticity - Law of supply - Introduction to market structures.

Unit II: **Cost Analysis and Profit Planning**
Concept of Cost - Classification of Costs - Cost sheet (simple numericals) – Marginal Costing Analysis (simple numericals) - Application oriented approach (Make or buy, continue or shutdown decisions - Theory)

Unit III: **Conceptual Understanding of Accounting**
Accounting Cycle – Principles of Accounting - Journal - Subsidiary Books – Ledger - Trial Balance (Theory Only)
Preparation of Trading and Profit and Loss Account and Balance Sheet (numericals with adjustments for closing stock, outstanding expenses, prepaid expenses, accrued incomes, incomes received in advance, depreciation, bad debts and provision for bad debts) – Introduction to Corporate Balance Sheet

UNIT IV: **Financial Statement Analysis**

Ratio Analysis - uses and limitations - Liquidity, Solvency, Activity & Profitability Ratios (simple numericals)

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

Financing decisions - Dividend decisions - Investment decisions - Long term – Capital budgeting – Traditional and DCF Techniques (Numericals on capital budgeting techniques namely PBP, ARR, NPV, PI and IRR) – Short term - Introduction to working capital.

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

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

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

POWER SYSTEM – II
SYLLABUS FOR B.E. VI SEMESTER

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code: **U23PC610EE**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	**COURSEOUTCOMES** On completion of the course, students will be able to
1. Acquire knowledge of Transmission Lines Performance. 2. Understand the Per Unit system Representation. Learn about the Symmetrical Fault analysis and S.C capacity of a Bus. 3. Acquire the knowledge of the fundamentals of Sequence components, Sequence networks of Generator, T/F, T.M.L & Load and Unsymmetrical Fault analysis of power system 4. Understand the concepts of reflection and refraction of voltage or current wave and construct Bewley Lattice diagram. 5. Understand the concept of AI Techniques such as machine learning and deep learning.	1. Calculate and compare the performance (Constants A, B, C & D, voltage regulation & efficiency) of different types of Transmission lines. 2. Calculate the P.U quantities in power system and analyze symmetrical fault (LLL Fault) and calculate S.C capacity of a Bus. 3. Draw the diagram of Sequence networks of different components and compute the Unsymmetrical Fault (LG, LL, LLG) current value & MVA values. 4. Evaluate the value of coefficient of reflection and refraction of voltage or current wave and construct Bewley Lattice diagram. 5. Apply AI techniques such as machine learning and deep learning and optimization algorithms to analyze and monitor power system networks.

UNIT I

Constants of overhead lines: Inductance of 2-wire line, 3-phase line, Self-GMD and mutual GMD. Capacitance of single-phase line, 3-phase line. Classification of Transmission lines-Short transmission line – single phase and three-phase, medium transmission line – End condenser, Nominal-T and Nominal-π methods, Long transmission line. Regulation and efficiency transmission lines.

UNIT II

Per Unit Representation: Use of per Unit Quantities in power systems, Advantages of per unit system.

Symmetrical faults: Z bus formation, Symmetrical Three phase Transients in R-L series circuits – short circuit currents – Reactance's of Synchronous Machines – Symmetrical Fault calculations. Short circuit capacity of bus.

UNIT III

Unsymmetrical faults: Symmetrical components of unsymmetrical phasors – Power in terms of symmetrical components - sequence impedance and sequence networks. Sequence networks of unloaded generators – Sequence impedances of circuit elements – Single line to ground, line-to-line and double line to ground faults on unloaded generator – Unsymmetrical faults of power systems.

UNIT IV

Transients in power systems: Causes of over voltages, Traveling Wave Theory – Wave equation – Open Circuited Line – The short circuited line – Junction of lines of different natural impedances – Reflection and refraction – Coefficients – Junction of Cable and overhead lines – Junction of three lines of different natural impedances – Bewley Lattice diagram. Corona: Causes – Disruptive and Visual Critical Voltages, Power loss – minimization of Corona Effects.

UNIT V

Introduction to AI in power systems: Definitions, history & applications - AI techniques: Machine learning, deep learning and optimization algorithms- Applications of machine learning in power systems: load forecasting, fault detection

Learning Resources

1. C.L. Wadhwa , Electrical Power Systems, Wiley Eastern Ltd., 4th Ed. 2006.
2. 2. John J.Grainger William D. Stevenson Jr. Power System Analysis, TataMCGraw Hill Edn.2003
3. 3. I.J.Nagrath & D.P.Kothari "Modern Power Systems Analysis" TMH Edition,2003.
4. 4. A. Chakrabarti, M.L.Soni, P.V.Gupta, U.S.Bhatnagar, A Text book on PowerSystem, Dhanpat Rai & Co(P) Ltd
5. .Sivanandam, S. N., and S. N. Deepa. Principles of soft computing, John Wiley & Sons, 2007.

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)
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:**U23PC620EE**
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 and AC Voltage controllers.	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 bidirectional 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, introduction to wide band gap devices.

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:

Elementary chopper with an active switch and diode, concepts of duty ratio and average voltage.

Buck converter, Boost converter, Buck-Boost converter:

Power circuits; operation; waveforms at steady state; calculation of average voltage; calculation of ripple voltage and ripple current; calculation of critical values of inductor and capacitor.

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; 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 2025-26

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: **U23PC630EE**
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 Academic Year 2025-26

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: **U23PC640EE**
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 Academic Year 2025-26

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

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

SKILL DEVELOPMENT COURSE VII - VERBAL ABILITY
(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: **U23HS630EH**
Credits: 1	CIE Marks: 30	Duration of SEE : 2 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the learners 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	**At the end of the course the learners will be able to: -** 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 Academic Year 2025-26

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:**U23PE610EE**
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 Academic Year 2025-26

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: **U23PC651EE**
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 Academic Year 2025-26

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

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Power Electronics Lab

SYLLABUS FOR B.E. VI SEMESTER

L:T: P (Hrs/Week):0:0:2	SEE Marks: 50	Course Code:**U23PC631EE**
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. Simulation of Single phase fully controlled bridge rectifier with R-load and highly inductive load.
2. Simulation of three phase fully controlled bridge rectifier with R-load and highly inductive load.
3. 1 – Ø bridge rectifiers: Full converter and Semi-converter with R & R – L loads
4. 3 – Ø bridge rectifiers: Full converter and Semi-converter with R & R – L loads
5. Simulation of Buck and Boost Converters.
6. Buck converter
7. Buck-Boost Converter
8. Simulation of Single phase voltage source inverters
9. Simulation of three phase voltage source inverters.
10. Single phase inverter- R and RL load

11. Three phase inverter– R and RL load
12. Simulation of Single phase AC voltage controller
13. Simulation of single phase cyclo-converter
14. Study of single phase AC voltage controller
15. Study of single phase cyclo-converter

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 Academic Year 2025-26

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: **U23PW619EE**
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 Academic Year 2025-26

OPEN ELECTIVES OFFERED BY VARIOUS DEPARTMENTS IN
B.E. VI SEMESTER (2025-26)

Dept	Code	Title
Civil	U23OE610CE	Project Management
CSE	U23OE610CS	Fundamentals of Database Management System
MECH	U23OE610ME	Industry 4.O (Stream: Robotics)
MECH	U23OE620ME	Additive Manufacturing and its Applications (General Pool)
IT	U23OE610IT	Web application development & Security
IT	U23OE620IT	Introduction to Machine Learning (Stream based (AI&ML))
ECE	U23OE610EC	Internet of Things and Applications
ECE	U23OE630PH	Automatic Train Protection System – Kavach
MATHS	U230E610MA	Advanced Probability and Statistical Methods

With effect from Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING

PROJECT MANAGEMENT

(OPEN ELECTIVE-IV) SYLLABUSFORB.E.VI-SEMESTER

L:T:P(Hrs/Week):3:0:0	SEE Marks:60	Course Code: U23OE610CE
Credits: 3	CIEMarks:40	DurationofSEE:3Hours

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to:	Upon the completion of this course the students will be expected to:
1. Learn the concept of project management along with function and objectives. 2. Understand 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 ofproject 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.
Tender: Tender form, Tender Documents, Tender 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. Srinath L.S., PERT and CPM: Principles and Application, Vision IAS, 2020.
2. Peret, F, Construction Project Management an Integrated approach, Taylor and Francis, Taylor and Francis Group, London & New York, 2019
3. Punmia B.C., and Khandelwal, PERT and CPM, Laxmi Publications, 2022.
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, 2017.

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 Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

ACCREDITED BY NAAC WITH 'A++' GRADE

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

Fundamentals of 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 :U23OE610CS
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.	1	Identify the functional components of database management system. Create conceptual data model using Entity Relationship Diagram
2	Understand transaction processing.	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/

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

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

Duration of Internal Tests : 1 Hour 30 Minutes

With effect from Academic Year 2025-26

VASAVI COLLEGE OF ENGINEEING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF MECHANICAL ENGINEERING

INDUSTRY 4.O

(Open Elective-IV) SYLLABUS FOR B.E VI Semester

L:T: P (Hrs./week):3: 0 : 0	SEE Marks:60	Course Code : U23OE610ME
Credits: 3	CIE Marks:40	Duration of SEE : 3 Hours

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

UNIT – I

Introduction

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 work piece

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

Learning Resources:

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

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

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	5
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	5

Duration of Internal Test: 90 Minutes

With effect from Academic Year 2025-26

VASAVI COLLEGE OF ENGINEEING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF MECHANICAL ENGINEERING

ADDITIVE MANUFACTURING AND ITS APPLICATIONS

(General Pool) (Open Elective-IV) SYLLABUS FOR B.E VI Semester

L:T: P (Hrs./week):3: 0 : 0	SEE Marks:60	Course Code : U23OE620ME
Credits: 3	CIE Marks:40	Duration of SEE : 3 Hours

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

Unit-I

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

Unit-II

Liquid based systems: Stereo lithography apparatus (SLA): Models and specifications, process, working principle, photopolymers, photo polymerization, layering technology, laser and laser scanning, applications, advantages and disadvantages, case studies.

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

UNIT III

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

Unit-IV

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

UNIT-V

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

Learning Resources:

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

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

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

Duration of Internal Test: 90 Minutes

With effect from Academic Year 2025-26

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 : U23OE610IT
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
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	On completion of the course, students will be able to 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

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

Duration of Internal Tests : 90 Minutes

With effect from Academic Year 2025-26
With effect from Academic Year 2025-26

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: U23OE620IT
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

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

Duration of Internal Tests : 90 Minutes

With effect from Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

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: U23OE610EC
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

UNIT - I : OVERVIEW

Introduction to IoT – Improving Quality of life.

IoT-An Architectural Overview, M2M and IoT Technology Fundamentals- Devices and gateways, Data management, Introduction to cloud IOT platforms like MS Azure, AWS IOT, Google Cloud IOT, Thingworx, Business processes in IoT, IoT Enabling Technologies, IoT Levels & Deployment.

UNIT - II : Real-World Design Constraints

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

UNIT - III : IOT PROTOCOLS

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

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

UNIT - IV : Device for IoT

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

UNIT - V : IoT case studies

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

Learning Resources:

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

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

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

Duration of Internal Tests: 90 Minutes

With effect from Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

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:U23OE630PH
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To provide students with a comprehensive understanding of automatic train protection technologies, focusing on the architecture and working of the Kavach system. 2. To impart knowledge about the components and subsystems of Kavach, including both onboard and wayside equipment, communication protocols, and signaling interfaces. 3. To equip students with the skills required to explain layout-specific plans, diagrams, and implementation strategies for deploying Kavach systems in railway networks. 4. To enable students to simulate, test, and validate Kavach configurations using testbench environments to ensure functionality, reliability, and safety compliance.	On completion of the course, students will be able to 1. Acquire knowledge about the Train Protection Systems in general and Kavach - Indian Railways Automatic Train Protection System in detail. 2. Acquire knowledge about various elements, subsystems associated with Kavach, those on the ground - wayside, those on the train - onboard and related concepts. 3. Illustarte various plans & diagrams required for implementation of Kavach for typical station layout. 4. Simulate, test, and evaluate the performance of the Kavach system using testbench environments, ensuring correctness of configuration, data validation, and compliance with safety standards.

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

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

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

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

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

UNIT – II: (6 Hours)

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

UNIT – III: Design –Kavach: (8 Hours)

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

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

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

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

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

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

Practicals at IRISET Laboratory (12 Hours)

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

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

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

Duration of Internal Tests: 90 Minutes

With effect from Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

Accredited by NAAC with A++ Grade

9-5-81, Ibrahimbagh, Hyderbad-500031

DEPARTMENT OF MATHEMATICS

ADVANCED PROBABILITY & STATISTICAL METHODS

(OPEN ELECTIVE)

For B.E., VI - Semester – CBCS (Common to CSE, AIML & IT Branches)

Instruction: 3 Hours per week	Semester End Exam Marks: 60	Subject Reference Code: U230E610MA
Credits:3	Sessional Marks: 40	Duration of Semester End Exam: 3 Hours

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

UNIT – I: (8 Hours)

CORRELATION AND REGRESSION ANALYSIS Correlation –Scatter diagrams-Spearman's Rank of Correlation-Curve fitting by the Method of Least Squares - Fitting of Straight line - Parabola - Exponential curves: $y = a\,e^{bx}$ & $y = a\,b^{x}$-

– Regression - Lines of Regression - Multiple Regression - Curvilinear regression.

UNIT – II: (8 Hours)

TIME SERIES: Time series and Forecasting: Introduction-Moving averages, weighted average method smoothening of curves forecasting models and Methods.

UNIT – III: (8 Hours)

DESIGN OF EXPERIMENTS: Introduction to Design of experiments - Aim of the Design of experiments - Randomized Block Design (R.B.D) - Latin Square Design (L.S.D) - Comparison of RBD and LSD - Related problems.

UNIT – IV: (8 Hours)

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

UNIT – V: (8 Hours)

STATISTICAL QUALITY CONTROL

Introduction, Methods for preparing control charts, variable charts – mean and range charts, Attribute charts- np, p and c charts.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

ONLINE SOURCES:

1. https://onlinecourses.nptel.ac.in/noc24_ch03
https://onlinecourses.nptel.ac.in/noc24_ma28

With effect from Academic Year 2025-26

VASAVI COLLEGE OF ENGNEERING (AUTONOMOUS)

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

INTRODUCTION TO PSYCHOLOGY

SYLLABUS FOR B.E-VI SEMESTER: GENERAL POOL - OE

Instruction: 3 Hrs/week	SEE Marks: 60	Course Code: U23OE630EH
Credits: 3	CIE Marks:40	SEE: 3 hrs.

Course Objectives:	Course Outcomes:
The course aims to:	By the end of the course, students will be able to:
1. Introduce students to the foundational concepts, theories, and branches of psychology.	1. Explain core psychological theories and their relevance to everyday life.
2. Develop an understanding of human behaviour and mental processes through scientific approaches.	2. Analyze behaviour using major psychological perspectives (e.g., behavioural, cognitive, humanistic, etc.).
3. Encourage critical thinking and analytical reasoning in the study of psychological phenomena.	3. Apply psychological principles to real-world situations such as learning, motivation, and social interaction.
4. Foster awareness of the biological, cognitive, and socio-cultural influences on behaviour.	4. Demonstrate basic skills in psychological research, including hypothesis formulation, data collection, and analysis.
5. Equip students with basic research skills and ethical considerations in psychological practice.	5. Evaluate ethical issues and cultural factors that influence psychological practice and research.

Course Description:

This course provides an overview of psychology as a scientific discipline. Students will explore the biological, cognitive, social, and developmental foundations of human behaviour. No prior knowledge is required.

Unit 1: Foundations of Psychology

1. History of psychology (structuralism, functionalism, behaviourism, etc.)
2. Major perspectives (biological, cognitive, behavioural, humanistic, psychodynamic)
3. Research methods in psychology

Unit 2: Biological Bases of Behaviour

1. The nervous system and the brain
2. Neurotransmitters and hormones
3. Sleep and consciousness

Unit 3: Development across the Lifespan

1. Cognitive and emotional development (Piaget, Erikson)
2. Social development
3. Nature vs. nurture debate

Unit 4: Learning and Memory

1. Classical and operant conditioning
2. Observational learning
3. Memory processes and types

Unit 5: Social and Abnormal Psychology

1. Attitudes, conformity, and group behaviour
2. Psychological disorders and diagnosis (DSM overview)
3. Basic treatment approaches (CBT, psychotherapy)

Textbook:
"Psychology" by Saundra K. Ciccarelli& J. Noland White
The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal tests	:	2	Max.Marks	:	30
2	No. of assignments	:	3	Max. Marks	:	5
3	No. of Quizzes	:	3	Max. Marks	:	5

Duration of Internal Tests: 90 Minutes

With effect from Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD-31

Department of Humanities & Social Sciences

Advanced Course in Entrepreneurship

(Open Elective-IV) SYLLABUS FOR B.E.VI-SEMESTER

L:T:P(Hrs/week):3:0:0	SEE Marks:60	Course Code: U23OE640EH
Credits :03	CIE Marks:40	Duration of SEE: 03Hours

Course Objectives The objectives of this course are to	**Course Outcomes** On completion of the course the student will be able to
1. Develop an A-team 2. Refine business models and expand customer segments. 3. Develop strategies to grow revenues and markets, understand Financial Planning 4. Leverage technologies and platforms for growth stage companies 5. Develop key metrics to track progress.	1. Build and manage a high-performing startup team. 2. Refine business models and identify new customer segments. 3. Formulate revenue growth strategies and apply financial planning principles. 4. Utilize digital tools and platforms to scale growth-stage ventures. 5. Define and track key performance metrics for business progress.

Unit I: Pivoting and New Business Model

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

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

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3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: 90 Minutes

With effect from Academic Year 2025-26

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

BUSINESS INTELLIGENCE

(Common to all branches) SYLLABUS FOR B.E. VI Semester

Stream- Based – Open Elective

Instruction: 3 Hours	SEE: 60	Course code: U23OE620EH
Credits: 3	CIE: 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
The course will enable he leaners to 1. To introduce the concepts and architecture of Business Intelligence (BI) systems. 2. To familiarize students with data warehousing, data mining, and analytics tools. 3. To provide insights into BI implementation and its role in decision-making.	By the end of this course, students will be able to : - 1. Define the architecture, evolution, and benefits of Business Intelligence. 2. Explain data warehousing and mining techniques, and apply them in real-time data environments. 3. Use Business Performance Measurement (BPM) tools and performance dashboards for managerial decision-making. 4. Employ Business Analytics and data visualization techniques in business contexts. 5. Discuss the challenges in BI implementation and emerging trends such as social BI and reality mining.

Unit-I: Introduction to Business Intelligence (BI)

Definition, History and Evolution, Styles of Business Intelligence, Benefits of Business Intelligence, Real-time Business Intelligence, Business Intelligence Value chain, Architecture of Business Intelligence.

Unit- II: Data ware housing and Data mining

Date Warehousing (DWH): Definition, Characteristics, types,-Date warehousing frame world, Data Warehousing architecture, Alternative architectures, Data ware housing integration, Data ware housing- Development approaches, Real time data warehousing.

Data Mining: Definition, Characteristics, Benefits, Data mining functions, Data mining applications, Data mining techniques and tools. Text mining, Web mining.

Unit -III: Business Performance Measurement (BPM)

Definition, BPM v/s BI, Summary of BPM Process, Performance measurement, BPM methodologies, BPM architecture and applications, Performance dash boards.

Unit-IV: Business Analytics and Data Visualization

Business Analytics-Definitions, Tools and techniques of BA, Advanced business analytics Business Analytics and Web usage, Benefits and success factors of Business Analytics.

DataVisualization: Definition, New direction in Data Visualization, GIS, GIS v/s GPS

Unit-V: Business Intelligence implementation and emerging trends

Implementing Business Intelligence-Implementation Factors, Critical success factors of Business implementation, Managerial issues related to BI implementation, Business Intelligence and integration -Types, Need, and Levels of Business Intelligence integration.

Emerging trends in Business Intelligence implementation, Social networks and Business Intelligence, Collaborative decision making, Reality mining.

Suggested Readings:

1. Business Intelligence-A Managerial Approach, Turban, Sharada, Delen, King-Pearson -Second Edition-2014.
2. Decision Support and Business Intelligence Systems-Turban, Aarons on, Liang, Sharada- Pearson, and latest Edition.
3. Successful Business Intelligence, Cindi Howson, McGrawHill Education-Indian Edition.
4. BusinessIntelligence-AhandsonapproachbyN.Rajeshwari,1stEdition,PHI
5. Ramesh Sharda, TurbanE,BusinessIntelligenceandanalytics,10tsEdition,PearsonBooks
6. Bernard Marr,"Data strategy"Kogan Pagepublishing
7. Anoop V KKumar,"Business Intelligence demystified" lstedition 2022, BPB publications

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

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2	No. of assignments	:	3	Max. Marks	:	5
3	No. of Quizzes	:	3	Max. Marks	:	5