VASAVI COLLEGE OF ENGINEERING
(AUTONOMOUS)
ACCREDITED BY NAAC WITH 'A++' GRADE
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. (ECE) V and VI Semesters With effect from 2022-23 (For the batch admitted in 2020-21) (R-20)

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
Phones: +91-40-23146040, 23146041
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

Striving for excellence in teaching, training and research in the areas of Electronics and Communication Engineering and fostering ethical values

Department Mission

To inculcate a spirit of scientific temper and analytical thinking and train the students in contemporary technologies in Electronics and Communication Engineering to meet the needs of the industry and society with ethical values

B.E (ECE) Program Educational Objectives (PEO's)	
PEO I	Graduates will be able to identify, analyze and solve engineering problems.
PEO II	Graduates will be able to succeed in their careers, higher education, and research.
PEO III	Graduates will be able to excel individually and in multidisciplinary teams to solve industry and societal problems.
PEO IV	Graduates will be able to exhibit leadership qualities and lifelong learning skills with ethical values.

B.E. (ECE) PROGRAM OUTCOMES (PO's) Engineering Graduates will be able to:	
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.
PO10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, give and receive clear instructions.
PO11	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.
PO12	Lifelong learning: Recognize the need, and for have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

B.E (ECE) PROGRAM SPECIFIC OUTCOMES (PSO's)	
PSO I	ECE students will be able to analyze and offer circuit and system level solutions for complex electronics engineering problems, keeping in mind the latest technological trends.
PSO II	ECE students will be able to apply the acquired knowledge and skills in modeling and simulation of wireless communication systems.
PSO III	ECE students will be able to implement signal and image processing techniques for real time applications.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS) :: IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
SCHEME OF INSTRUCTION AND EXAMINATION **(R-20)** :: B.E. - ECE : FIFTH SEMESTER (2022 - 23)

B.E (ECE) V - SEMESTER								
Course Code	Name of the Course	Scheme of Instruction			Scheme of Examination			
		Hours per Week			Duration in Hrs	Maximum Marks		Credits
		L	T	P/D		SEE	CIE	
THEORY								
U20PC510EC	Microprocessors and Microcontrollers	3	-	-	3	60	40	3
U20PC520EC	Integrated Circuits & Applications	3	-	-	3	60	40	3
U20PC530EC	Analog and Digital Communication Systems	3	-	-	3	60	40	3
U20PC540EC	Antennas and Wave Propagation	3	-	-	3	60	40	3
U20OE5XXXX	Open Elective – III	3	-	-	3	60	40	3
U20HS510EH	Skill Development Course-V: Communication Skills in English-II	1	-	-	2	40	30	1
U20PE510EC	Skill Development Course - VI : Technical Skills - II	1	-	-	2	40	30	1
PRACTICALS								
U20PC511EC	Microprocessors and Microcontrollers Lab	-	-	2	3	50	30	1
U20PC521EC	Integrated Circuits and Applications Lab	-	-	2	3	50	30	1
U20PC531EC	Analog & Digital Communication Systems Lab	-	-	2	3	50	30	1
U20PW519EC	Mini Project – II	-	-	2	3	50	30	1
	TOTAL	**17**	**-**	**8**		**580**	**380**	**21**
	GRAND TOTAL	**25**				**960**		
Left over hours will be allocated for : Sports / Library / Mentor - Mentee Interaction / CC / RC / TC / ECA / CCA								
Note: Every student should acquire one online course certification equivalent to 2 Credits weightage during III – VII Semester								

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Microprocessors and Microcontrollers

SYLLABUS FOR B.E. V – SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: **U20PC510EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To familiarize the students on 8086µp and 8051µc architecture so as to realize the concepts of SoC built-in peripheral programming in Assembly and embedded-C to develop a system.	On completion of the course, students will be able to 1. Summarize architectural features of 8086µp. 2. Interface and program 8086µp with memory, PPI, timer and DMA. 3. Apply the knowledge of Architectural features of 8051 µc to program 8051µc. 4. Interface and program on chip peripherals of 8051µc. 5. Interface off chip peripherals with 8051µc and design a system around 8051µc based system

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2										2		
CO2	2	2	1										1		
CO3	2	2	1	1	1								1		
CO4	3	2	1												
CO5	1	1	1	1	1								2		

UNIT - I: 8086 ARCHITECTURE

8086 Architecture, Register Organization, Memory segmentation, Pin configuration, latching of address bus, Buffering of data bus. Minimum and Maximum mode operations; control signal interfacing for read and write operations; Organization of stack, Interrupt Vector Table

UNIT - II: 8086 INTERFACING

Memory interfacing: RAM, EPROM IC Chips
I/O interfacing: 8255 PPI, 8257 DMA interface
Interfacing programmable interval timers – 8253/8254

UNIT - III: 8051 MICROCONTROLLER

Architecture of 8051, Pin configuration, built-in ROM & RAM organization, Stack organization.

Assembly language Programming with 8051: Instruction set, Data transfer, Arithmetic, logical and Branching instructions, Addressing modes.

UNIT - IV: Peripheral & interfacing programming in Assembly & Embedded-C

8051 Timers in different modes, counter programming, 8051 Serial data communication; Interrupt programming.

Off-chip EPROM, SRAM, Expansion of I/O using 8255; Sensor interface– ADC0804, ADC0808; DAC interface.

UNIT - V: Real world interfacing & Device drivers in Embedded-C

Interfacing Seven-segment display, 2x16 LCD, 4x3 Matrix Keyboard, DC Motor, Stepper Motor, DS12887 RTC. Applications of 8086 & 8051: Speed control in Industrial, Automotive with PWM generation; Home automation.

Learning Resources:

1. Ray A.K & Bhurchandhi K.M, "Advanced Microprocessor and Peripherals," 2/e, TMH, 2007.
2. Douglas V Hall, "Microprocessors and Interfacing Programming and Hardware," 2/e, THM, 2007.
3. Mazidi M.A, Mazidi J.G & Rolin D. Mckinlay, "The 8051 Microcontroller & Embedded Systems using Assembly and C," 2/e, Pearson Education, 2007.
4. Microprocessors and Microcontrollers by Dr. Santhanu chatopadhya, IIT Kharagpur
   https://onlinecourses.nptel.ac.in/noc18_ec03/course
5. Microprocessors and Microcontrollers, IIT Kanpur.
   https://nptel.ac.in/courses/Webcourse-contents/IIT- KANPUR/microcontrollers

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

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Integrated Circuits and Applications

SYLLABUS FOR B.E. V – SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: **U20PC520EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. Students will acquire the knowledge of linear IC applications and design various circuits using IC's for any given specifications. 2. Student shall describe specifications of a digital IC for various logic families and design combinational and sequential circuits with digital ICs.	On completion of the course, students will be able to 1. Illustrate the internal circuit, parameters and features of op-amp. 2. Design of linear and non-linear circuits using op- amp. 3. Design and analyze various applications using ICs, such as 741, 555, 723 etc,. 4. Define specifications of digital IC and select appropriate IC based on specifications. 5. Design and analyze applications using different combinational and Sequential circuits (IC's)

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2							1				2		
CO2	3	2	2				1		2				2		
CO3	3	2	3				1		2				3		
CO4	3	2							1				2		
CO5	3	2	2				1		2				3		

UNIT - I : Integrated Circuits and Op-Amp Applications

Chip Size and Circuit Complexity, Ideal and Practical Op-Amp, Op-Amp Characteristics - DC, AC-Slew Rate and Frequency Response, 741 Op-Amp, Modes of Operation: Inverting, Non- Inverting, Differential.

Op-Amp Applications: Basic Applications of Op-Amp, Instrumentation Amplifier, Sample & Hold Circuits, Differentiators and Integrators, Comparators, Schmitt Trigger

UNIT - II : Active filters, Timers

Active Filters: First Order and Second Order Low Pass, High Pass filters, Band Pass, Band Reject and All Pass Filters. Analysis and Design of Function Generators using IC 8038.

555 Timers: Functional Diagram, Monostable, Astable Operations and Applications.

UNIT - III : IC regulators & Data convertors

IC Regulators: Analysis and design of fixed voltage regulators & IC 723 voltage regulator

Data convertors : Basic DAC Techniques – Weighted Resistor Type, R-2R Ladder Type, Inverted R- 2R Type DAC's Different types of ADCs – Parallel Comparator Type, Counter Type, Successive Approximation Register Type and Dual Slope Type.

UNIT - IV : Logic Families

Digital Integrated Circuits: Classification of Digital Integrated Circuits, Standard TTL NAND Gate-Analysis & Characteristics, TTL Open Collector Outputs, Tristate TTL, MOS & CMOS Open Drain and Tristate Outputs,. Comparison of various Logic Families, IC Interfacing - TTL Driving CMOS & CMOS Driving TTL.

UNIT - V : Digital IC Applications

Digital IC Applications TTL & CMOS 74XX Series ICs, Arithmetic Circuit ICs-Parallel Binary Adder/Subtractor using 2's Complement System - 7483, Magnitude Comparator Circuits-7485. Multiplexers -74151 & Demultiplexer - 74138. BCD to 7-segment decoder/driver - 7447. Sequential Circuits: Synchronous and Asynchronous IC Counters – 74163 & 7490, Shift Registers – 7495 and its Applications.

Learning Resources:

1. Op-amps and Linear Integrated Circuits, Ramakant A. Gayakwad, Prentice Hall, 2003.
2. Linear Integrated Circuits, D. Roy Chowdhury, 3rd Edition, New Age International(P) Ltd., 2008
3. Ronald J. Tocci, Neal S.Widmer & Gregory L.Moss, "Digital Systems: Principles and Applications,"PHI,10/e, 2009.
4. Sonde, B. S., "Introduction to system Design using IC's," Wiley, 2/e, 1994.
5. Digital Fundamentals, Floyd and Jain, 8th Edition, Pearson Education, 2005.
6. Modern Digital Electronics, RP. Jain, 4th Edition, Tata McGraw-Hill, 2010.
7. https://nptel.ac.in/courses/108106069/
8. https://nptel.ac.in/courses/108108111/
9. https://nptel.ac.in/courses/108108114/

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

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Analog and Digital Communication Systems

SYLLABUS FOR B.E. V – SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: **U20PC530EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To impart knowledge on analog and digital communication.	On completion of the course, students will be able to 1. Determine power, bandwidth, and figure of merit of amplitude modulated signal. 2. Design FM transmitter for a specified frequency and analyze superheterodyne receiver 3. Apply source coding techniques and pulse modulation techniques to convert analog signal to digital signal. 4. Estimate probability of errors for various digital modulation schemes. 5. Encode and decode digital signal for error control.

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3											1	2	
CO2	2	2	2	2										3	
CO3	1	2											2	3	
CO4	2	3		3								2		2	
CO5	2	2										2		2	

UNIT - I : Amplitude modulation

Principle of modulation, Quantitative analysis of amplitude modulation: AM, DSBSC, SSBSC, VSB. Square law modulator, Switching Modulator, Square law detector, Envelope detector. Balanced modulator, Ring modulator, coherent detection of DSBSC. Generation of SSBSC and coherent detection of SSBSC, frequency division multiplexing. Figure of merit and Noise considerations in in AM, DSBSC, SSBSC, Costas loop.

UNIT - II : Angle Modulation

Principle of angle modulation, Phase modulation, frequency modulation, Quantitative analysis of frequency modulation, NBFM, WBFM. Direct method of FM generation, Armstrong method of FM generation, Foster-Sealey detector, Spectrum Analysis of Sinusoidal FM Wave using Bessel functions, Pre emphasis and De-emphasis, Threshold effect in angle modulation, amplitude limiter.

Transmitters and receivers

Functions of a transmitter and receiver. Low level transmitters, High level transmitters. TRF receiver, Super heterodyne receiver: Intermediate frequency, Image frequency, AGC.

UNIT - III : Pulse Modulation

Principles of Pulse modulation- generation and detection of PAM, Aperture effect, Generation and detection of PWM and PPM signals. Quantization, Types of quantization, Companding, Pulse code modulation (PCM), Differential pulse code modulation, Delta modulation, Adaptive delta modulation, Time Division multiplexing. Noise considerations in PCM and DM.

UNIT - IV : Digital communication

Baseband Pulse Transmission- Inter symbol Interference, Eye diagram, Error vector magnitude, Pass band Digital Modulation schemes- ASK, PSK, FSK, M-ary signaling, MSK, QAM. Generation and detection of digital modulation techniques. Optimum detection of signals in noise, Coherent receiver, matched filter -Probability of Error evaluations.

UNIT - V : Error Control Coding

Types of transmission errors, need for error control coding, Source coding, Shannon – Fano algorithm and Huffman coding. Coding efficiency, Linear Block Codes (LBC):, Encoder, Syndrome and error detection, Convolutional code: Encoder, Decoder.

Learning Resources:

1. Singh, R.P. and Sapre, S.D., "Communication Systems," TMH, 2017.
2. Simon Haykin, "Communication Systems," 5/e, Wiley India.
3. Sam Shanmugham.K., "Digital and Analog Communication Systems," Wiley, 2005.
4. Communication Systems (Analog and Digital) by Dr. Sanjay Sharma, 2013
5. Modern Digital And Analog Communication Systems: Fourth Editionby B.P. Lathi, Zhi Ding, et al. | 1 July 2017
6. https://nptel.ac.in/courses/117105143/
7. https://nptel.ac.in/courses/108104091/
8. https://nptel.ac.in/courses/117105144/
9. https://nptel.ac.in/courses/108104098

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

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Antennas and Wave Propagation

SYLLABUS FOR B.E. V – SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: **U20PC540EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
Students will 1. Understand the fundamentals of antenna operation and working for different applications. 2. Acquire the knowledge of different modes of wave propagation.	On completion of the course, students will be able to 1. Describe the basic principles of radiation and antenna parameters. 2. Analyse and design wire and loop antennas. 3. Apply the antenna fundamentals in antenna array analysis. 4. Analyse the behaviour of various VHF, UHF and Microwave Antennas 5. Compare modes of wave propagation for different applications

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	2										1	
CO2	3	2	2			2								2	
CO3	3	3	3	2		2						2		2	
CO4	2	2	2	2			2					2		2	
CO5	3	2		2			2							2	

UNIT - I: Antenna Basics

Principles of radiation-single wire, two wire, current distribution on a thin wire antenna, retarded potential, isotropic radiator.

Antenna parameters: Radiation pattern, Beam area, Beam efficiency, radiation intensity, Antenna temperature, Antenna field regions, Gain, directivity, Antenna Polarization, effective length, Antenna Impedance, effective aperture and aperture efficiency, Friis transmission equation.

UNIT - II: Analysis of Linear and Loop Antennas

Infinitesimal dipole, region separation, Half wave dipole, quarter wave mono pole, Ground effects, small circular loop.

UNIT - III: Antenna Arrays

Introduction, Point sources, Array of two isotropic point sources, Linear Arrays of N isotropic point sources of equal amplitude and spacing, principle of pattern multiplication, Broad Side Array, End Fire Array, Binomial Array, Introduction to synthesis of antenna arrays using Schelkunoff polynomial method.

UNIT - IV: VHF, UHF and Microwave Antennas

Helical Antennas-Geometry, Helix modes, Design considerations for Helical Antenna, Horn Antenna, Parabolic Reflector Antennas, Yagi_Uda Array and Log Periodic Array.

Micro strip Antennas- Basic characteristics of micro strip antennas, feeding methods.

UNIT - V: Smart Antennas and Wave Propagation

Basic Concepts of Smart Antennas-Concept and benefits of smart antennas, Different modes of Radio Wave propagation used in current practice: Ground wave propagation, Sky wave propagation and Space wave propagation.

Learning Resources:

1. J.D. Kraus, "Antennas and Wave propagation", McGraw Hill, 5th edition, 2017.
2. C.A. Balanis, "Antenna Theory - Analysis and Design", John Wiley, 4th edition, 2015.
3. K.D. Prasad, "Antenna and Wave Propagation", Satya Prakashan Publishing Company, 2009.
4. I.J. Bahl and P. Bhartia, "Micro Strip Antennas", Artech House, 1980.
5. R.K. Shevgaonkar, "Electromagnetic Waves", Tata McGraw Hill, 2005.
6. R.E. Crompton, Adaptive Antennas, John Wiley.
7. https://nptel.ac.in/courses/108101092/

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

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DEPARTMENT OF HUMANITIES & SOCIAL SCIENCE

Skill Development Course - V : Communication Skills in English - II

SYLLABUS FOR B.E. V – SEMESTER

L:T:P (Hrs./week): 1:0:0	SEE Marks : 40	Course Code: **U20HS510EH**
Credits : 1	CIE Marks : 30	Duration of SEE : 2 Hours

COURSE OBJECTIVES	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

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1									2	3					
CO2									2	3					
CO3									2	3					
CO4									2	3					

UNIT-1: Delightful Discussions

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

UNIT-2: Powerful Presentations

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

UNIT-3: Fact, Observation and Inference

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

UNIT-4: Effective Technical Writing

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

Learning Resources:

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

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

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

Duration of Internal Tests: 90 Minutes

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Microprocessors and Microcontrollers Lab

SYLLABUS FOR B.E. V – SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U20PC511EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To enable the students with 8086µp and 8051µc based programming with built in peripheral and interfacing off chip peripherals to develop an interface system using µVision5 IDE & simulate on proteus 7.2.	On completion of the course, students will be able to 1. Apply knowledge in writing the programs using Masm assembler tool for 8086 Microprocessor. 2. Apply knowledge in writing the programs in assembly using µVision5 for 8051µc. 3. Interface on chip peripherals of 8051µc using modern tool. 4. Interface off chip peripherals and I/O with interrupt programming to arrive at designs in implementing mini projects.

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2			1										
CO2	2	2			2										
CO3	2	2	1		2								1		
CO4	2	2	1		2							1	1		

Cycle – I:

Assembly language programming for 8086 µP using Assembler

1. Execution of basic programs on 8086 microprocessor (8 bit and 16 bit arithmetic operations).
2. Programs for data transfer, String searching and sorting

Embedded C programming for 8051 µC using Keil IDE and Proteus for on-chip interface.

3. Programs related to arithmetic instructions.
4. Programs related to logical instructions.
5. Timer and counter programming.

6. Square wave generation with variable duty cycle (PWM).
7. Interrupt programming.

Cycle – II:
Embedded C programming with 8051 using Keil IDE & Proteus for off chip peripheral interface.

8. Serial communication using RS 232 UART protocols.
9. Sensor interfacing with off chip ADC applications.
10. Transducer interfacing with off chip DAC applications.
11. Program to control stepper motor
12. LCD display interfacing (4-bit and 8-bit mode).
13. Keypad interfacing.

Mini project

Mini project based on applications that possibly can be developed using 8051μC by interfacing with on-chip and off-chip peripherals.

New / Additional experiments planned:

1. Implementation of user Authentication Module with Password based Protection.
2. Implementation of a Prototype of Electronic Voting Machine

The break-up of CIE :

1. No. of Internal Test	:	1
2. Max. Marks for internal test	:	12
3. Marks for day-to-day laboratory class work	:	18

Duration of Internal Tests: 3 Hours

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Integrated Circuits and Applications Lab

SYLLABUS FOR B.E. V – SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U20PC521EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
Students will Design and verify circuits using IC's for the given specifications.	On completion of the course, students will be able to 1. Implementing and Testing Various Op-Amp based circuits. 2. Design and verify the combinational and sequential circuits. 3. Examine the performance of various filters and 555 timer Applications. 4. Design & verify regulator using IC723 for given specifications.

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1							1				2		
CO2	3	2	2		2				2				3		
CO3	3	1							1				2		
CO4	3	2	2		2				2				3		
CO5															

CYCLE - I Experiments

1. Measurement of parameters of Op-Amp. Voltage Follower, Inverting and Non Inverting Amplifiers, Level Translators using Op-Amp.
2. Arithmetic Circuits: Summer, Integrator Differentiator Op-Amp.
3. Active filters: LP, HP and BP using Op-Amp.
4. Op-Amp Oscillators: Astable, Monostable.
5. Triangle and Square wave Generators. Schmitt Trigger using Op-Amp.
6. Voltage Controlled Oscillator Using LM 566.
7. IC Regulators and current boosting.
8. Applications of 555 Timer.

CYCLE - II Experiments

1. Measurement of propagation delay, fan-out, Noise margin and transfer Characteristics of TTL and CMOS IC gates and open collector / drain gates.

2. Designing code converters using logic gates and standard code converters. Parity generator and checker circuit.
3. Flip-Flop conversions and latches using gates and ICs.
4. Designing Synchronous, Asynchronous up/down counters
5. Shift registers and ring counters using IC Flip-Flops & Standards IC counters.
6. Full Adders, Subtractors using logic gates and multiple bits IC Adder / Subtractor and arithmetic Circuits.
7. Mux - Demux applications.
8. Interfacing counters with 7-segment LED/LCD display units.

General Note:

1. At least 5 experiments from each part.
2. A total of not less than 10 experiments must be carried out during the semester.
3. Analysis and design of circuits, wherever possible, should be carried out using SPICE tools.

New / Additional experiments planned:

1. Design and implement a function generator using IC 8038 for any given frequency.
2. Design and implement Psuedo random sequence generator using IC 7495 shift register.

Mini Project(s)

Learning Resources / Tools :

1. http://www.ti.com/lit/an/sboa092b/sboa092b.pdf
2. https://www.electrical4u.com/applications-of-op-amp/

The break-up of CIE :

1.	No. of Internal Test	:	1
2.	Max. Marks for internal test	:	12
3.	Marks for day-to-day laboratory class work	:	18

Duration of Internal Tests: 3 Hours

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

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Analog and Digital Communication Systems Lab

SYLLABUS FOR B.E. V – SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U20PC531EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To demonstrate analog and digital communication modulation and demodulation schemes for a given signal.	On completion of the course, students will be able to 1. Estimate the transmitted power and bandwidth of analog modulation scheme. 2. Apply concepts of multiplexing to RF signals in time domain and frequency domain. 3. Demonstrate radio signal reception using superheterodyne receiver. 4. Distinguish various line coding and source encoding schemes for digital data transmission.

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3			3				2	2			3	3	
CO2	1	2	1						1	2		2	2	3	
CO3	2	1	1		2				2	2		2	2	3	
CO4	1	1							1	2			1	2	

Cycle-I

1 Modulation and demodulation of DSB with full carrier.
AM radio signal reception using Superheterodyne receiver

2 Modulation and demodulation of DSB with suppressed carrier
Modulation and demodulation of SSB with supressed carrier
Frequency division multiplexing and demultiplexing

3 FM signal reception using FM discriminator
Characteristics of Pre emphasis and deemphasis

4 Generation and detection of PAM signal
Time division multiplexing of PAM signals

5 Generation and detection of PWM signals
Generation and detection of PPM signals

6 Spectral analysis of AM and FM signals using MATLAB

Cycle- II

7 Generation and detection of PCM signals
Time division multiplexing of PCM signals
8 Source coding using Delta modulation
Source coding using Adaptive delta modulation
9 Line encoding and decoding: Data formats
10 Generation and detection of ASK, FSK and BPSK signals using Simulink
11 Generation and detection of QPSK signals
12 Generation and detection of MSK signals

New / Additional experiments planned:

1 Estimation of attenuation in optical fibre cable and Calculation of losses in optical fibre cable
2 Spectral analysis of digital signals in RF analyzer

Learning Resources/ Tools :

Tools: MATLAB, Simulink

1. Comunication systems by V. Chandra Sekar, SASTRA University, Oxford University Press, 2013, ISBN: 9780198078050
2. Digital Communication Systems Using MATLAB and Simulink, Second Editionby Dennis Silage
3. Communication Systems Modeling and Simulation using MATLAB and Simulink 1st Edition by K. C. Raveendranathan

The break-up of CIE :

1. No. of Internal Test	:	1
2. Max. Marks for internal test	:	12
3. Marks for day-to-day laboratory class work	:	18

Duration of Internal Tests: 3 Hours

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Mini Project - II

SYLLABUS FOR B.E. V – SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U20PW519EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3

COURSE OBJECTIVES	COURSE OUTCOMES
Students should be 1. Exposed to contemporary technologies in Electronics and Communication Engineering and apply engineering knowledge into a real world problem with proper Design.	On completion of the course, students will be able to 1. Review the literature survey to identify the problem 2. Propose the solution to address the problem 3. Design/Develop/Implement /Solve the problem and test the solution 4. Demonstrate the work done in the mini project through presentation and documentation 5. Adapt to contemporary technologies

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3			2	2								
CO2				3	3										
CO3								3		3					
CO4									3			3			
CO5											3				

Note: CO1 & CO2 must be mapped with one of the relevant PSOs based on the domain of the project with 3.
CO4 can be mapped to appropriate PSO with level 2.

The students are required to carry out mini projects in relevant areas of electronics communication engineering such as Electronic Devices and Circuits, Embedded Systems, RF, Microwave and Wireless Communications, Communication Systems, Signal, Image and Video Processing, VLSI, Networking.

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 6^{th} week and another during 12^{th} week and final evaluation shall be conducted at the end of the semester.

- Students are required to give Presentations / Demonstration of the work during the reviews.
- Students are required to submit the report.

Grades awarded to the Mini Project - II

Outstanding	–	≥ 45 marks
Excellent	–	≥ 40 - 44 marks
Very Good	–	≥ 35 - 39 marks
Good	–	≥ 30 - 34 marks
Average	–	≥ 25 - 29 marks

Continuous Internal Evaluation (CIE) – 30 marks: To be evaluated by the Internal Examiner as per the following:

Assesment-1 : [5 Marks]
Review of problem selection & abstract to be conducted in week-2.

Assesment-2: [10 Marks]
Review of project design & initial phase of implementation and to be conducted in week-7.

Assesment-3: [15 Marks]
Review of final implementation, presentation and report to be conducted in week-15.

Semester End Examination(SEE) – 50 marks: To be evaluated by the External Examiner

Evaluation guidelines for Semester End Examination (SEE):

Power Point Presentation		[5 Marks]
Demonstration of the application		[25 Marks]
Innovation	: 05 Marks	
Implementation	: 15 Marks	
Understanding	: 05 Marks	
Project Report		[10 Marks]
Viva Voce		[10 Marks]

OPEN ELECTIVES OFFERED BY VARIOUS DEPARTMENTS IN B.E. V SEMESTER

S.No.	Dept.	Course Code	Name of the Course	Credits
1	Civil	U20OE510CE	Spatial Information Technology	3
2	CSE	U20OE510CS	Introduction to Operating Systems	3
3	CSE	U20OE520CS	Web Design	3
4	ECE	U20OE510EC	Sensors for Engineering Applications	3
5	ECE	U20OE010EC	Mathematical Programming for Engineers	3
6	EEE	U20OE510EE	Solar Power and Applications	3
7	IT	U20OE510IT	Introduction to Database Management Systems	3
8	IT	U20OE520IT	Introduction to Statistical Programming	3
9	Mechanical	U20OE510ME	Introduction to Robotics	3
10		U20OE520ME	Introduction to Automobile Engineering	3
11	Mathematics	U20OE510MA	Numerical Methods for CSE, AIML & IT	3
12	H&SS	U20OE610EH	Design Thinking	3
13		U20OE520EH	Technical Writing and Professional Presentations	3
14		U20OE530HS	Basics of Entrepreneurship	3

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DEPARTMENT OF CIVIL 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: **U20OE510CE**
Credits : 3	CIE Marks:40	Duration of SEE:3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to 1. To provide fundamental knowledge on geo spatial technology such as Remote sensing GPS and GIS.	Upon the completion of the course, students are expected to 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, History of GIS, Early development in GIS, Areas of GIS application, Components of GIS, Overview of GIS Software packages, Current issues and Trends in GIS. Variables-Point, line, polygon, Geographic coordinate system, 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 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

VASAVI COLLEGE OF ENGINEERING(Autonomous)
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 : **U20OE510CS**
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 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

VASAVI COLLEGE OF ENGINEERING(Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Computer Science & Engineering

WEB DESIGN (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 : **U20OE520CS**
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	Develop web application using HTML, CSS, JavaScript and PHP.	1	Design static web pages.
		2	Apply styles to the web pages.
		3	Create dynamic web pages using JavaScript.
		4	Design DTD and schema for a given XML file.
		5	Develop server side components using PHP.

UNIT-I: Web Basics and overview: Introduction to Internet, World Wide Web, Web Browsers, Web Servers, URL, MIME, HTTP, Web Programmers Tool Box, Introduction to HTML Purpose of HTML and XHTML, Text Formatting, Hypertext Links, Images, Lists, Tables, Forms and Frames.

UNIT-II: Cascading Style Sheets- Levels of Stylesheet, Style Specification Formats, Selector Formats, Property Value Forms, Font Properties, List Properties, Alignment of Text, Box Model, Background Images, Borders, div and span tags, Conflict Resolution.

UNIT-III: JavaScript - Object Orientation and JavaScript, Primitives, Operations, Expressions, Control Statements, Object Creation, Arrays, Functions- Introduction, Program Modules in JavaScript, Programmer-Defined Functions, Function Definitions, Random-Number Generation, Scope Rules, JavaScript Global Functions, Recursion, Constructors, Regular Expressions, DOM Model, Events, Event Handling in JavaScript, JavaScript objects.

UNIT-IV: Introduction to XML, Syntax of XML, XML Document Structure, Document type Definition, Namespaces and Schemas.
Client-Server Architecture, Multi-tier Architecture, Web server.

UNIT-V: PHP- Overview of PHP, General Syntactic Characteristics, Primitives, Operations, and Expressions, Output, Control Statements, Arrays, Functions, Pattern Matching, Form Handling, Cookies and Session Tracking.

Learning Resources:

1. Robert W. Sebesta, "Programming the World Wide Web", Pearson Education.(4th Edition)
2. Uttam K.Roy, "Web Technologies", Oxford publishers.
3. http://www.w3schools.com
4. https://www.php.net/manual/en/tutorial.php

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

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Sensors for Engineering Applications (Open Elective - III)

SYLLABUS FOR B.E. V - SEMESTER (for other branches)

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: **U20OE510EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. The student will come to know the various stimuli that are to be measured in real life instrumentation. 2. He will be able to select the right process or phenomena on which the sensor should depend on 3. He will be aware of the various sensors available for measurement and control applications.	On completion of the course, students will be able to 1. Appreciate the operation of various measuring and control instruments which they encounter in their respective fields. 2. Visualize the sensors and the measuring systems when they have to work in areas of interdisciplinary nature and also think of sensors and sensors systems when for a new situation they encounter in their career 3. Identify and select the right process or phenomena on which the sensor should depend on. 4. Know various stimuli that are to be measured in real life instrumentation.

CO-PO-PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1					1							2	
CO2	2	2		2			1							2	
CO3	1	1	1	2			1							2	
CO4	1	2	2											2	

UNIT - I

Introduction to sensors and transducers .Need for sensors in the modern world. Different fields of sensors based on the stimuli - various schematics for active and passive sensors. Static and dynamic characteristics of sensors - zero, I and II order sensors – Response to impulse, step, ramp and sinusoidal inputs. Environmental factors and reliability of sensors.

UNIT – II

Sensors for mechanical systems or mechanical sensors - Displacement - acceleration and force - flow of fluids - level indicators - pressure in fluids - stress in solids. Typical sensors - wire and film strain gauges, anemometers, piezo electric and magnetostrictive accelerometers, potentio metric sensors, LVDT.

UNIT – III

Thermal sensors – temperature – temperature difference – heat quantity. Thermometers for different situation – thermocouples thermistors – color pyrometry.

Optical sensors: light intensity – wavelength and color – light dependent resistors, photodiode, photo transistor, CCD, CMOS sensors.

Radiation detectors: radiation intensity, particle counter – Gieger Muller courter (gas based), Hallide radiation detectors.

UNIT – IV

Magnetic sensors: magnetic field, magnetic flux density – magneto resistors, Hall sensors, super conduction squids.

Acoustic or sonic sensors: Intensity of sound, frequency of sound in various media, various forms of microphones, piezo electric sensors.

UNIT – V

Electrical sensors: conventional volt and ammeters, high current sensors, (current transformers), high voltage sensors, High power sensors.

High frequency sensors like microwave frequency sensors, wavelength measuring sensors.

MEMs and MEM based sensors.

Learning Resources :

1. Doebelin, "Measurement Systems: Application and Design", McGraw Hill Kogakusha Ltd.
2. Julian W. Gardner, Vijay K. Varadan, Osama O. Awadelkarim "Microsensors, MEMS and Smart Devices", New York: Wiley, 2001.
3. Henry Bolte, "Sensors – A Comprehensive Sensors", John Wiley.
4. Jocob Fraden," Handbook of Modern Sensors, Physics, Designs, and Applications", Springer.
5. Manabendra Bhuyan," Intelligent Instrumentation Principles and Applications", CRC Press.
6. Randy Frank," Understanding Smart Sensors", Second edition, Artech House.

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

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Mathematical Programming for Engineers (Open Elective - III)

SYLLABUS FOR B.E. V – SEMESTER (for other branches)

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: **U20OE010EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To provide fundamental knowledge of programming language for solving problems.	On completion of the course, students will be able to 1. Generate arrays and matrices for numerical problems solving. 2. Represent data and solution in graphical display. 3. Write scripts and functions to easily execute series of tasks in problem solving. 4. Use arrays, matrices and functions in Engineering applications 5. Design GUI for basic mathematical applications.

CO-PO-PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	-	-	3	-	-	-	-	-	-	-	-	2	3
CO2	-	2	-	-	3	-	-	-	-	-	-	-	-	2	3
CO3	1	1	2	2	3	-	-	-	-	-	-	-	-	2	3
CO4	1	2	-	-	3	-	-	-	-	-	-	-	-	2	3
CO5	-	1	1	1	3	-	-	-	-	-	-	-	-	2	3

UNIT - I : Introduction:
Basics of MATLAB,MATLAB windows, Advantages of MATLAB,on-line help, file types.

MATLAB Basics: Variables and Constants –Vectors and Matrices- Arrays - manipulation- Built-in MATLAB Functions. Creating and printing simple plots, Creating, Saving and Executing a Script File, Creating and Executing a function file.

Programming Basics: Data types-Operators – Hierarchy of operations, Relational and logical operators, if-end structure, if-else-end structure, if-elseif-else-end structure, switch-case statement, for-end loop, while-end loop, break and continue commands.

UNIT - II : Scripts and Functions
Script Files, Function Files, Debugging methods in MATLAB.

Graphics: Basic 2D plots: Printing labels- grid and axes box- Entering text in a box- Axis control-Style options-Multiple plots-subplots-specialized 2D plots:

stem-,bar, hist, pi, stairs, loglog, semilog, polar, comet 3D plots: Mesh, Contour, Surf, Stem3, ezplot.

UNIT - III : Numerical Methods Using MATLAB

Numerical Differentiation, Numerical integration- Newton-Cotes integration formulae, Multi-step application of Trapezoidal rule, Simpson's 1/3 Rule for Numerical Integration. MATLAB functions for integration.

Linear Equations- Linear algebra in MATLAB, Solving a linear system, Gauss Elimination, Finding eigen values and eigen vectors, Matrix factorizations, Advanced topics.

UNIT - IV : Nonlinear Equations

System of Non-linear equations, Solving System of Equations Using MATLAB function fsolve, Interpolation-Lagrange Interpolation, Two dimensional Interpolation, Straight line fit using Least Square Method, Curve fitting using built-in functions ployval and polyfit, cubic fit using least square method. Finding roots of a polynomial -roots function, Newton-Raphson Method.

UNIT - V :

Solution of Ordinary differential Equations(ODEs)-The 4^{th} order Runge-kutta Method, ODE Solvers in MATLAB, Solving First –order equations using ODE23 and ODE45.

Structures and Graphical user interface using app Designer: Advanced data Objects, How a GUI works, Creating and displaying a GUI. GUI components, Dialog Boxes.

Learning Resources:

1. Getting started with MATLAB "A quick introduction for scientist and engineers by Rudra Pratap, Oxford publications.
2. Advanced Guide to MATLAB-Practical Examples in Science and Engineering by S.N.Alam, S.Islam, S.K. Patel-I.K. International Publishing House Pvt. Ltd.
3. Stephen J. Chapman-"MATLAB Programming for Engineers"- 5th Edition-Cengage Learning- 2015. Getting started with MATLAB (Version 9) The Math works.
4. An Introduction to MATLAB® Programming and Numerical Methods for Engineers 1st Edition by Timmy Siauw Alexandre Bayen, Elsevier-18th April 2014.
5. https://nptel.ac.in/courses/103106118/2
6. https://www.udemy.com/numerical-methods/

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

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

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Solar Power and Applications

Open Elective-III

SYLLABUS FOR B.E. V SEMESTER

L: T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U20OE510EE**
Credits:3	CIE Marks: 40	Duration of SEE: 3Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to: To impart the basics of solar energy harnessing and solar panel and array.	On completion of the course, students will be able to 1. Compare different energy resources. 2. Identify and choose proper type of meter for solar radiation measurement. 3. Use proper solar thermal system according to the load requirements. 4. Categorize and compare photovoltaic cells. 5. Apply the knowledge of solar energy.

Unit – I

Fundamentals of Energy Sources: Oil crisis of 1973, Classifications of Energy Resources, Importance of Non-conventional energy sources, Advantages-disadvantages and salient features of Non-conventional energy sources.

Unit – II

Solar Energy Basics: Sun as a source of energy, the Earth, Radiation Spectrums, Extraterrestrial and Terrestrial Radiations, Depletion of solar Radiation, Pyranometer, Pyrheliometer, Sunshine Recorder.

Unit – III

Solar Thermal Systems: Solar Collectors, Solar Water Heater, Solar Passive space – heating and cooling systems, Solar Cookers, Solar furnaces, Solar thermal water pump, Vapour compression refrigeration and Solar pond Electric power plant.

Unit – IV

Solar Photovoltaic Systems: Solar Cell fundamentals, Cell characteristics, Cell classification, Module, Panel and Array, Maximizing the Solar PV output and load matching, MPPT.

Unit – V

Solar PV systems & Applications: Solar PV system classification - Stand-Alone Solar PV system and Grid-Interactive Solar PV system. Applications - Water Pumping, lighting, medical refrigeration, village power and Telecommunication.

Suggested Reading:

1. B H Khan, Non-Conventional Energy Resources, 2nd Edition, Tata McGraw Hill.
2. G. D. Rai, Non-Conventional Energy Sources, 13th Reprint 2014, Khanna Publications.

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

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

Introduction to Database Management 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 :**U20OE510IT**
Credits :3	CIE Marks: 40	Duration of SEE :3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
Apply the concepts of database management systems and design relational databases.	On completion of the course, students will be able to 1. Understand functional components of the DBMS and develop ER model for a given problem and map ER it to Relational model 2. Understand Relational model and basic relational algebra operations. 3. Devise queries using SQL. 4. Design a normalized database schema using different normal forms. 5. Understand transaction processing and concurrency control techniques.

UNIT – I

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

DatabaseDesign and the E-R Model: Overview of the Design Process, The E-R Model, Constraints, E-R Diagrams

UNIT – II

Relational Model: Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Fundamental Relational-Algebra Operations.

UNIT – III

Structured Query Language: Introduction, Data Definition, Basic Structure of SQL Queries, Modification of the Database, Additional Basic

Operations, Set Operations, Null Values, Aggregate Functions, Nested Subqueries, Join Expressions, Views.

UNIT – IV

Relational Database Design: Features of Good Relational Design, Normalization-Decomposition Using Functional Dependencies, Functional-Dependency Theory.

UNIT – V

Transactions: Transaction Concepts, Transaction State, Concurrent Executions, Serializability

Concurrency Control: Lock-Based Protocols, Timestamp-Based Protocols.

Learning Resources :

1. Abraham Silberschatz, Henry F Korth, S. Sudarshan, Database System Concepts, 6th Edition, McGraw-Hill International Edition, 2011.
2. Raghu Ramakrishnan, Johannes Gehrke, Database Management Systems, Third Edition, McGraw-Hill International Edition, 2003.
3. Elmasri, Navathe, Somayajulu and Gupta, Fundamentals of Database System, 6th Edition, Pearson Education, 2011.
4. Patric O'Neil, Elizabeth O'Neil, Database-principles, programming, and performance,Morgan Kaufmann Publishers, 2001.
5. Peter Rob, Carlos coronel, Database Systems, (2007), Thomoson.
6. https://nptel.ac.in/courses/106105175/

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

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

Introduction to Statistical Programming

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

L:T:P(Hrs./week): 3:0:0	SEE Marks :60	Course Code : **U20OE520IT**
Credits :3	CIE Marks: 40	Duration of SEE :3 Hours

COURSE OBJECTIVES	**COURSE OUTCOMES**
The course will enable the students to apply the statistical programming concepts and techniques using Python libraries in the analysis of Statistical data.	On completion of the course, students will be able to 1. Understands the basics of statistical concepts and various data types in Numpy, Pandas. 2. Cleans and Analyzes the data with descriptive statistics and EDA. 3. Visualizes the data with matplotlib, seaborn graphic libraries. 4. Analyzes data with various statistical inference techniques using Hypothesis testing. 5. Understands and applies various data distributions, sampling and simulation of random variables. 6. Applies various statistical models like linear regression, ANOVA to the data.

Unit I: Introduction to Statistical computing and Python libraries

Intro to statistics: Samples and Population,Descriptive statistics; intro to Computational statistics, Data analysis, knowledge discovery in Data, Various data types.

Intro to statistical computing software: Python libraries & R.

Unit II: Data Collection, Cleaning and Exploratory Data Analysis using Pandas.

Data types in Numpy, Pandas: list, vector, matrix, array, tensor, DataFrame. Operations on Data Types.

Data import using Pandas, Data cleaning, imputation, EDA case studies using Pandas.

Unit III: Data Visualization with matplotlib and Seaborn.

Intro to matplotlib and Seaborn graphic libraries, basic visualizations using matplotlib, Advanced visualizations with Seaborn, Data correlation chart. Case studies on visualizations.

Unit IV: Data distributions, Statistical Inference using Hypothesis testing.

Understanding various data distributions: Bernoulli, Binomial, Exponential, Poisson & Gaussian.

Intro to Hypothesis testing: p-value, critical value, interpretation of test results.

Types of Hypothesis testing using Scipy.stats: Normality tests, Correlation tests, Comparing samples.

Unit V: Simulations and Statistical models

Random variables, sampling and simulation of data distributions.

Statistical models: Linear algebra, Optimizations, Linear regression, Intro to Statistical or Machine learning.

Learning Resources:

1. https://machinelearningmastery.com/statistics_for_machine_learning/
2. https://scipy-lectures.org/packages/statistics/index.html
3. Udemy: Python for Statistical Analysis
4. courseera: Statistics with Python specialization
5. https://numpy.org/
6. https://pandas.pydata.org/
7. https://matplotlib.org/
8. https://seaborn.pydata.org/
9. https://www.statsmodels.org/stable/index.html
10. https://scikit-learn.org/stable/
11. A first Course in Statistical Programming with R, W. John Braun, Duncan J. Murdoch, Cambridge University Press, 2007.
12. https://cran.r-project.org/manuals.htm

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

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

DEPARTMENT OF MECHANICAL ENGINEERING

INTRODUCTION TO ROBOTICS

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

L:T:P(Hrs./week):3	SEE Marks : 60	Course Code: **U20OE510ME**
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, Serial manipulator &Parallel Manipulator

Robot wrist mechanism, Precision and accuracy of robot.

UNIT-II

ROBOT ELEMENTS

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

UNIT-III

ROBOT KINEMATICS AND CONTROL

Robot kinematics – Basics of direct and inverse kinematics. D-H matrix. Forward kinematics for a 2-link RR planar manipulator.

Control of robot manipulators – Point to point and Continuous Path Control. Robot programming methods. Introduction to Solve any robotic kinematic problem using python programming.

UNIT-IV

ROBOT SENSORS

Sensors in robots – Touch sensors-Tactile sensors – Proximity and range sensors. Force sensors, Light sensors, Pressure sensors, position and velocity feedback devices.

Introduction to Machine Vision and Artificial Intelligence.

UNIT-V

ROBOT APPLICATIONS

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

Applications of Micro and Nanorobots, Future Applications of robots.

Learning Resources:

1. Mikell P. Groover, Mitchell Weiss, Roger N Nagel and Nicholas G Odrey, "Industrial Robotics Technology, Programming and Applications", TataMcGraw-Hill Publishing Company Limited *,* 2008.
2. Deb.S.R and Sankha Deb, "Robotics Technology and Flexible Automation", Tata McGraw Hill Publishing 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: 1 Hour 30 Minutes

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

DEPARTMENT OF MECHANICAL ENGINEERING

Introduction to Automobile Engineering

(OE-III) SYLLABUS FOR B.E. V-SEMESTER

Instruction : 3Hours	SEE Marks : 60	Course Code : U20OE520ME
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

Course objectives	Course Outcomes
The objectives of this course are to: 1. familiarize the student with the different types of automobiles and engine components along with its working. 2. impart adequate knowledge in fuel supply, cooling, lubrication and ignition of IC engines. 3. understand the steering geometry, steering mechanism and types of suspension systems. 4. gain the knowledge about working of clutch, gear mechanism, brakes 5. make the student conversant with types of wheels, tyres and pollution control techniques.	On completion of the course, the student will be able to: 1. identify types of Automobiles and engine components and describe its working. 2. describe the engine fuel system in petrol and Diesel engines, cooling, lubrication systems. 3. describe the steering mechanism, suspension systems 4. describe the working principle and operation of clutch, gear mechanism and brakes. 5. know the pollutants from automobile and pollution control techniques and identify the types of wheels, tyres.

UNIT-I

Introduction: Types of automobiles: Hybrid Vehicles, Electrical, gas and Fuel cell vehicles. Chassis and body, Lay out of transmission system, Engine components: cylinder block, cylinder head, crankcase, crank shaft and cam shaft. Types and working of IC Engines: SI and CI engines, two stroke and four stroke engines.

UNIT-II

Fuel system: Fuel supply system for SI engines and CI engines. Simple carburettor, Introduction to Multipoint fuel injection system (**MPFI**) of petrol engines, Introduction to **CRDI** system for diesel engines.

Cooling system: air cooling, water cooling: Thermo syphon, pump circulation system.

Lubrication system: Petroil System, splash system, pressure lubrication: Wet sump and Dry Sump.

Ignition system: Battery Ignition System, Magneto Ignition System and Electronic Ignition System.

UNIT-III

Suspension system: Rigid axle, Independent suspension system:Double wish bone type, Macpherson strut system, Air suspension system.

Steering system: wheel alignment, Ackermann steering mechanism,steering geometry: camber, caster, toe-in, toe-out, steering linkage for vehicle with rigid axle front suspension, steering linkage for vehicle with independent front suspension.

UNIT –IV

Power Train: Single plate clutch, Multi plate clutch. Manual Gear Box: sliding mesh gear box, constant mesh gear box, synchromesh gear box and Automatic Gear Box. Working principle of Differential.

Brakes: Types: Drum and Disc brakes, Mechanical and Hydraulic Brakes, **ABS** system.

UNIT –V

Wheels and Tyres: Types of Wheels: wire wheels, disc wheels, alloy wheels. Types of tyres: Tube type, tubeless type.

Automobile Emissions and control: Automobile pollutants and sources of pollution. Pollution Control Techniques: Catalytic Converters, EGR and PCV. Bharath emission Norms.

Learning Resources:

1. Crouse & Anglin, “Automobile Engineering”, 10th Edition, Tata McGraw Hill Publishing Co. Ltd., New Delhi,. 2007.
2. Kirpal Singh, “Automobile Engineering”, Vol.I& II, 13th Edition, Standard Publishers, New Delhi 2013.
3. R.B Gupta, “Automobile Engineering” 7th Edition, Satya Prakashan, New Delhi, 2015.
4. Joseph Heitner, “Automotive Mechanics”, 2nd Edition, Affiliated East West Pvt. Ltd., 2013.
5. C.P. Nakra, “Basic Automobile Engineering”, 7th Edition, Dhanpat Rai Publishing C (P) Ltd., 2016.

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

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

Duration of Internal Test: 1 Hour 30 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

Accredited by NAAC with A++ Grade

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

DEPARTMENT OF MATHEMATICS

NUMERICAL METHODS (Open Elective)

For B.E., V - Semester – CBCS **(for CSE & IT only)**

Instruction : 3 Hours per week	Sem. End Exam Marks : 60	Subject Reference Code : U20OE510MA
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. Study various numerical methods to solve Algebraic and Transcendental equations. **2. Understand** the methods to solve linear system of equations. **3. Understand** the numerical methods in interpolation and extrapolation. **4. Understand** the numerical methods in interpolation using central differences. **5. Understand** numerical methods in solving ordinary differential equations.	**1. Apply** numerical methods to solve Algebraic and Transcendental equations which cannot be solved by traditional algebraic methods **2. Solve** linear system of equations using direct and iteration methods. **3. Use** various numerical methods in interpolation and extrapolation. **4. Use** various numerical methods in interpolation using central differences. **5. Find** numerical solutions of ordinary differential equations.

Unit – I: (8 Hours)

Solution of Algebraic and Transcendental equations:

Intermediate value property of equations-Solution of Algebraic and Transcendental equations: Bisection method, Newton-Raphson method Regula-Falsi method.

Unit – II: (8 Hours)

Solution of linear system of equations:

Direct methods- Gauss elimination method- Factorization method- Iterative methods: Jacobi's Iteration method- Gauss - Seidel Iteration method-Ill-conditioned system of equations.

Unit – III: (8 Hours)

Numerical differences-I

Introduction to finite differences - Interpolation- Newton's Forward and Backward Interpolation Formulae – Interpolation with unequal intervals – Lagrange's Interpolation Formula – Divided differences- Newton's divided difference formula.

Unit – IV: (8 Hours)

Numerical differences-II

Central differences interpolation-Gauss's forwards and backward difference formulae-Stiriling's formula- Bessel's formula.

Unit – V: (8 Hours)

Numerical Solutions of Ordinary Differential Equations

Numerical Solutions of Ordinary Differential Equations: Taylor's Series Method - Euler's Method - Modified Euler's Method – Runge-Kutta of 4th order (without proofs).

Text Books:

1. Numerical methods in engineering and science by B.S.Grewal, Khanna publishers
2. Advanced Engineering Mathematics by R.K.Jain & S.R.K.Iyengar, Narosa publishing house.

Reference Books:

1. Numerical Analysis by S.S.Sastry, PHI Ltd.

Online Resources :

1 http://mathworld.wolfram.com/topics
2 http://www.nptel.ac.in/course.php

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		

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

DEPARTMENT OF MECHANICAL ENGINEERING
SYLLABUS FOR B.E V Semester

Basics of Entrepreneurship (Open Elective-III)

(Open Elective) SYLLABUS FOR B.E. 3/4 – V SEMESTER

Instruction: 3 Hours	SEE: 60	Course code: U19OE530HS
Credits: 3	CIE: 40	Duration of SEE: 3 Hours

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

UNIT-I

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

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

UNIT-II

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

UNIT-III

Economics and Financial Analysis: Revenue streams and pricing, Income analysis and Cost Analysis-Product Cost and Operation Cost, Basics of Unit Costing, Profit Analysis, Customer Value

Analysis, Different Pricing Strategies, Investors' Expectations, Pitching to Investors and Corporate.

UNIT-IV

Team Euilding and Project Management: Leadership Styles, Team Building in Venture, Rote of good team in Venture, Roles and Respondents, Explore Collaboration Tools and Techniques brain storming, 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 Leveragini social Media, Measuring effectiveness of channels, customer Decision-making process, sales plans and rargets, 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, Mccraw-Hill Education.
2. Thomas W. Zimmerer, Norman M. Scarborough, "Essentials of Entrepreneurship and small business Management", Fourth edition, Pearson, New Delhi, 2006.
3. Alfred E. Osborne, "Entrepreneurs Toolkit", Harvard Business Essentials, HBS press, USA, 2005 4. MadhurimaLall and ShikhaSahai, "Entrepreneurship", Excel Books, First Edition, New Delhi,2006

Web Resource: htto://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

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

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

DESIGN THINKING

(Open Elective) SYLLABUS FOR B.E. 3/4 – V SEMESTER

Instruction: 3 Hours	SEE: 60	Course code: U20OE610EH
Credits: 3	CIE: 40	Duration of SEE: 3 Hours

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

Unit 1: Design Thinking Skills

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

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

Unit 2: Identifying Customer Needs

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

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

Unit 3: Product Specifications

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

3.1 Creating a Design Brief Template
3.2 Stakeholder map template

3.3 Customer journey template
3.4 Context map template
3.5 Opportunity map template

Unit 4: Applied Creativity
Learn to apply creativity, brainstorming, and concept generation process in designing needs solutions.
4.1 The need to ideate
4.2 The Rules of ideation
4.3 Participating in an ideation session
4.4 Building a Creative Culture
4.5 Divergent—5 common ideation techniques

Unit 5: Product Development Processes and Prototyping
Learn to select and implement a product development process that's aligned to your project needs. Explore prototyping methods, strategies, and real-life examples where these have been applied to create a design that represents customer needs and product specifications.
5.1 The need for a prototype
5.2 The Need to Test and how to conduct a structured test
5.3 How to conduct the observers' debrief

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

ASSESSMENTS
- Online assignments
- Individual and Group

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

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

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

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

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

Technical Writing and Professional Presentations

(Open Elective) SYLLABUS FOR B.E. 3/4 – V SEMESTER

Instruction: 3 Hours	SEE: 60	Course code: U20OE520EH
Credits : 3	CIE: 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the learners to: 1. Understand the principles and mechanics of technical writing for students of engineering. 2. Identify different kinds of business correspondences and the dos and don'ts for each of them. 3. Make effective presentations as part of today's workplace demands. 4. Recognize the need for Video and Written CVs with focus on specific elements. 5. Comprehend skills associated with technical writing and understand different papers ranging from process description and feasibility reports to research projects, project proposals, and SOPs	At the end of the course the learners will be able to: - 1. Write effective reports. 2. Articulate business correspondences based on need. 3. Make persuasive presentations. 4. Design their videos CVs. 5. Write papers ranging from process description and feasibility reports to research projects, project proposals, and statement of purpose

UNIT 1: FORMAL & INFORMAL TECHNICAL REPORTS

1.1 Informal Report Formats
1.2 Project and Research Reports
1.3 Formal Report Components, Feasibility Reports, Evaluation reports
1.4 Analytical and Informational reports
1.5 Executive summaries.

UNIT 2: BUSINESS CORRESPONDENCE

2.1 Electronic communication
2.2 Effective emails
2.3 Instant and text messaging guidelines

UNIT 3: PROFESSIONAL PRESENTATIONS

3.1 Paper presentations & Poster presentations

3.2 PowerPoint presentations
3.3 Storyboard writing

UNIT 4: RESUME & CVs

4.1 Technical Resume
4.2 Cover letter, resume format
4.3 Video CVs

UNIT 5: WRITING PROPOSALS & SOPs

5.1 Types of proposals
5.2 Request for proposals
5.3 Stating your objective.

METHODOLOGY

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

ASSESSMENTS

- Online assignments
- Individual and Group

LEARNING RESOURCES

learn.talentsprint.com

4. Read Me First!: A Style Guide for the Computer Industry by Sun Technical Publications.
5. Eats, Shoots and Leaves Paperback – 18 February 2010 by Lynne Truss.
6. Don't Make Me Think, Revisited: A Common Sense Approach to Web & Mobile Usability | Third Edition | By Pearson Paperback.
7. The Design of Everyday Things: Revised and Expanded Edition Paperback – Illustrated, 5 November 2013 by Don Norman (Author)

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

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS) :: IBRAHIMBAGH, HYDERABAD – 500 031.
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
SCHEME OF INSTRUCTION AND EXAMINATION **(R-20)** :: B.E. - ECE : SIXTH SEMESTER (2022 - 23)

B.E (ECE) 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								
U20PC610EC	Control Systems Engineering	3	-	-	3	60	40	3
U20PC620EC	Digital Signal Processing	3	-	-	3	60	40	3
U20PC630EC	Computer Networks	3	-	-	3	60	40	3
U20PE6XXXX	Professional Elective – I	3	-	-	3	60	40	3
U20OE6XXXX	Open Elective – IV	3	-	-	3	60	40	3
U20HS040EH	Economics and Finance for Engineers	2	-	-	3	60	40	2
U20BS630EH	Skill Development Course-VII : Verbal Aptitude	1	-	-	2	40	30	1
U20PE610EC	Skill Development Course-VIII : Technical Skills – III	1	-	-	2	40	30	1
U20HS020EH	Human Values and Professional Ethics - II	1	-	-	2	40	30	1
PRACTICALS								
U20PC611EC	Control Systems Engineering Lab	-	-	2	3	50	30	1
U20PC621EC	Digital Signal Processing Lab	-	-	2	3	50	30	1
U20PC631EC	Computer Networks Lab	-	-	2	3	50	30	1
U20PW619EC	Theme Based Project	-	-	2	3	50	30	1
	TOTAL	**20**	**-**	**8**		**680**	**450**	**24**
	GRAND TOTAL	**28**				**1130**		
Left over hours will be allocated for : Sports / Library / Mentor - Mentee Interaction / CC / RC / TC / ECA / CCA								
Note: Every student should acquire one online course certification equivalent to 2 Credits weightage during III – VII Semester								

Professional Electives (R – 20) : Semester – VI			
Professional Elective – I			
S.No.	**Professional Elective Stream**	**Course Code**	**Name of the Course**
1.	Embedded Systems and VLSI Stream	U20PE610EC	IoT Architectures and Protocols
2.	Communication Engineering Stream	U20PE620EC	Mobile Cellular Communication
3.	Signal Processing Stream	U20PE630EC	DSP Processors and Architectures
4.	Networking Stream	U20PE640EC	Wireless Sensor Networks

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Control Systems Engineering

SYLLABUS FOR B.E. VI – SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: **U20PC610EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
Analyse the performance of a given system in time and frequency domains and choose appropriate compensator if needed.	On completion of the course, students will be able to 1. Develop the mathematical model of the physical systems and find its transfer function 2. Determine time domain specifications of a second order system and analyse its response. 3. Construct Bode plot, Nyquist plot for a given system and analyse its stability. 4. Design a compensator/ controller to meet desired specifications. 5. Analyse MIMO system using state variable approach

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	2										3		
CO2	2	2		2											
CO3	1	3		3									1		
CO4	2	3	3									2	2		
CO5	2	3		2								2			

UNIT - I :

Control System fundamentals and Components: Classification of control systems, Open and Closed loop systems. Mathematical modelling of mechanical systems and their conversion into electrical systems. Block diagram reduction and Signal flow graphs.

UNIT - II :

Time response Analysis: Transfer function and Impulse response, types of input. Transient response of second order system for step input. Time domain specifications. Types of systems, static error coefficients, Routh - Hurwitz criterion for stability.

Root locus techniques: Analysis of typical systems using root locus techniques. Effect of location of roots on system response.

UNIT - III :

Frequency response Analysis: Frequency domain specifications, bode plots, Gain margin and Phase Margin. Principle of argument, Nyquist plot and Nyquist criterion for stability.

UNIT - IV :

Compensators: Introduction to compensators, Lag compensator, Lead compensator, Lag- Lead compensator, Design of compensators.
Controllers: Introduction to controllers, P, I, D, PI, PD, PID controllers

UNIT - V :

State space representation: Concept of state and state variables. State models of linear time invariant systems, State transition matrix, Solution of state equations. Controllability and observability.

Learning Resources:

1. Nagrath, I.J., and Gopal, M., "Control System Engineering," New Age Publishers, 5/e, 2009.
2. Ogata, K., "Modern Control Engineering," 5/e, PHI, 2010.
3. Benjamin C. Kuo, "Automatic Control Systems," 7/e, PHI, 2010.
4. Nise, Norman S. Control Systems Engineering. 5th ed. New York, NY: John Wiley & Sons, 2007
5. Richard C. Dorf & Robart H. Bishop, "Modern Control Systems," 11/e, Pearson, 2008.
6. http://www.nptelvideos.in/2012/11/control-engineeringprof-gopal.html
7. https://nptel.ac.in/courses/108101037/ 9. https://nptel.ac.in/courses/108106098/

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

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Digital Signal Processing

SYLLABUS FOR B.E. VI – SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: **U20PC620EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
Students will apply FFT algorithms, discuss various design methods of FIR & IIR filters, describe the concepts of multirate signal processing and identify important features of TMS320C67XX DSP processors.	On completion of the course, students will be able to 1. Apply the knowledge of FFT Algorithms for computation of DFT. 2. Design of FIR filters using various methods. 3. Design of IIR filters using various methods. 4. Apply decimation and interpolation concepts for the design of sampling rate converters. 5. Study TMS320C67XX DSP processors for the design of digital filters.

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	2	2										2
CO2	3	2	3	3	2										3
CO3	1	3	3	3	2										3
CO4	3	2	2	2	2										3
CO5	1	2	2	2	3										2

UNIT - I : Fast Fourier Transform

Overview of Discrete time Fourier Transform (DTFT), Discrete Fourier transform (DFT), - Efficient computation of DFT- Properties of DFT.
FFT algorithms - Radix-2 FFT algorithms - Decimation in Time – Decimation in Frequency algorithms - in place computation- bit reversal- Use of FFT algorithms in Linear Filtering and Correlation.

UNIT - II : Digital filters (FIR) Design

Amplitude and phase responses of FIR filters – Linear phase filters – Windowing techniques for design of Linear phase FIR filters – Rectangular, Bartlet, Hamming, Blackman, Kaiser FIR filter design, realization and finite word length effects.

UNIT - III : Digital filters (IIR) Design

Butterworth and Chebychev approximation- IIR digital filter design techniques- Impulse Invariant transformation - Bilinear transform techniques- Digital Butterworth- Chebychev filters,-comparisons between FIR and IIR filters. Digital filters structures.

UNIT - IV : Multirate Digital Signal Processing

Introduction -Decimation by a Factor D- Interpolation by a Factor I- Sampling Rate Conversion by a Rational Factor I/D- Implementation of Sampling Rate Conversion- Multistage implementation of Sampling Rate Conversion- Sampling Rate Conversion by an Arbitrary factor- Application of Multirate Signal Processing.

UNIT - V : Introduction to DSP Processors

Difference between DSP and other microprocessors architectures- Importance of DSP Processors- General purpose DSP processors- TMS320C67XX processor, architecture, registers, pipelining, addressing modes and introduction to instruction set.

Learning Resources:

1. Alan V. Oppenheim & Ronald W. Schafer, "Digital Signal Processing," PHI, 2/e, 2014.
2. John G. Proakis & Dimtris G. Manolakis, "Digital Signal Processing Principles, Algorithms and Application," PHI, 4/e, 2012.
3. Ashok Ambardar, "Digital Signal Processing: A Modern Introduction," Cengage Learning, 2009.
4. Li Tan, "Digital Signal Processing: Fundamentals and Applications," Elsevier, 2012.
5. B.Venkataramani & M. Bhaskar, "Digital Signal Processor Architecture, Programming and Application," TMH, 2e 2013.
6. RulphChassaing, "Digital Signal Processing and Applications with the C6713 and C6416 DSK", John wiley& sons, 2005.
7. https://nptel.ac.in/courses/117102060/
8. https://nptel.ac.in/courses/117104070/

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

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Computer Networks

SYLLABUS FOR B.E. VI – SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code: **U20PC630EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To experience the designing and managing of communication protocols while getting a good exposure to the TCP/IP protocol suite and to understand the different topologies and configurations in the area of computer networks	On completion of the course, students will be able to 1. Analyze the network requirements for a given organization and select most appropriate network architecture. 2. Design and analyze the performance of LAN for small and medium organizations. 3. Analyze the existing routing and congestion control algorithms. 4. Identify deficiencies in existing protocols and then formulate new and better protocols. 5. Apply and use of cryptography and network security in day to day applications.

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2													
CO2	3	3												2	
CO3	3	3													
CO4	2	3	2												
CO5	3	3											1		

UNIT - I :

Data communication, Network Topologies: LAN, WAN, MAN, Types- Bus, Star, Ring, Hybrid. Line configurations. Reference Models: OSI, TCP/IP.

Data Link Layer: Design issues, Framing, Error Detection and Correction, Flow control

Protocols: Stop and Wait, Sliding Window, ARQ Protocols, HDLC.

UNIT - II :

MAC Sub Layer: Multiple Access Protocols: ALOHA, CSMA, Wireless LAN. IEEE 802.2, 802.3, 802.11, 802.16 standards. Bluetooth, Bridges and Routers. Circuit switching: Circuit Switching Principles and concepts. Packet switching: Virtual circuit and Datagram subnets.

UNIT - III :

Network Layer: Network layer Services, Routing algorithms: Shortest Path Routing, Flooding, Hierarchical routing, Broadcast, Multicast, Distance Vector Routing and Congestion Control Algorithms. Internet Working: The Network Layer in Internet, IPV4, IPV6 and Internet control protocols.

UNIT - IV :

Transport Layer: Transport Services, Elements of Transport Layer, Connection management, TCP and UDP protocols, ATM.

UNIT - V :

Application Layer: Domain Name System, SNMP, Electronic Mail, World Wide Web. Network Security: Cryptography Symmetric Key and Public Key algorithms, Digital Signatures, Authentication Protocols.

Learning Resource:

1. Andrew S Tanenbaum, "Computer Networks," 5/e, Pearson Education, 2011.
2. Behrouz A. Forouzan, "Data Communication and Networking," 5/e, TMH, 2008.
3. William Stallings, "Data and Computer Communications," 8/e, PHI, 2004.
4. S.Keshav, "An Engineering Approach to Computer Networks," 2/e, Pearson Education.
5. https://onlinecourses.nptel.ac.in/noc18_cs38/preview

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

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

Duration of Internal Tests: 90 Minutes

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

IoT Architectures and Protocols

(Professional Elective-I)
SYLLABUS FOR B.E. VI – SEMESTER

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: **U20PE610EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The purpose of this course is to impart knowledge on IoT Architecture, practical constrains, various protocols and multiple case studies.	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. Choose the required protocol for a given application. 4. Explore IoT usage in various applications 5. Understand the Security requirements in IoT.

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1												1	1
CO2	3	2					1					1	1	2	2
CO3	3	1												1	1
CO4	3	1		1		2	2		2			2		2	2
CO5	3	2		1		2						2		1	1

UNIT - I : IoT

Definition and Technologies that led to evolution of IOT, Characteristics of IoT, Physical Design of IoT, Logical Design of IoT, IoT Enabling Technologies, IoT Levels & Deployment. M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT.

UNIT - II : IoT Reference Architecture

Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. IoT edge system architecture.
Real-World Design Constraints: Technical Design constraints, Connectivity constraints, Data representation and visualization, Big Data Management.

UNIT - III : IoT communications

Data link and physical layer Protocols: PHY/MAC Layer (IEEE 802.11, IEEE 802.15), Z-Wave, Bluetooth Low Energy, Zigbee Smart Energy;
Network Layer Protocols: IPv6, 6LoWPAN;
Transport layer protocols: TCP, UDP;
Messaging protocols: Quality of services in MQTT, standards and security in MQTT, CoAP, AMQP.

UNIT - IV : Case Studies

Smart Cities, Smart Homes, Smart Transportation, Smart Healthcare, Precision Agriculture, Connected Vehicles.

IOT in Indian Scenario: i) IOT and Aadhaar ii) IOT for health services. iii) IOT for financial inclusion. iv) IOT for rural empowerment.

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

UNIT - V : Securing the Internet of Things

Security Requirements in IoT Architecture - Security in Enabling Technologies, Security Concerns in IoT Applications.

Security Architecture in the Internet of Things - Security Requirements in IoT, Insufficient Authentication/Authorization, Insecure Access Control, Threats to Access Control, Privacy, and Availability, Attacks Specific to IoT. Security and Vulnerabilities – Secrecy & Secret Key Capacity, Authentication/Authorization for Smart Devices, Transport Encryption, Secure Cloud/Web Interface, Secure Software/Firmware, Physical Layer Security.

Learning Resources:

1 Pethuru Raj and Anupama C. Raman, —The Internet of Things: Enabling Technologies, Platforms, and Use Cases", 1st Edition, 2017, CRC Press.

2 David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton, Jerome Henny "IoT Fundamentals: Networking technologies Protocols, and Use Cases for the internet of things", June, 2017, Cisco press.

3 Jan Holler, VlasiosTsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, —From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence‖, 1st Edition, 2014, Academic Press.

4 Arshdeep Bahga, Vijay Madisetti, —Internet of Things: A Hands-on Approach‖, Universities Press, 2014.

5 Practical Internet of Things Security (Kindle Edition) by Brian Russell, Drew Van Duren, Packt Publishing, 2016.

6 Securing the Internet of Things Elsevier Authors: Shancang Li Li Da Xu,Paperback ISBN: 9780128044582,Imprint: SyngressPublished Date: 13th January 2017.

7 https://nptel.ac.in/courses/106105166/5

8 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

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Mobile Cellular Communication

(Professional Elective-I)
SYLLABUS FOR B.E. VI – SEMESTER

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: **U20PE620EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To impart knowledge about cellular communication system, CDMA, MIMO systems To model a wireless channel and perform BER analysis to estimate its performance.	On completion of the course, students will be able to 1 Describe the cellular system design and technical challenges in deployment. 2 Analyse the mobile radio propagation, fading, diversity concepts and the channel modelling. 3 Discuss the concept of CDMA to provide access to multiple users. 4 Perform BER analysis of multi antenna system. 5 Apply the concepts of OFDM to MIMO systems.

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3											1		3	
CO2	2	2		2								2		3	
CO3	2											1		2	
CO4	2	2		2										2	
CO5	1			2								1		3	

UNIT - I :

Cellular system design concepts: Basic Cellular system and its operation, frequency reuse, channel assignment strategies, Handoff process, factors influencing handoffs, handoffs in different Generations, Interference and system capacity, Enhancing capacity and cell coverage, Trunked radio system.

UNIT - II :

Mobile Radio Wave propagation: large scale propagation models- Free space propagation model, three basic propagation mechanisms, practical link budget design using path loss models, Impulse response of the wireless channel, small scale fading and multipath propagation,

Mathematical modelling of fading channel coefficient, Parameters of mobile multipath channels, types of small-scale fading.

UNIT - III :

Multiple Access schemes: FDMA, TDMA. Introduction to CDMA, Basic CDMA mechanism, Fundamentals of CDMA codes, spreading codes based on PN sequences, Correlation properties of random CDMA spreading, Advantages of CDMA, CDMA near far problem and power control. SDMA.

UNIT - IV :

BER analysis of wired communication system, BER analysis of SISO wireless system, Diversity, BER analysis of multiple antenna system: Maximal ratio combining, Diversity order. BER analysis of CDMA systems, BER analysis of MISO wireless system

UNIT - V :

Introduction to OFDM, Multicarrier transmission, cyclic prefix in OFDM, Schematic representation of OFDM transmitter and receiver, BER analysis of OFDM systems. Introduction to MIMO wireless communication systems, MIMO system model, MIMO ZF receiver, MIMO MMSE receiver, MIMO-OFDM.

Learning Resources:

1. Theodore.S. Rappaport, "Wireless Communications: Principles and Practice", 2/e, Pearson Education, 2010
2. Aditya K. Jagannatham, "Principles of Modern Wireless Communication Systems Theory and Practice", McGraw Hill Education (India) Private Limited, 2017.
3. Principles of modern CDMA/MIMO/OFDM Wireless Communications – by Prof. Aditya. K. Jagannatham, IIT Kanpur. (NPTEL Course)
4. Introduction to cellular and wireless communications - by Dr. David. Koil pillai, IITM. https://nptel.ac.in/courses/106106167/
5. https://www.coursera.org/learn/wireless-communications
6. https://www.udemy.com/introduction-to-wireless-communications

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

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

DSP Processors and Architectures

(Professional Elective-I)
SYLLABUS FOR B.E. VI – SEMESTER

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: **U20PE630EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To give an exposure to the fixed point point DSP architectures and to implement various signal processing algorithms using TI DSPs.	On completion of the course, students will be able to 1 Differentiate between DSP Processors and General Purpose processors. 2 Apply different number formats on DSP processors 3 Understand the architecture details of fixed point & floating point DSPs. 4 Illustrate the features of on-chip peripherals and its interfacing with DSP processors. 5 Design and implement signal processing algorithms on DSP processors.

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2													1
CO2	2	2													1
CO3	1	2	1												1
CO4	1	2	2	1											2
CO5	1	2	3	2	1										3

UNIT - I : Number Format Representation and Source of Errors

Introduction, Digital signal processing system, Differences between DSP and other micro processor architectures. Fixed point, Floating point and block Floating point formats, IEEE-754 Floating point, Dynamic range and precision, Sources of error in DSP implementations, A/D Conversion errors, D/A Conversion Errors, Q-notation.

UNIT - II : Architectures for Programmable DSP Devices

Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Special addressing modes, Address Generation Unit, Programmability and Program Execution, Speed Issues, Pipelining and Performance, Pipeline Depth, Interlocking, Branching effects, Interrupt effects.

UNIT - III : Programmable Digital Signal Processors

Commercial Digital signal-processing Devices, Data Addressing modes of TMS320C54XX DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline Operation of TMS320C54XX Processors.

UNIT - IV : Floating point DSPs

Types of Floating point DSPs, Features of TMS320C67XX Processors, Architecture of 'C67X Processor-CPU, General Purpose Registers files, Functional Units and Operation, Data paths, Control Register File, Addressing modes-Register, Linear & Circular addressing modes, Instructions set-Fixed and Floating point instructions, Pipelining and on-chip peripherals.

UNIT - V : Implementations of Basic DSP Algorithms & Interfacing of 'C54xx

FIR Filters, IIR Filters, Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA). A Multichannel buffered serial port (McBSP), McBSP Programming, a CODEC interface circuit, CODEC programming, A CODEC-DSP interface example, An Image Processing System.

Learning Resource:

1. Avtar Singh, S. Srinivasan "Digital Signal Processing Implementations: Using DSP Microprocessors--With Examples from TMS320C54xx", Cengage Learning (2004)
2. B. Venkataramani, M. Bhaskar, "Digital Signal Processors, Architecture Programming and Applications", Tata Mc Graw Hill, 2013.
3. Lapsley et al. "DSP Processor Fundamentals, Architectures & Features", S. Chand & Co, 2000.
4. Rulph Chassaing, "Digital Signal Processing and Applications with the C6713 and C6416 DSK", John wiley & sons, 2005.
5. Digital Signal Processing: A practical approach, Ifeachor E. C., Jervis B. W Pearson Education, PHI/ 2002
6. "Architectures for Digital Signal Processing", Peter Pirsch John Weily, 2007.
7. Jonatham Stein, "Digital Signal Processing", John Wiley, 2005.
8. https://nptel.ac.in/courses/108102045/8

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

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Wireless Sensor Networks

(Professional Elective-I)
SYLLABUS FOR B.E. VI – SEMESTER

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: **U20PE640EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1 Differentiate WSNs and mobile ad-hoc networks and illustrate the single node computational blocks and design challenges narrating WSN fundamental entities. 2 Analyze and Summarize the MAC (L-2) and Routing (L-3) protocols along with the physical transceiver radio design. 3 Describe WSN topology, localization along with existing hardware support and software simulators and programming models.	On completion of the course, students will be able to 1 Analuyze Wireless Sensor Network Characteristics and its challenges; and, differentiate WSN with other ad-hoc networks. 2 Illustrate architecture of Single WSN mote with Energy consumption mathematical models of a single mote both during the transmission and reception. 3 Apply Physical Layer and Transceiver Design Considerations, MAC Protocols for Wireless Sensor Networks and their comparisons 4 Analyze different topology control and clustering schemes with localization concepts. 5 Describe some of the widely used WSN simulation tools and platforms with engineering case studies.

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2											2	
CO2	3	3	2											2	
CO3	3	3	2											2	
CO4	2	3	2											2	
CO5	3	3	2											2	

UNIT - I : OVERVIEW OF WIRELESS SENSOR NETWORKS

Challenges for Wireless Sensor Networks Characteristics requirements-required mechanisms, Difference between mobile ad-hoc and sensor networks, Applications of sensor networks- Enabling Technologies for Wireless Sensor Networks

UNIT - II : ARCHITECTURES

Single-Node Architecture - Hardware Components, Energy Consumption of Sensor Nodes, Operating Systems and Execution Environments, Network

Architecture - Sensor Network Scenarios, Optimization Goals and Figures of Merit, Gateway Concept

UNIT - III : NETWORKING SENSORS

Physical Layer and Transceiver Design Considerations, MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols And Wakeup Concepts - S-MAC, Zigbee: IEEE 802.15.4 MAC Layer, The Mediation Device Protocol, Wakeup Radio Concepts, Address and Name Management, Assignment of MAC Addresses, Routing Protocols- Energy-Efficient Routing, Geographic Routing.

UNIT - IV : INFRASTRUCTURE ESTABLISHMENT

Topology Control, Clustering, Time Synchronization, Localization and Positioning, Sensor Tasking and Control.

UNIT - V : SENSOR NETWORK PLATFORMS AND TOOLS

Operating Systems for Wireless Sensor Networks, Sensor Node Hardware – Berkeley Motes, Programming Challenges, Node-level software platforms, Node-level Simulators, State-centric programming.

Learning Resource:

1. Holger Karl and Andreas Willig, "Protocols and Architectures for Wireless Sensor Networks," John Wiley, 2005.
2. Feng Zhao and Leonidas J. Guibas, “Wireless Sensor Networks - An Information Processing Approach," Elsevier, 2007.
3. Kazem Sohraby, Daniel Minoli, and Taieb Znati, “Wireless Sensor Networks-Technology, Protocols and Applications,” John Wiley, 2007.
4. Anna Hac, “Wireless Sensor Network Designs,” John Wiley, 2003.
5. https://nptel.ac.in/courses/106105160/21

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

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
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DEPARTMENT OF HUMANITIES & 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: **U20HS040EH**
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The objective of the Course is to equip the prospective engineers with the concepts and tools of economics, finance, cost and taxes that facilitate business decisions at the work place.	On completion of the course, students will be able to 1. Enable students to identify the essential components of demand and supply to decide upon the production quantities. 2. Facilitate in deciding an appropriate price through the identification of the areas of cost control. 3. Make better investment decisions both in short and long run by understanding the financial viability of given investment proposals in the wake of limited resources and manage routine business financial requirements. 4. Analyze the given financial statements of a firm to understand the past performance and to make decisions for future. 5. Identify the impact of the new tax policies on the company's financial structure/ individual's incomes.

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			2						1						
CO2									1		1				
CO3											3				
CO4				2											
CO5												1			

UNIT - I: Basics of Economics:

Scarcity Definition of Economics and its criticisms - Macro and Micro Economics - Managerial Economics – Nature and Scope of Managerial Economics - Meaning of a Firm and Industry – Demand concept and its determinants – Law of Demand with its assumptions and exceptions – Price elasticity of demand and its types, Income elasticity – Cross elasticity – Advertising elasticity – Meaning of Supply – Equilibrium Price and Quantity – Production – Meaning of Production and Production function – Types of production function – Economics of Scale. (Simple problems on computation of Price elasticity).

UNIT - II: Cost and Price:

Cost – Meaning – Types of Costs - Cost Sheet - Break - even Analysis - Methods of Pricing (Problems on Cost Sheet and Breakeven Analysis can be asked).

UNIT - III: Sources and uses of Finance:
Capital Budgeting – Discounting and Non-discounting Techniques (including simple problems) – Working Capital Management – Concepts and Components of Working Capital – Determinants of working capital – Sources of finance (long term and short term).

UNIT - IV: Understanding Financial Statements:
Financial Statements- Meaning - Types - Purpose - Ratios (Liquidity, Solvency, activity & Profitability Ratios including problems).

UNIT - V: Direct & Indirect Taxes:
Income tax - Heads of Income - Income from Salaries - Income from House Property - Income from Business or Profession - Income from Capital Gains - Income from Other Sources – old and new regime tax rates and calculation of tax (Latest Tax Rates) - GST – Introduction to GST - CGST - SGST - IGST – (Simple problems on Computation of Salaries and House property and Final tax computation.

Learning Resources:

1. S.P. Jain and K.L Narang., "Cost Accounting", Kalyani Publishers, Twentieth Edition Revised– 2008.
2. S.P.J ain and K.L Narang., "Financial Accounting", Kalyani Publishers –2002.
3. Mehta P.L., "Managerial Economics: Analysis, Problems and Cases", Thirteenth Edition, Sultan Chand and Sons, Nineteenth Edition - 2013.
4. M.Y. Khan and P.K. Jain., "Financial Management – Text, Problems and Cases", Mc Graw Hill Education Private Limited, New Delhi.
5. Vinod K Singhania and Kapil Singhania., "Direct Taxes Law and Practice", Taxmann Publications, Sixtieth Edition - 2018.
6. Dr. Vinod K Singhania., "Students' Guide to GST and Customs Law", Taxmann Publications, Edition - 2018.
7. Muralidharan., "Modern Banking", Prentice Hall of India.
8. Narayana swamy, "Financial Accounting: A Managerial Perspective" Prentice Hall India.

Reference Books:

1. M. L. Seth., "Micro Economics", Lakshmi Narain Agarwal.
2. Dr. R.P. Rustagi., "Fundamentals of Financial Management" Taxmann Publications.
3. Dr. D.M. Mithani, "Money Banking International Trade & Public Finance", Himalaya Publishing House - 2014.
4. Rajesh., "Banking Theory and Practice", Tata Mc Graw Hill Publishing

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

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DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

Skill Development Course – VII : Verbal Aptitude

COMMON FOR ALL BRANCHES – B.E. VI - SEMESTER

L:T:P (Hrs./week): 1:0:0	SEE Marks : 40	Course Code: **U20BS630EH**
Credits : 1	CIE Marks : 30	Duration of SEE : 2 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students 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 this course, the student 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

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1										3					
CO2										3					
CO3										3					
CO4										3					
CO5										3					

UNIT - 1: Vocabulary- Reading for Content and Context

Overview:

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

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

UNIT - 2: Fill in the Blanks- Applying Content and Context

Overview:

This course is designed for students to identify the clue/ theme words in sentences, then understand the context in which the words are used and finally apply concepts like collocation, antonyms, and synonyms to solve questions.

2.1 Concepts & Rules: Single Fill in the Blanks
2.2 Double/ Triple Fill in the Blanks
2.3 Cloze Test

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

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

UNIT-5: Spotting the Errors
Overview:
In this unit students will focus on identifying errors in sentences, rectifying them and improving the quality of sentences. Building on these skills will also have an impact on the written and spoken skills of students since they will be aware of the common and often made errors and therefore be able to avoid them while using language.
5.1 Concepts- Basic Introduction & Sentence Fillers
5.2 Spot the Errors
5.3 Sentence Improvement

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

ASSESSMENTS
- Online assignments
- Individual and Group

Learning Resources:
learn.talentsprint.com

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

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

Duration of Internal Tests : 90 Minutes

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DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

Human Values and Professional Ethics-II

COMMON FOR ALL BRANCHES – B.E. VI - SEMESTER

L:T:P (Hrs./week): 1:0:0	SEE Marks : 40	Course Code: **U20HS020EH**
Credits : 1	CIE Marks : 30	Duration of SEE : 2 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to :- 1. Create an awareness on the interrelation between Society, Ethics and Human Values 2. Understand how ethical dilemmas apply to real life scenarios 3. Develop ethical human conduct and professional competence. 4. Understand the role of good ethical practices and apply it in a project	At the end of this course, the student will be able to 1. Identify ethical risks in everyday life and in societies that can lead to unethical choices, such as structures that diffuse responsibility or a group that has collectively de-stigmatized unethical behaviour 2. Identify ethical concerns in research and intellectual contexts, including academic integrity, use and citation of sources, and the objective presentation of data. 3. Assess their own ethical values and the social context of problems and articulate what makes a particular course of action ethically defensible 4. Demonstrate knowledge of ethical values in non-classroom activities, such as service learning, internships, and field work integrate, synthesize, and apply knowledge of ethical dilemmas and resolutions in academic settings, including focused and interdisciplinary research

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1								3							
CO2								3							
CO3								3							
CO4								3							

UNIT-I: NORMATIVE ETHICS & SOCIETAL ETHICS

This unit deals with normative ethics, the branch of moral philosophy, or ethics, concerned with criteria of what is morally right and wrong. It includes the formulation of moral rules that have direct implications for what human actions, institutions, and ways of life should be like. This unit also covers societal ethics which is the systematic reflection on the moral dimensions of social structures, systems, issues, and communities.

UNIT-II: PROFESSIONAL ETHICS - NEED FOR ETHICAL CODES

This unit covers the code of Professional Ethics- it is designed to ensure that students learn the necessary skills that groom them to behave like employees should, one that is socially acceptable and respectful of one another. It establishes the rules for behavior and sends a message to every employee that universal compliance is expected.

UNIT-III: PRIVACY

This unit covers "Cyber ethics" - the code of responsible behavior on the Internet. Just as we are taught to act responsibly in everyday life with lessons such as "Don't take what doesn't belong to you" and "Do not harm others," we must act responsibly in the cyber world as well.

The basic rule is "Do not do something in cyberspace that you would consider wrong or illegal in everyday life."

UNIT-IV: MEDIA AND MEDICAL ETHICS

This unit covers Media and Medical ethics is the best division of applied ethics dealing with the specific ethical principles and standards of media (including broadcast media, film, theatre, the arts, print media and the internet) and medicine (practice of clinical medicine and related scientific research)

MODE OF DELIVERY

• Questionnaires • Quizzes • Case-studies • Observations and practice • Home and classroom assignments	• Discussions • Skits • Short Movies/documentaries • Team tasks and individual tasks • Research based tasks • Project

Relevant Websites, CD's and Documentaries

- https://plato.stanford.edu/

Learning Resources:

learn.talentsprint.com

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

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

Duration of Internal Tests: 90 Minutes

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Control Systems Engineering Lab

SYLLABUS FOR B.E. VI – SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U20PC611EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. To demonstrate data acquistion from sensors using NI lab view. 2. To design and analyze control systems using control system tool/box / simulink / MATLAB	On completion of the course, students will be able to 1. Model any system using MATLAB, simulink. 2. Perform data acquisition through NI myRIO, 3. Appreciate the operation of various measuring and control instruments which they encounter in their respective fields. 4. Perform stability analysis of a given system in time and frequency domain. 5. Design a compensator for given specifications.

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2		2	1								1	2	3
CO2	2	1		2	2								2	2	2
CO3	3	2	1	2	2									3	2
CO4	2	3	1	2	2									3	2
CO5	2	2	3	2	2								1	2	

CYCLE - I Experiments

1. Measurement of temperature/pressure/strain of physical quantities using sensors using experimental trainer kits.
2. Sense the temperature with PmodTMP3
3. Sense the ambient light with PmodALS
4. Measurement of displacement/velocity with PmodACL
5. Estimate the range for a given IR and Ultrasonic sensors

CYCLE - II Experiments

6. Determine the stability of a given system.
7. Determine the time domain specifications for a second order system.
8. Find the static error coefficients of a given loop transfer function for test input signals.
9. Test system stability using R-H criterion.
10. Effect of addition of poles and zeros to the loop transfer function using root locus technique.
11. Estimate gain margin and phase margin for given transfer function from Bode plot.
12. Estimate gain margin and phase margin for given transfer function from Nyquist plot.
13. Design of compensators for given specifications.
14. Compare the response of second order system with and without controllers.
15. Stability analysis of digital control system using ZOH.
16. Testing observability and controllability of a given system using kalman's test.

New / Additional experiments planned:

1. Design of first order differential equation using LabVIEW
2. Design of PI controller using LabVIEW

Mini Project(s)

Mini projects related to sensor applications

Learning Resources / Tools:

1. Sensors Interfacing With Labview: A Practical Guide to Sensors and Actuators Data Acquisition and Interfacing Using Myrio, Createspace Independent Pub; 1 edition (28 April 2016)
2. Modeling, Analysis and Design of Control Systems in MATLAB and Simulink, Dingyü Xue, North eastern University China Yang Quan Chen, University of California, World Scientific Publishing Co., 2015

The break-up of CIE :

1.	No. of Internal Test	:	1
2.	Max. Marks for internal tests	:	12
3.	Marks for day-to-day laboratory class work	:	18

Duration of Internal Tests: 3 Hours

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Digital Signal Processing Lab

SYLLABUS FOR B.E. VI – SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U20PC621EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
Students will develop C & MATLAB programs for operation of sequences, design and obtain the frequency response of various digital filters and to implement techniques of multirate processing.	On completion of the course, students will be able to 1. Develop MATLAB files for the verification of system response. 2. Design and analyze the digital filters using MATLAB. 3. Verify the functionality of FFT algorithms. 4. Experiment with multirate techniques using MATLAB & CCS. 5. Design and Implement the digital filters on DSP processor.

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	3	3	3	3										2
CO2	2	2	3	3	2										2
CO3	2	2	1		2										3
CO4	2	3	2	3	2										3
CO5	1	2	2	3	3										2

CYCLE - I Experiments

1. Basic matrix operations and Generation of test signals.
2. Linear Convolution
3. Circular convolution
4. Discrete Fourier Transform(DFT) and Fast Fourier Transform(FFT)
5. FIR filter design using different windows
6. IIR filter design: Butter worth, Chebyshev type 1 and 2: LPF, HPF, BPF & BSF filter.
7. Interpolation and Decimation.
8. I/D conversion using multistage.

Conduct any Six experiments from Cycle-I

CYCLE - II Experiments

9. Study of procedure to work in real- time.
10. Solutions of difference equations.
11. Linear Convolution.
12. Circular Convolution.
13. Discrete Fourier Transform(DFT)
14. Implementation of FIR filters.
15. Implementation of IIR filters.
16. Decimation and Interpolation.

Conduct any Six experiments from Cycle-I

New / Additional experiments planned:

1. Sine wave generation using Code Composer Studio.
2. Raster Experiments for Image processing using Code Composer Studio.

Mini Project(s)

Develop various programs for designing signal processing applications.

Learning Resources/Tools

1. MATLAB 2018a and TMS320C6748 OMAP Processor with CCS version 7.
2. Paul B. Zbar, Albert P. Malvino, Michael A. Miller, "Basic Electronics, A Text - Lab Manual", Vinay K. Ingle and John G. Proakis, "Digital Signal Processing using MATLAB", 4/e, Cengage learning, 2012.
3. Digital signal processing using MATLAB for students and researchers, John W. Leis, A John Wiley & Sons, Inc., Publication,1966.
4. B. Venkataramani and M. Bhaskar," Digital Signal Processor architecture, programming and application", 6/e, TMH, 2013.
5. Rulph Chassaing, "Digital Signal Processing and Applications with the C6713 and C6416 DSK", John wiley & sons, 2005.

The break-up of CIE :

1.	No. of Internal Test	:	1
2.	Max. Marks for internal test	:	12
3.	Marks for day-to-day laboratory class work	:	18

Duration of Internal Tests: 3 Hours

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Computer Networks Lab

SYLLABUS FOR B.E. VI – SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U20PC631EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To provide comprehensive knowledge of networking devices, tools and skills required to implement, test and trouble computer networks	On completion of the course, students will be able to 1. Implement IP addressing schemes and different sub netting scenarios. 2. Perform basic configurations of networking devices like switches and routers 3. Build and implement simple networking topologies and troubleshooting the networks. 4. Implement and troubleshoot virtual LANs and inter-VLAN routing. 5. Implement and test routing protocols like RIPv1, RIPv2, single-area and multi-area OSPF.

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	3	2	2		2				2	1	3	
CO2	3	3	2	3	2	2		2				2	1	3	
CO3	3	3	2	3	2	2		2				2	1	3	
CO4	3	3	2	2	2	2		2				2	1	3	
CO5	3	2	2	2	2	2		2				2	1	3	

CYCLE - I Experiments

1. Getting started with Packet Tracer tool and Internetworking Operating System.
2. Implementation of different sub netting scenarios and IP addressing schemes
3. Basic configuration of networking devices
4. Building and troubleshooting different networking topologies
5. Building and testing Wired Local Area Networks
6. Building and testing Wireless Local Area Networks
7. Implementation and understanding of different servers like HTTP, TFP, TFTP and DNS

CYCLE - II Experiments

8. Creating and testing Wide Area Networks
9. Implementation of routing protocols
10. Implementation of Virtual Local Area Networks (VLAN) and inter VLAN routing
11. Testing and troubleshooting networks with Protocol Data Units
12. Implementation of access lists for traffic control in networking
13. Implementation of Gateway protocols (Boarder Gateway Protocols)
14. Experiments on DATA LINK LAYER

New / Additional experiments planned:

1) Configuring a Network using Link State Routing Protocol
2) Configuring a Network using Distance Vector Routing Protocol

Mini Project(s)

1) Case Study: Vasavi College of Engineering Campus wide LAN network

Learning Resources / Tools :

1. Packet tracer
2. CCNA module 1CCNA Routing and Switching: Introduction to Networks
3. CCNA module-2 CCNA Routing and Switching: Routing and Switching Essentials www.netacad.com

The break-up of CIE :

1. No. of Internal Test	:	1
2. Max. Marks for internal test	:	12
3. Marks for day-to-day laboratory class work	:	18

Duration of Internal Tests: 3 Hours

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Theme Based Project

SYLLABUS FOR B.E. VI – SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code: **U20PW619EC**
Credits : 1	CIE Marks : 30	Duration of SEE : 3

COURSE OBJECTIVES	COURSE OUTCOMES
Students should be 1. Exposed to contemporary technologies in Electronics and Communication Engineering and apply engineering knowledge into a real world problem with proper Design.	On completion of the course, students will be able to 1. Review the literature survey to identify the problem 2. Propose the solution to address the problem 3. Design/Develop/Implement /Solve the problem and test the solution 4. Demonstrate the work done in the mini project through presentation and documentation 5. Adapt to contemporary technologies

CO-PO/PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	3			2	2								
CO2				3	3										
CO3								3		3					
CO4									3			3			
CO5											3				

Note: CO1 & CO2 must be mapped with one of the relevant PSOs based on the domain of the project with 3.
CO4 can be mapped to appropriate PSO with level 2.

A. Guidelines for theme based projects

Course for conducting theme-based projects as per the following:

- Batch size shall be 2 (or) 3 students per batch.
- Allocation by department based on their academic performance.
- Themes shall be different for each batch i.e., sometimes main theme may be same, but sub topic shall be independent as for as possible. In case of big size theme, part of the theme can be allotted to different groups for final integration.
- Output of the theme based project should be demonstrable / measurable / outcome based.

- Two overall coordinators for each section for theme based project supervision and faculty supervisors for different batches should be assigned.
- Two reviews – one after six weeks and another one after twelve weeks and final evaluation shall be conducted at the end of the semester.

B. Grades awarded to the theme based project.

Outstanding	–	≥ 45 marks
Excellent	–	≥ 40 - 44 marks
Very Good	–	≥ 35 - 39 marks
Good	–	≥ 30 - 34 marks
Average	–	≥ 25 - 29 marks

Continuous Internal Evaluation (CIE) – 30 marks: To be evaluated by the Internal Examiner as per the following:

Assesment-1 : [5 Marks]
Review of problem selection & abstract to be conducted in week-2.

Assesment-2: [10 Marks]
Review of project design & initial phase of implementation and to be conducted in week-7.

Assesment-3: [15 Marks]
Review of final implementation, presentation and report to be conducted in week-15.

Semester End Examination(SEE) – 50 marks: To be evaluated by the External Examiner
Evaluation guidelines for Semester End Examination (SEE):

Power Point Presentation		[5 Marks]
Demonstration of the application		[25 Marks]
Innovation	: 05 Marks	
Implementation	: 15 Marks	
Understanding	: 05 Marks	
Project Report		[10 Marks]
Viva Voce		[10 Marks]

OPEN ELECTIVES OFFERED BY VARIOUS DEPARTMENTS IN B.E. VI SEMESTER

S.No.	Dept.	Course Code	Name of the Course	Credits
1	Civil	U20OE610CE	Project Management	3
2	CSE	U20OE610CS	Introduction to Databases	3
3		U20OE620CS	Fundamentals of Cloud Computing	3
4	ECE	U20OE610EC	Internet of Things and Applications	3
5		U20OE620EC	Introduction to Mobile Communications	3
6	EEE	U20OE610EE	Electrical Installation and Safety	3
7	IT	U20OE610IT	Introduction to Web Application Development	3
8		U20OE620IT	Introduction to Machine Learning	3
9	Mechanical	U20OE610ME	Additive Manufacturing and its Applications	3
10		U20OE620ME	Alternative Fuels and Energy Systems	3
11		U20OE630ME	Industrial Administration and Financial Management	3
12	H&SS	U20OE510EH	Critical Reasoning	3
13		U20HS610EH	English for Competitive Examinations	3

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

DEPARTMENT OF CIVIL ENGINEERING

Project Management

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

L:T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code:**U20OE610CE**
Credits: 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The objectives of this course are to: 1. Learn the concept of project management along with functions and objectives. 2. Understand the various techniques used for project planning such as bar charts, CPM, PERT and crashing of networks. 3. Acquire knowledge on various types of contracts, tenders.	On completion of the course, students will be able to 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: Objectives and functions of project management, management team, principles of organization and types of organisation.

UNIT-II

Project 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, East-West Press, 2001.
2. Peret, F, Construction Project Management an Integrated approach, Taylor and Francis, Taylor and Francis Group, London & New York, 2009
3. Punmia B.C., and Khandelwal, PERT and CPM, Laxmi Publications, 2006.
4. http://nptel.ac.in/courses/

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

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

Duration of Internal Test: 90 minutes

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

Department of Computer Science & Engineering

INTRODUCTION TO DATABASES (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 :**U20OE610CS**
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

VASAVI COLLEGE OF ENGINEERING(Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
Department of Computer Science & Engineering

FUNDAMENTALS OF CLOUD COMPUTING (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 :**U20OE620CS**
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 the basic principles of Cloud computing and compare the various Levels of Virtualization. 2. Use the theoretical principles for Architectural Design of Compute and Storage Clouds. 3. Develop Confidentiality Protection and Improve User Access to Cloud Computing using Parallel and Distributed Programming Paradigms	1	Explain the cloud enabling technologies and the Cloud service models.
	2	Choose the levels of virtualization and tools for resource provisioning.
	3	Compare the cloud platform architectures for virtualized data centers and Inter-cloud Resource Management.
	4	Analyze the principles of Security and Trust management to protect confidentiality of data in the Cloud.
	5	Create an instance on AWS or Google Cloud.

UNIT-I

Introduction to Cloud Computing: Cloud Computing in a Nutshell, System Model for Distributed and Cloud Computing, Roots of Cloud Computing, Grid and Cloud, Layers and Types of Clouds, Desired Features of a Cloud, Basic Principles of Cloud Computing, Challenges and Risks, Service Models.

UNIT-II

Virtual Machines and Virtualization of Cluster and Data Centers, Levels of Virtualization, Virtualization structures/Tools and Mechanism, Virtualization of CPU, Memory and I/O Devices, Virtual Clusters and Resources Management, Virtualization Data-Center Automation.

UNIT-III

Cloud computing architecture over Virtualized data Centers: Data-Center design and inter connection network, Architectural Design of Compute and Storage Clouds, Public Cloud Platforms, Google Cloud, AWS, Azure, Inter-cloud Resource Management.

UNIT -IV

Cloud Security and Trust Management, Data Security in the Cloud: An Introduction to the Idea of Data Security, The Current State of Data Security in the Cloud CryptDb: Onion Encryption layers- DET, RND, OPE, JOIN, SEARCH, HOM, and Homomorphism Encryption, FPE. Trust, Reputation and Security Management.

UNIT -V

Cloud Programming and Software Environments: Features of Cloud Platforms, Parallel and distributed Programming Paradigms, Programming Support of Google Cloud, Programming on Amazon AWS and Microsoft Azure, Emerging Cloud Software Environments.

Suggested Books:

1. Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Cloud Computing: principles and paradigms (Wiley Series on Parallel and Distributed Computing), (2011), Wiley Publishing (c).
2. Kai Hwag. Geoffrey C. Fox, Jack J. Dongarra, Distributed and Cloud Computing from parallel processing to the internet of things, (2012), Elsevier.
3. Raluca Ada Popa, Catherine M.S. Redfiled, Nickolai Zeldovich, and Hari Balakrishnan, crypt DB Protecting confidentiality with encrypted Query Processing, 23rd ACM Symposium on Operating Systems principles (SOSP 2011), Cascais, Portugal October 2011.
4. John W. Rittinghouse, Cloud Computing: Implementation, management, and security, James F. Ransome, (2009), CRC Press.

Reference Books:

1. A fully Homomorhic Encryption Scheme, Craig Gentry, September 2009.
2. David Marshall, Wade A. Reynolds, Advanced server virtualization: VMware and Microsoft platform in the virtual Data Center, (2006), Aucrbach publications.

Online resources:

1. https://cloudacademy.com/cloud-computing/what-is-cloud-computing-introductory-course/
2. http://cloudschool.com/courses

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

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

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Internet of Things and Applications (Open Elective)

SYLLABUS FOR B.E. VI - SEMESTER (for other branches)

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: **U20OE610EC**
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.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1												1	1
CO2	3	2					1					1	1	2	2
CO3	3	1												1	1
CO4	3	1			2								1	1	1
CO5	3	2		1		2	2		2			2		2	2

UNIT - I : OVERVIEW

Introduction to IoT – Improving Quality of life.
IoT-An Architectural Overview, M2M and IoT Technology Fundamentals- Devices and gateways, Local and wide area networking, Data management, Business processes in IoT.

UNIT - II : Real-World Design Constraints

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

UNIT - III : IOT PROTOCOLS

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

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

UNIT - IV : Device for IoT

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

UNIT - V : IoT case studies

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

Learning Resources:

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

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

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

Duration of Internal Tests: 90 Minutes

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

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Introduction to Mobile Communications (Open Elective)

SYLLABUS FOR B.E. VI - SEMESTER (for other branches)

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: **U20OE620EC**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

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

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	2	1	1								3	
CO2	3	2	2	2		1								3	
CO3	3	2				1								3	
CO4	3	2	2	2	1	1								3	
CO5	3	2		2	1	1								3	

UNIT - I:

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

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

UNIT - II:

Mobile Radio Propagation - Large Scale Path Loss: Introduction to

Radio wave Propagation, Free Space Propagation Model, Reflection, Ground Reflection (Two-Ray) Model, Diffraction, Scattering.

UNIT - III:

Mobile Radio Propagation - Small Scale Fading and Multipath: Small Scale Multipath Propagation, Small – Scale Multipath Measurements, Parameters of Mobile Multipath Channels, Types of Small-Scale Fading, Rayleigh and Ricean Distributions.

UNIT -IV:

Multiple Access Techniques for Wireless Communications: Introduction, Frequency Division Multiple Access (FDMA), Time Division Multiple Access (TDMA), Code Division Multiple Access (CDMA), Space Division Multiple Access (SDMA).

UNIT -V:

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

Learning Resources:

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

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

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

Duration of Internal Tests: 90 Minutes

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

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Electrical Installation and Safety

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

L: T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code: **U20OE610EE**
Credits:3	CIE Marks: 40	Duration of SEE: 3Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to: Have a fair knowledge about the fundamentals of wiring systems, electrical safety procedures, Estimation of lighting & Power loads.	On completion of the course, students will be able to 1. Identify and choose the proper type wiring for domestic & industrial applications. 2. Identify and choose the proper type wiring Accessories for domestic & industrial applications. 3. Apply and implement the Electrical safety procedures for repairs & hazards. 4. Design and Estimate the domestic lighting installation. 5. Design and Draw the wiring layout for a big office building, electrical laboratory, big industry and big hotel with lift arrangement

UNIT - I

Wiring Systems: Introduction, size of wires, standard wires, types of wires, CTC, PVC, Lead sheathed VIR, weather proof wires, flexible wires different types of cable wires – Types and Installation of House Wiring Systems or Methods of installing wiring.

UNIT - II

Wiring Accessories: - Clips, screws -round blocks switch boards, sockets socket pins - CTS wiring - Installation of surface conduit wiring. Rigid conduits, flexible conduits – Conduit accessories - elbows bushings - reducers, conduit box saddles, PVC conduit wiring - Concealed wiring.

UNIT - III

Safety Procedures: Distribution fuse boards - Main switches – Different types of fuses and fuse carriers, MCB, ELCB & MCCB. Safety procedures – Electric shock and first aid, causes for fire hazards in Electrical installations

UNIT - IV

Estimation of Lighting: Estimation of domestic lighting installation service main - types of wire - specification - quantity of materials required for service main – estimation and selection of interior wiring system suitable to a given building - number of circuits - quantity of accessories required - estimates of materials for execution of the domestic wiring installation as per National Electrical act 2003.

UNIT - V

Estimation of power loads: Power wiring installation - Drawing wiring layout for a big office building, electrical laboratory, big industry, big hotel with lift arrangement and a residential building with 2 bed room house.- estimation upto 20 kVA calculation of load current based on ratings of various equipment's to be installed - size of wire.

Suggested Books:

1. J.B.Gupta –A course in Electrical installation Estimating & costing-9th edition 2014, S.K. Kataria & Sons.
2. S.L.Uppal-Electrical Wiring, Estimating & costing Electrical wiring.

Reference Books:

1. Balbir Singh-Electrical Drawing
2. Arora -Electrical wiring
3. BVS Rao -Maintenance and Operation of Electrical Equipment –Vol-I-TMH
4. S. Rao -Testing, Commissioning Operation & Maintenance of Electrical equipment -TMH
5. CR Dargar -Electrical Installation design and drawing -New Asian publishers.

Online resources:

1. http://ocw.tufts.edu
2. http://ocw.upm.es
3. www.open.edu/openlearn/
4. http://nptel.ac.in/courses/

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

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

Introduction to Web Application Development

(OPEN ELECTIVE-V) (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 : **U20OE610IT**
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Acquire basic skills for designing static and dynamic Web Applications using HTML, CSS, Java script and PHP.	On completion of the course, students will be able to 1. Design a static web pages using HTML, CSS. 2. Use JavaScript for creating dynamic web pages and client side validation. 3. Use built-in functions of PHP to perform server side validations and sending emails. 4. Use built-in functions of PHP to connect, query and fetch results from a database. 5. Build a PHP application using an MVC Framework.

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: Basics of PHP

Basics of PHP: Data Types, Variables and Operators, Control Structures: If else, Switch Case. Loop: For, ForEach, While, Do While. Functions in PHP, PHP Forms, Cookies & Sessions, File Processing.

UNIT-IV: Advanced PHP

Advanced PHP: PHP E-Mail, Filters, Database Access, OOPS in PHP. Application using PHP.

UNIT-V: Introduction to MVC

Introduction to Model View Controller Architecture, Building Application using a PHP Framework, Testing and Deploying a PHP application.

Learning Resources:

1. "Web Technologies", 7th Edition, Uttam K.Roy,2012.
2. "Internet & World Wide Web How to Program", 5/e, Paul J. Deitel, Harvey M. Deitel, Abbey Deitel,2012.

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

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

DEPARTMENT OF INFORMATION TECHNOLOGY

Introduction to Machine Learning

(OPEN ELECTIVE-V) (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: **U20OE620IT**
Credits : 3	CIE Marks: 40	Duration of SEE :3Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Introduce the fundamental concepts and approaches in Artificial intelligence and Machine Learning field to effectively apply techniques to the real-world problems.	On completion of the course, students will be able to 1. Demonstrate knowledge of the Artificial intelligence and machine learning literature. 2. Apply an appropriate algorithm for a given problem. 3. Apply machine learning techniques in the design of computer systems. 4. Prove basic results in the theory of learning 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.

Supervised learning: Linear Regression, Logistic Regression.

UNIT-II:

Supervised Non-parametric learning: Introduction to Decision Trees, K-Nearest Neighbor, Feature Selection.

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

UNIT-III:

Supervised Parametric learning (Neural networks): Perceptron, Multilayer Neural Network, Backpropagation.

UNIT-IV:

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/

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

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

DEPARTMENT OF MECHANICAL ENGINEERING

Additive Manufacturing and its Applications

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

L:T: P (Hrs./week):3:0:0	SEE Marks:60	Course Code : U20OE610ME
Credits: 3	CIE Marks:40	Duration of SEE : 3 Hours

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

Unit-I

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

Unit-II

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

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

UNIT III

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

Fused Deposition Modeling (FDM): Models and specifications, Process, Working principle, Applications, Advantages and disadvantages, Case studies.

Unit-IV

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

Three dimensional printing (3DP): Models and specification, process, working principle, applications, advantages and disadvantages, case studies.

UNIT-V

Applications of AM systems: Applications in **Design,** aerospace industry, automotive industry, jewellery industry, coin industry, GIS Application, arts and architecture.

RP medical and bio engineering Application: planning and simulation of complex surgery, customized implant and prosthesis, design and production of medical devices, forensic science and anthropology, visualization of bio-molecules.

Learning Resources:

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

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

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

Duration of Internal Test: 1 Hour 30 Minutes

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

DEPARTMENT OF MECHANICAL ENGINEERING

Alternative Fuels and Energy Systems

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

L:T:P (Hrs./week): 3:0:0	SEE Marks:60	Course Code: **U20OE620ME**
Credits: 3	CIE Marks:40	Duration of SEE : 3 Hours

Course objectives	Course Out comes
The objectives of this Course are: To broaden the knowledge of alternate fuels and energy system and to understand the manufacturing and operating characteristics of alternative fuels.	On completion of the Course, the student will be able to: 1. Identify the need for alternative fuels. 2. Explain the characteristic features of bio-fuels. 3. Elucidate the properties of biogas, LPG & CNG. 4. Identify the merits and challenges of hydrogen and fuel cell based vehicles. 5. Explain the characteristics of electric and hybrid vehicles.

UNIT – I

Need for Alternative Fuels: Working of I.C. Engine; Properties of Fuels; Fuel Rating; Study of various performance parameters related to properties of different types of fuels; Fossil Fuels: Sources, scope of availability; Need for Alternative Fuels; Effects of constituents of Exhaust gas emission on environment; Green house effect, Factors affecting green house effect.

UNIT – II

Alcohols: Sources of Methanol and Ethanol, methods of it's production. Properties of methanol & ethanol as engine fuels, Use of alcohols in S.I. and C.I. engines, performance of blending methanol with gasoline. Emulsification of alcohol and diesel. Dual fuel systems. Improvement / Change in emission characteristics with respect to % blending of Alcohol.

Bio-diesels: Base materials used for production of Bio-diesel; Properties of Diesel blended with vegetable oils and difference in performance characteristics of Engine.

Synthetic Alternative Fuels: Di-Methyl Ether **(**DME), P-Series, Eco-friendly Plastic fuels (EPF).

UNIT – III

Biogas: Introduction to Biogas system; Extraction process; Factors affecting biogas formation; Usage of Biogas in SI engine & CI engine;

LPG & CNG: Properties of LPG & CNG as engine fuels, fuel metering systems, combustion characteristics, effect on performance, emission, cost and safety.

UNIT – IV

Hydrogen: Hydrogen as a substitute fuel; Properties, Sources and methods of Production of Hydrogen; Storage and Transportation of hydrogen; Advantages of hydrogen (Liquid hydrogen) as fuel for IC engine/ hydrogen car; Layout of a hydrogen car;

Fuel Cells: Concept of fuel cells based on usage of Hydrogen and Methanol; Power rating and performance; Layout of fuel cell vehicle.

UNIT – V

Electric & Hybrid Vehicles: Layout of an electric vehicle; Systems and components; electronic controlled systems; high energy and power density batteries; Types of hybrid vehicles; advantages & limitations.

Solar Powered Vehicles: Solar cells for energy collection, Storage batteries; Layout of solar powered automobiles; Advantages and limitations.

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

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

Duration of Internal Test: 1 Hour 30 Minutes

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

DEPARTMENT OF MECHANICAL ENGINEERING

Industrial Administration and Financial Management

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

Instruction: 3 Hrs / week	SEE Marks:60	Course Code: **U20OE630ME**
Credits: 3	CIE Marks:40	Duration of SEE : 3 Hours

Course objectives	Course Out comes
The objectives of this course are to: 1. aware about types of business forms, organization structures, plant layouts, merits, demerits and applications. 2. understand method study procedure, PME, time study techniques and wage incentives. 3. importance of PPC and improving quality by control charts and sampling plants. 4. optimization of inventory to minimize total cost and other optimization techniques like LPP, project management techniques. 5. estimate selling price of a product, TVM and budgeting techniques, depreciation methods.	On completion of the course, the student will be able to: 1. understand business forms, organization structures and plant layouts. 2. implementation of method study and estimation of standard time. 3. understand types of production, functions of PPC, quality control by charts and sampling. 4. implement optimization techniques like LPP, assignment and project management techniques. 5. understand BEA, estimation of depreciation, selling price of a product and capital budgeting techniques.

UNIT – I

Industrial Organization: Types of various business organisations. Organisation structures and their relative merits and demerits. Functions of management.

Plant location and layouts: Factors affecting the location of plant and layout. Types of layouts and their merits and demerits.

UNIT – II

Work study: Definitions, Objectives of method study and time study. Steps in conducting method study. Symbols and charts used in method study. Principles of motion economy. Calculation of standard time– by– time study and work sampling. Performance rating factor. Types of ratings. Jobs evaluation and performance appraisal. Wages, incentives, bonus, wage payment plans.

UNIT – III

Inspection and quality control: Kinds and Types, objectives of inspection, Sampling inspection quality control by chart and sampling plans. Quality circles.

Production planning and control: Types of manufacture. Types of production. Principles of PPC and its functions.

UNIT – IV

Optimisation: Introduction to linear programming and graphical solutions. Assignment problems.

Project Management: Introduction to CPM and PERT. Determination of critical path.

Material Management: Classification of materials. Materials planning. Purchasing procedure of a material for an industry Duties of purchase manager and Stores department. Determination of economic order quantities. Types of materials purchase.

UNIT – V

Cost accounting: elements of cost. Various costs. Types of overheads, calculation of selling price. Break even analysis and its applications. Depreciation. Methods of calculating depreciation fund. Nature of financial management. Time value of money. Techniques of capital budgeting and methods.

Learning Resources:

1. Pandey I.M., "Elements of Financial Management", Vikas Publ. House, New Delhi, 1994
2. Khanna O.P., "Industrial Engineering and Management", Dhanapat Rai & Sons.
3. Everrete E Admaa& Ronald J Ebert , "production and Operations Management", 5th Ed. , PHI , 2005
4. S N Chary, "Production and Operations Management", 3rd Ed. , Tata McGraw Hill, , 2006
5. Pannerselvam, "production and Operations Management", Pearson Education, 2007

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

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

Duration of Internal Test: 1 Hour 30 Minutes

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

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

Critical Reasoning

(Open Elective) SYLLABUS FOR B.E. 3/4- VI SEMESTER

Instruction: 3 Hours	SEE: 60	Course code: U20OE510EH
Credits: 3	CIE: 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the learners to: 1. Identify the alternative solutions to the problem or case. 2. Derive solution or discuss the best solution(s) to the problem or case. 3. Discuss the conclusions that follow from the solution(s). Students will be trained to apply concepts like percentages and averages to solve complex problems. 4. Students will be trained to use effective methods like elimination of options and shortcuts to solve problem accurately. 5. Students will be trained to use effective methods like decision making and shortcuts to solve problems accurately.	At the end of the course the learners will be able to: - 1. Analyse and use techniques for Venn diagrams to solve questions effectively. 2. Demonstrate the difference between deductive and inductive reasoning. 3. Evaluate and distinguish between strong and weak assumption and conclusions. 4. 4. Evaluate a select the right arguments from the given statements. 5. 5. Evaluate and choose the right decision for the given situation

Unit- 1 Analyzing Datasets & Puzzles with Analytical Thinking

1.1 Set Theory/Data Sets/Venn Diagrams
1.2 Analogy
1.3 Classifications

Unit- 2 Logical Reasons & Logical Deductions

2.1 Analytical Puzzles
2.2 Logical Data Sequences
2.3 Logical Fact Deductions
2.4 Assertions & Reasons

Unit- 3 Essentials, Reactions, Causes & Data Adequacies/Inadequacies

3.1 Essential Part/Verification of Truth of Statements
3.2 Situation Reaction Test
3.3 Cause & Effect
3.4 Data Sufficiency

Unit- 4 Statements, Assumptions, Arguments & Conclusions

4.1 Statements & Assumptions
4.2 Statements & Arguments/Inferences/Analyzing Arguments
4.3 Statements & Conclusions
4.4 Analytical Reasoning

Unit- 5 Evaluations, Decisions & Making Judgements

5.1 Decision Making
5.2 Making Judgements
5.3 Evaluating Course of Action

Prescribed textbook for theory:

1. A Modern Approach to Verbal & Non-Verbal Reasoning S.CHAND by Dr. R S Aggarwal

Suggested Reading

1. Learn.talentsprint.com/References Courses
2. LOGICAL Reasoning Disha Publications

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

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

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

English for Competitive Examinations

(Open Elective) SYLLABUS FOR B.E. 3/4 – VI SEMESTER

Instruction: 3 Hours	SEE: 60	Course code: U20OE610EH
Credits: 3	CIE: 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the learners to: 1. To familiarize the students to various types of competitive examinations. 2. To practice questions and prepare for GATE.GRE.CAT.TOEFL.	At the end of the course the learners will be able to: - 1. The students will be able to solve various types of questions in competitive English examinations effectively. 2. Provide logical conclusions for the questions aptitude and reasoning within the stipulated time.

GATE:

- Concentrating on English Grammar.
- Recognizing suitable option in sentence completion.
- Solving verbal analogies.
- Categorizing word groups.
- Ignoring distractions in critical reasoning questions.
- Providing reasoning in verbal deduction.

GRE:

VERBAL REASONING:

- Analyzing and drawing add value to incomplete data: identify the perception of the author.
- Identifying vital points and differentiating between relevant and irrelevant points.
- Understanding and summarizing the structure of a text.
- Understanding the given words, sentences and entire texts: ability to focus on the meaning of the entire sentence.
- Understanding relationships among words and concepts.

ANALYTICAL WRITING:

- Articulating complex ideas effectively and with clarity.
- Supporting ideas with relevant reasons and examples.
- Examining claims and accompanying evidence.
- Sustaining a well-focused, coherent discussion.

CAT:

VERBAL ABILITY AND READING COMPREHENSION:

- Reading comprehension (antonyms / synonyms)
- Sentence correction.
- Fill in the blanks & cloze passage.
- Jumbled sentence.
- Jumbled paragraph (word meaning based questions).
- Analogies.
- Para odd one out.
- Summary (facts, assumptions, judgments).
- Verbal reasoning (paragraph formation)

TOEFL:

- Basic understanding, speed and accuracy, learning from reading, pronoun reference, author's point of view.
- Good delivery including clarity of speech, fluidity, natural pacing and correct intonation patterns.
- Correct use of language showing a good grasp of grammar, vocabulary and speech structures.
- Topic development in which you are able to show a well-structured, organized response that effectively connects ideas with enough support for each point you are making.
- Writing strategy and format execution skills.

METHODOLOGY

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

ASSESSMENTS

- Online assignments
- Individual and Group

LEARNING RESOURCES

learn.talentsprint.com

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

Duration of Internal Tests : 90 Minutes