



VIJAYANAGARA SRIKRISHNADEVARAYA UNIVERSITY
JNANASAGARA CAMPUS, BALLARI-583105

Department of Studies in Electronics

III,IV,V and VI Semester Syllabus

Bachelor of Science

VSKUBSEPCurricularandCreditsStructureunderCBCSSchemefortheThreeYearsB.Sc.
UndergraduateProgrammew.e.f.from2024-2025 (Three Major Combination)

I-VISemester[Electronics]

Semester	Coursecode	TitleoftheCourse	Marks			Teaching hours/week			Credit	Duration of SEE (Hrs)
			IA	SEE	Total	L	T	P		
I	24MJEL1L	BASIC ELECTRONICS	20	80	100	4	0	0	4	03
	24MJEL1P	BASIC ELECTRONICS LAB	10	40	50	0	0	4	2	03
II	24MJEL2L	ELECTRONIC CIRCUITS	20	80	100	4	0	0	4	03
	24MJEL2P	ELECTRONIC CIRCUITS LAB	10	40	50	0	0	4	2	03
III	24MJEL3L	SCILLATORS & OP-AMP	20	80	100	4	0	0	4	03
	24MJEL3P	OSCILLATORS & OP-AMP LAB	10	40	50	0	0	4	2	03
	24MJEL3S	PCB Designing & Fabrication	10	40	50	1	0	2	2	1.5*
IV	24MJEL4L	DIGITAL ELECTRONICS	20	80	100	3	0	0	3	03
	24MJEL4P	DIGITAL ELECTRONICS LAB	20	80	100	3	0	0	3	03
	24MJEL4S	Sensors & Industrial Instrumentation	10	40	50	1	0	2	2	1.5*
V	24MJEL5L	ELECTRONICS COMMUNICATION System	20	80	100	3	0	0	3	03
	24MJEL5P	ELECTRONICS COMMUNICATION System LAB	10	40	50	0	0	4	2	03
	24MJEL5E	Mobile Communication	10	40	50	2	0	0	2	02
VI	24MJEL6L	Microprocessor & Microcontroller	20	80	100	3	0	0	3	03
	24MJEL6P	Microprocessor & Microcontroller LAB	10	40	50	0	0	4	2	03
	24MJEL6E	VLSI & EMBEDDED SYSTEM	10	40	50	2	0	0	2	02
	24MJEL6R	Project	10	40	50	0	0	4	2	01
Total			240	960	1200	30	0	28	44	

Course Title: OSCILLATORS & OP-AMP	Course Code: 24MJEL3L
Total Contact Hours: 55	No of Credits: 04
Internal Assessment Marks: 20	Duration of SEE: 3 Hours
Semester End Exam Marks: 80	

Course Outcomes S(COs):

1. At the end of the course, students will be able to:
2. Analyse power supplies (ADVANCED).
3. Design different Transistor Biasing Systems.
4. Explain Basics OP Amplifiers.
5. Explain power amplifier and feedback amplifier.

Unit	Description	Hours
1	Wave Shaping Circuits Introduction to linear and nonlinear wave shaping and negative clippers RC & RL differentiating circuits- derivation, input and output waveforms. RC & RL integrating circuits- derivation, input and output wave form non-linear wave shaping- positive, negative clippers biased- positive negative clippers & combination clipper Clamping circuits- positive and negative clippers	11
2	Sinusoidal Oscillators Classification of oscillators, Damped & undamped oscillator. The oscillatory circuit (tank circuit). essentials of transistor oscillator- barkhausen criterion. Transistor LC oscillator: Hartley oscillator and Colpitts oscillator limitations of LC & RC oscillators. Transistor crystal oscillator: working of quartz crystal, equivalent circuit of crystal frequency response of transistor crystal oscillator.	11
3	Nonsinusoidal oscillators . Nonsinusoidal wave forms, classification, Definitions of pulse parameters, time delay, rise time, turn on, turn off, storage time, fall time, pulse width and duty cycle. Multivibrators: types and uses, construction and working of Astable Monostable and bistable multivibrators Schmitt trigger using transistors and 555 timer.	11

4	<p>Operational Amplifier</p> <p>Introduction, advantages and disadvantages of IC technology IC packages scale of integration, IC terminology</p> <p>Emitter coupled differential amplifier- differential and common mode operation CMRR block diagram of OPAMP. Characteristics of ideal OPAMP. Inverting and noninverting opamp expressions For closed loop voltage gain opamp parameters-input bias current, input offset Voltage output offset voltage and input and output impedances CMRR and slew rate frequency compensation, null adjustment.</p>	11
5	<p>OPAMP Applications</p> <p>OPAMP as an integrator differentiator-circuit function and waveform. Active filters- OPAMP low pass High pass band pass and band reject filters circuit construction, function and frequency response. OPAMP oscillators comparator Schmitt trigger phase shift oscillator Wein bridge oscillator, a stable bistable and monostable multivibrator- circuit and working.</p> <p>Analog computation Introduction linear computing circuits and symbols using OPAMP scale changer, adder, subtractor, multiplication by a constant. Solutions of linear ordinary differential equation with constant coefficients (Bootstrap method). Analog computer symbols, operation modes of analog computer, time scaling and amplitude scaling, examples.</p>	11

CourseTitle: OSCILLATORS & OP-AMP LAB	CourseCode:24MJEL3P
TotalContactHours:04	Noof Credits:02
L:T:P:0-0-4	
InternalAssessmentMarks:10	Durationof SEE: 3 Hours
SemesterEndExamMarks:40	

Course Outcomes(COs):

At the end of the course,

Studentsarebe able to:

1. Able to make connections using breadboard.
2. Design Different Power Supply Systems Using IC's.
3. Design Amplifier Circuit sand analyse their Performance.
4. analyse Performance Of power Amplifier Circuits and Feedback Systems

Listof Experiments/Programs (For a Lab Course)

- 1RC Differentiator and Integrator (Trace input and output waveforms for sine, square and triangular waves).
- 2Clipping Circuits–Positive, Negative and Biased.
- 3Clamping Circuits-Positive, Negative and Biased.
- 4Hartley oscillator (using transistor)-determine the frequency of oscillation
- 5Phase shift oscillator (using transistor)-determine the frequency of oscillation
- 6Wien bridge oscillator (using transistor)-determine the frequency of oscillation
- 7Crystal oscillator(using transistor)-determine the frequency of oscillation
- 8Inverting & non inverting op-Amp – determination of gain
- 9Frequency response of inverting op-Amp
- 10Frequency response of Non-inverting op-Amp
- 11Phasshiift oscillator (usingop-Amp)-determine the frequency of oscillation
- 12Wien bridge oscillator (using-Amp)-determine the frequency of oscillation
- 13Active low pass filter-Frequency response
- 14Active high pass filter-Frequency response
- 15Determination of op-Amp parameters
- 16.Op Amp as a differentiator&
Op-Amp as an integrator.

Course Title: PCB designing& Fabrication	Course Code: 24MJEL3S
TotalContactHours: 30	No. of Credits: 02
Internal Assessment Marks: 10	Duration of SEE: 2 Hours
SemesterEndExamMarks: 40	

Course Outcomes: At the end of the Course the student will be able to

1. Determine appropriate components to make circuits. (L3)
2. Interpret test results and measurements on electric circuits. (L2)
3. Analyze the fabrication processes of printed circuit boards. (L4)
4. Apply the software and hardware for PCB Design. (L3)

Unit	Description	Hours
1	<p>Introduction to PCB designing concepts: Introduction & Brief History, what is PCB, Difference between PWB and PCB, Types of PCBs: Single Sided (Single Layer), Multi-Layer (Double Layer), PCB Materials</p> <p>Component introduction and their categories Types of Components</p> <ul style="list-style-type: none"> • Active Components o Diode o Transistor o MOSFET o LED o SCR o Integrated Circuits (ICs) • Passive Components o Resistor o Capacitor o Inductor o Transformer o Speaker/Buzzer <p>Component Package Types</p> <ul style="list-style-type: none"> • Through Hole Packages o Axial lead o Radial Lead o Single Inline Package(SIP) o Dual Inline Package(DIP) o Transistor Outline(TO) o Pin Grid Array(PGA) • Through Hole Packages o Metal Electrode Face(MELF) o Leadless Chip Carrier(LCC) o Small Outline Integrated Circuit(SOIC) o Quad Flat Pack(QFP) and Thin QFP (TQFP) o Ball Grid Array(BGA) o Plastic Leaded Chip Carrier(PLCC) <p>Section 3: Introduction to Development Tools</p> <ul style="list-style-type: none"> • Introduction to PCB Design using OrCAD tool • Introduction to PCB Design using PROTEUS tool 	16
2	<p>PCB Designing Flow Chart • Schematic Entry • Net listing • PCB Layout Designing • Prototype Designing o Design Rule Check(DRC) o Design For Manufacturing(DFM) • PCB Making o Printing o Etching o Drilling • Assembly of components Description of PCB Layers • Electrical Layers o Top Layer o Mid Layer o Bottom Layer</p> <ul style="list-style-type: none"> • Mechanical Layers o Board Outlines and Cutouts o Drill Details • Documentation Layers o Components Outlines o Reference Designation o Text Keywords & Their Description • Footprint • Pad stacks • Vias • Tracks • Color of Layers • PCB Track Size Calculation Formula PCB Materials • Standard FR-4 Epoxy Glass • Multifunctional FR-4 • Tetra Functional FR-4 • NelcoN400-6 • GETEK • BT Epoxy Glass • Cyanate Aster • Plyimide Glass • Teflon 	14

	<p>Rules for Track • Track Length • Track Angle • Rack Joints • Track Size Study of IPC Standards • IPC Standard For Schematic Design • IPC Standard For PCB Designing • IPC Standard For PCB Materials • IPC Standard For Documentation and PCB Fabrication Section 5: Lab practice and designing concepts Starting the PCB designing • Understanding the schematic Entry • Creating Library & Components • Drawing a Schematic • Flat Design / hierarchical Design • Setting up Environment for PCB • Design a Board Auto routing • Introduction to Auto routing • Setting up Rules • Defining Constraints • Auto router Setup PCB Designing Practice • PCB Designing of Basic and Analog Electronic Circuits • PCB Designing of Power Supplies • PCB Designing of Different Sensor modules • PCB Designing of Electronics Projects • PCB Designing of Embedded Projects Post Designing & PCB Fabrication Process • Printing the Design • Etching • Drilling • Interconnecting and Packaging electronic Circuits (IPC) Standards • Gerber Generation • Soldering and De-soldering • Component Mounting • PCB and Hardware Testing Project work • Making the schematic of Academic and Industrial projects • PCB Designing of these projects • Soldering and De-soldering of components as per Design • Testing and Troubleshooting Methods</p>	
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Course Title: DIGITAL ELECTRONICS	CourseCode:24MJEL4L
TotalContactHours:55	No. of Credits: 04
L: T:P 4-0-0	
Internal Assessment Marks: 20	Duration of SEE:3 Hours
SemesterEndExamMarks:80	

Course Outcomes (COs):

1. Student Able to Understand Digital Technique.
2. By studying basic logic principles and laws.
3. By understanding combinational and Sequential logic circuits like FF, Registers.

Unit	Description	Hours
1	<p style="text-align: center;">NUMBER SYSTEMS & BOOLEAN ALGEBRA</p> <p>Binary, Octal & Hexadecimal systems and their inter conversions. Codes- BCD (8421), Excess- 3 code, Gray code, Binary operations- addition, subtraction, 1' & 2' complementary method of subtraction. Examples. BOOLEAN ALGEBRA: positive, negative logics, Boolean identities. Laws and Theorems of Boolean algebra. Demorgan's theorems. Simplifications of Boolean expressions using laws & theorems.</p>	11
2	<p>LOGIC GATES & LOGIC DESIGN</p> <p>Introduction, AND, OR, NOT – Basic gates: construction, working using diodes and transistors. Truth tables, symbols and IC's. Universal gates: NAND & NOR gates truth tables, symbols & Boolean expressions. Combinational gates: XOR & XNOR gates truth tables, symbols & Boolean expressions. Binary adder: Half adder & Full adder, 4-bit Binary adders. Logic design: Implementation of logic circuits for given Boolean expressions and design. Simplifying the logic circuits SOP & POS expressions, K-Map construction & simplifications to solve 3 & 4 variable Boolean expressions, don't care conditions.</p>	11
3	<p>LOGIC family IC's & Flip-flops</p> <p>RT, DTL & TTL families – characteristics, TTL NAND & NOR gates, CMOS series, Merits and demerits of TTL & CMOS. Flip-flops: Basic RS flipflop (bistable) using transistor. Flipflop as a memory cell. RS- NAND & NOR latches, clocked RS flipflop, D & T flipflop, JK flipflop, master slave flipflop.</p>	11

4	<p>COUNTERS</p> <p>Basic Counters Asynchronous & Synchronous Counters Timing & Clock Diagrams Of All Counters ,MOD-3, MOD-5, MOD-7. 4- bit synchronous counter decade counter, IC7490. Synchronous updown counter, design using K-map, ring counter and applications.</p>	11
5	<p>Registers Introduction, types of registers,4- bit serial in serial out, serial in parallel out, parallel in serial out and parallel in parallel out shift registers. Asynchronous counters logic diagram, truth table and timing diagram, 3-bit ripple counter, 4-bit up-down counter and modified</p> <p>Data Processors</p> <p>Multiplexers: block diagram, truth table and logic circuit of 4-to-1 multiplexer and 16 to 1 multiplexer .The 74150 TTL multiplexer-pin out diagram, truth table explanation Demultiplexer-1-to4, 1-to-16 demultiplexer block diagram, truth table and logic diagram and explanation. The 74154 demultiplexer-pin out diagram, truth table explanation</p>	11
<p>References:</p> <ol style="list-style-type: none"> 1.Digital fundamentals - Floyd, 2.Digital system –principles & application; Ronald J Tocci, 3.Modern digital electronics Jain 4.Digital principles & applications; Malvino&Leach 5.Digital logic & computer design S Morris Mano –,new edition. 		

CourseTitle: DIGITAL ELECTRONICSLAB	CourseCode:24MJEL4P
TotalContactHours:04	No.of Credits:02
L:T:P:0-0-4	
InternalAssessment Marks:10	Durationof SEE: 3 Hours
SemesterEndExamMarks:40	

Listof Experiments/Programs(ForaLab Course)

Experiments: minimum 12 experiments are to be performed for eligibility. (weekly two labs per section each of three hours duration)

1. Construction of Basic logic gates using diodes and transistor.
2. Verification of IC – logic gates OR (7432), AND(7408), NOT(7404),
3. NAND (7400), NOR (7402), X-OR (7486).
4. Verification of De' Morgan's theorems.
5. Realization of basic gates using universal gate –NOR
6. Realization of basic gates using universal gate –NAND
7. Construction of NAND, NOR latches.
8. Construction of RS flip-flop.
9. Construction of JK flip-flop.
- 10.Study of Multiplexer and using IC 74LS150.
- 11.Study of Demultiplexer using IC 74LS154
- 12.Four-bit binary counter using IC 7476
- 13.Construction of Full Adder&HalfAdder using IC7408,7432&7486

Course Title: Sensors & Industrial Instrumentation	CourseCode: 24MJEL4S
TotalContactHours: 60	No. of Credits: 04
Internal Assessment Marks: 20	Durationof SEE: 3 Hours
SemesterEndExamMarks: 80	

Course Outcomes (COs):

At the end of this course students will be able to:

1. Apply scientific principles for sensing various physical quantities.
2. Understand the operational details of sensors for measurements
3. Apply measurements techniques for instrumentation.

Unit	Description	Hours
1	<p>Introduction to Electronics Measurement and Instrumentation: 1 2 3 4 Transducers and sensors- Accuracy and precisions, types of errors, statistical analysis, probability of errors, limiting errors, sensitivity, linearity, hysteresis, resolution, reproducibility, transfer function. Analog Signal Conditioning: Signal conditioning, Loading effects, Bridges for measurement techniques, Attenuators and Amplifiers, Passive filters, Op-amp based signal conditioning circuits, Inverting and Non-Inverting Amplifiers, Linearization, Differential amplifiers and Instrumentation amplifiers.</p> <p>Temperature Sensors: Resistance Vs Temperature characteristics for different materials, Thermistors, Thermocouples - thermoelectric effects for thermocouples,</p>	14
2	<p>Pressure, force, displacement and weight measurement: 5 6 7 Capacitive and inductive transducers, Displacement Sensor (LVDT), Strain Sensors – strain gauges, its principle, applications, types of strain gauges, Load cells, Piezo-electric sensors, Motion sensors. Flow measurement: Basic principle of flow meter, Differential pressure flow meters, Variable area flow meter, Volumetric flow meter, Hotwire anemometer, Magnetic and ultrasonic flow meter, Rota meter, Hall effect transducer working and measurement</p>	16

	techniques. RF sensing: Basic principle of EM fields, Antenna, RFID, Near Field and Far Field Sensing, Radar and Navigation, EMI & EMC sensing	
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List of References:

1. Curtis D. Johnson, "Process Control Instrumentation Technology", Prentice Hall India.
2. D.V.S. Murty, "Transducers and Instrumentation", Prentice Hall India.
3. Helfrick Albert D. and Cooper W. D., "Modern Electronic Instrumentation and Measurement Techniques", Prentice Hall India.
4. Kalsi H. S. "Electronic Instrumentation", Tata McGraw-Hill Education.
5. Sawhney A. K. "A Course In Electrical and Electronics Measurements and Instrumentation", Dhan Patrai & Sons, 11th Ed., 1999.
6. Bell David A. "Electronic Instrumentation and Measurements", PHI / Pearson Education.
7. Mathew Sadiku, "Elements of Electromagnetics", PHI.

CourseTitle: ELECTRONIC COMMUNICATION System	CourseCode:24MJEL5L
TotalContactHours:55	No.of Credits: 04
L:T:P 4-0-0	
Internal Assessment Marks: 20	Durationof SEE:3 Hours
SemesterEndExamMarks:80	

Course Outcomes (CO's): After the successful completion of the course, the student will be able to:

1. Describe propagation of the Radio Engineering and its Fundamentals and transmissions lines.
2. Distinguish the characteristics of Modulationsand Demodulation techniques. Design of Modulators and demodulators (AM and FM).
3. Able to know the radio transmitters and receivers.

Unit	Description	Hou rs
1	Antennas and radio wave propagation Antenna requirements, antenna parameters, resonant antenna, dipole antenna, folded dipole antenna, reflectors, directors and yagi-uda antenna. EM theory- qualitative analysis of electromagnetic theory, Maxwell's equations,(no derivations) pointing theorem Propagation of radio waves, ionosphere-formation and composition, mechanism of radio wave propagation, different modes of radio wave propagation (qualitative analysis).Introduction to T- lines, Types of T- lines, distributed parameters of T- lines	11
2	Amplitude modulation (AM) &Frequency modulation (FM) Define modulation, Need for modulation, different types of modulations – AM, FM and PM, Expression for instantaneous voltage of AM waves, modulation index, frequency spectrum and bandwidth, power relation in AM waves, SSB transmission and its advantages. AM modulators - eitter modulator, base modulator and collector modulation. AM detectors- square law diode detector and linear diode detector. Advantages of FM over AM, Expression for instantaneous voltage of frequency modulated wave, modulation index and international standards on FM broadcasting. FM modulator - varactor diode modulator and theory of FET reactance modulator, FM detectors- slop detector, balanced slop detector and Foster-seelay discriminator.	11
3	Transmitters and Receivers	11

	Function of AM transmitters and FM transmitters with block diagrams, Receiver characteristics, AM-TRF receiver and super heterodyne receivers, need for Automatic gain control (AGC) circuit. FM super heterodyne receiver explanation with block diagram, comparison of AM & FM receivers. Experiments: paper –V (minimum 8 experiments to be performed)	
4	Monochrome & Colour TV: TV broad casting system, block diagram and function of monochrome TV transmitter & receiver, Scanning- aspect ratio, progressive, horizontal, vertical, & interlaced scanning, composite video signal, blanking and synchronizing pulses, channel band width, CCIR –B TV channels allotment of frequencies, Introduction, essentials of CTV , mixing of colours, additive & subtractive mixing, colour TV signals, luminance and chrominance signals, colour TV camera, colour sub carrier frequency, PAL colour TV system, PAL encoder & decoder, colour picture tube, block diagram & function of colour TV receiver, Camera tubes-introduction, types, construction, working and characteristics of vidicon and image orthicon camera tubes	11
5	Digital communication & Optic fibers & communication Introduction & basic digital communication, pulse modulation systems, PAM, PTM , PWM & PPM, Synchronous and Asynchronous transmission, probability of bit error, matched filter, Pulse code modulation systems, block diagram & working of PCM system, delta modulation, digital carrier systems, Block diagram & function of ASK, FSK, PSK, QPSK & DPSK Introduction, block diagram & function of optical communication system, advantages of optical communication, optical fiber & cable, types of optical fibers, modes of propagation, step index & graded index fiber, single and multimode fibers, propagation of light within a fiber Launching angle expression for numerical aperture(NA) , fiber materials	11
1. References: <ol style="list-style-type: none"> 1) Electronic Communication Systems – George Kennedy,. 2) Electronic Communication – Sanjeev Gupta. 3) Electronic Communication – Roddy and Coolen. 4) Radio Engineering – GK Mittal. 5) Handbook of Electronics – Gupta and Kumar. 6) Basic television – Vernod Grob. 7) TV Fundamentals – ADhake. 8) Basic TV Transmission and Reception – AK Maini. 		

CourseTitle: ELECTRONICS COMMUNICATION SystemLAB	CourseCode:24MJEL5P
TotalContactHours:04	No.of Credits:02
L:T:P:0-0-4	
InternalAssessmentMarks: 10	Durationof SEE: 3 Hours
SemesterEndExamMarks:4 0	

Experiments: paper-V(minimum8experimentstobeperformed)

1. Linear Ramp Generator using UJT.
2. Construction of Astable Multivibrator using IC 555.
3. Schmitt Trigger using IC 555.
4. Construction of Mono and Bi stable Multivibrator using IC 741.
5. Two Stage RC Coupled Amplifier-Frequency Response.
6. Amplitude Modulator using Transistor.
7. AM Detector using Linear Diode Detector.
8. IF Amplifier.
9. Study of Pre-Emphasis and De-Emphasis Circuits.
10. Frequency Response of Loud Speaker.
11. Study of Characteristics of Receiver–Sensitivity, Selectivity and Fidelity.
12. Double Tuned Amplifier.
13. Study of AGC Circuit (in AM detector).
14. Frequency Response of Microphone.

CourseTitle: Mobile Communication	CourseCode:24MJEL5E
TotalContactHours:30	No.of Credits: 02
Internal Assessment Marks: 10	Durationof SEE:2 Hours
SemesterEndExamMarks:40	

Course Outcomes:

- Demonstrate knowledge of cellular concepts of frequency reuse,GSM,HDMA,CDMA
- Demonstrate knowledge hand of interface and apply the concept to calculate link budget using loss model
- Demonstrate knowledge equalization and different diversity techniques
- Compare different multiple access techniques in mobile communication

Unit	Description	Hours
1	History of wireless communication, Evolution of Mobile Communication, Mobile and Wireless devices. A market for mobile communications. A simplified reference model for mobile communications, Large scale path loss: propagation models, reflection, P a g e 21 33 diffraction, scattering, practical link budget design using path loss model. Wirelesstransmission: A brief introduction of frequencies for radio transmission, signals propagation, Multiplexing, Modulation, spread spectrum, cellular system, Frequency reuse, channel assignment strategies, handoff strategies, interference and system capacity, improving coverage and capacity in cellular systems, Small scale fading & multipath propagation and measurements, impulse response model and parameters of multipath channels, types of fading, theory of multi-path shape factor for fading wireless channels.	
2	Spread spectrum modulation techniques: Pseudo-noise sequence, direct sequence spread spectrum (DS-SS), frequency hopped spread spectrum(FHSS), performance of DS-SS, performance of FH-SS, modulation performance in fading and multipath channels, fundamentals of equalisation, equaliser in communication receiver, survey of equalisation techniques, linear equaliser, linear equaliser, non-linear equalisation, diversity techniques, RAKE receiver. Medium Access Control: Introduction to MAC, Telecommunication systems, GSM, DECT, TETRA, UMTS & IMT-2000 UNIT-III Satellite System: Review of the System, Broadcast System-Review. Wireless LAN: IEEE 80211 Protocol, System Architecture, Protocol Architecture, Physical Layer & MAC Layer, Newer developments, Hiper LAN, Bluetooth Technology, Introduction to wireless networks, 2G, 3G wireless systems, wireless standards.	

CourseTitle: Microprocessor & Microcontroller	CourseCode:24MJEL6L
TotalContactHours:55	No.of Credits: 04
L:T:P 4-0-0	
Internal Assessment Marks: 20	Durationof SEE:3 Hours
SemesterEndExamMarks:80	

Course Outcomes (CO's): After the successful completion of the course, the student will be able to: □

1. Observe circuit connections and their Behavior with programming.
2. Study of various programs and their hands on response.
3. Study of various interfacing devices with 8085 and their response.
4. Able to interface the various devices to 8051 microcontroller
5. Student to able to study and write the programs and applications.

Unit	Descriptin	Hours
1	Converters Data converters- D to A converters-Binary weighted resister network and R-2R ladder network. A to D converters- Dual slope integrating type, successive approximation method, flash converter, resolution and accuracy for the above converters.	08
2	8085Microprocessor & Interfacing Introduction to 8085 based microcomputer system, 8085 MPU, Architecture and pin configuration of 8085, Flags and special purpose registers. Instruction and timings- instruction classification, instruction format, instruction timing and operation status, instruction set, addressing mode and groups, instruction cycle. Programs on Data transfer instruction, arithmetic operation, logic operation, branch operation, flow chart and executing, writing assembly language programs. Need of interfacing devices, parallel and serial interfacing, PPI 8255, USART8251	12
3	8051Microcontroller Microcontroller and embedded processors, overview of 8051 family, 8051 architecture, registers and memories in 8051, register banks, flag bits, PSW register, data types, JUMP, LOOP and CALL instructions.	12
4	8051 Addressing modes and Instruction set	11

	I/O programming of 8051- I/O programming, bit manipulation, addressing modes, arithmetic, logical and single bit instructions and programming.	
5	8051 Timer/Counter Programming and Interfacing 8051 Timer/Counter programming, TCON register, Baud rate and Interrupts in 8051, stepper motor description and stepper motor interfacing via ULN2003, interfacing of ADC and DAC to 8051	11

References:

1. .Modern Digital Electronics – RP Jain,
2. Digital Principles & applications – AP Malvino,
3. .Microprocessor – Architecture, Programming and applications- RA Goankar .
4. Fundamentals of Microprocessors and Microcontrollers – B Ra, Dhanpat Rai
5. .Microprocessors and Digital Systems – DV Hall.
6. The 8051 Microcontroller and embedded systems- Ali Mazidi and Janice Mazidi
7. 8051 microcontroller architecture, programming and applications – KJ Ayala
8. Microcontrollers (Theory and applications) – Ajay V Deshmukh

CourseTitle: Microprocessor & Microcontroller LAB	CourseCode:24MJEL6P
TotalContactHours:04	No. of Credits:02
L:T:P:0-0-4	
InternalAssessmentMarks:25	Durationof SEE: 3Hours
SemesterEndExamMarks:25	

Course Outcomes (CO's): After the successful completion of the course, the student will be able to: □

1. Observe circuit connections and their Behaviour with programming.
2. Study of various programs and their hands-on response. □
3. Study of various interfacing devices with 8051 and their response. □
4. Study of different IC's, sensors, filters, and amplifiers.

Experiments: paper –VI (minimum 8 experiments to be performed)

1. Construction of DAC using R-2R ladder network.
2. Transfer of Data from various registers of 8085.
3. 1's and 2's Complements of 8-bit numbers using 8085
4. Addition and Subtraction of two 8-bit numbers using 8085
5. Addition of two 16-bit numbers using 8085
6. Larger among two hexadecimal numbers using 8085
7. Smaller among two hexadecimal numbers using 8085
8. Arranging the numbers in ascending order using 8085
9. Arranging the numbers in descending order using 8085
10. Finding the square root of a number using 8085
11. Interfacing 8-bit DAC and generating different waveforms.
12. Interfacing 7- segment LED display and display of alphanumeric characters.
13. Interfacing 8-bit ADC.
14. 1's and 2's Complements of 8-bit numbers using 8051 microcontroller
15. Addition and Subtraction of two 8-bit numbers using 8051 microcontroller
16. Addition of two 16-bit numbers using 8051 microcontroller

17. Larger among two hexadecimal numbers using 8051 microcontroller 1
18. Smaller among two hexadecimal numbers using 8051 microcontroller
19. .Seven segment LED Interfacing with Intel 8051 microcontroller through PPI.
20. Relay Interfacing with Intel 8051 microcontroller through PPI

CourseTitle: VLSI & EMBEDDED SYSTEM	CourseCode:24MJEL6E
TotalContactHours:30	No.of Credits: 04
Internal Assessment Marks: 10	Durationof SEE:3 Hours
SemesterEndExamMarks:40	

Course Outcomes:

1. To understand CMOS and its applications in VLSI Circuits
2. Understand VLSI design Flow
3. Design any digital circuit using VHDL
4. Understand the importance of testability in chip design

Unit	Description	Hours
1	Environment for VLSI Technology : Clean room and safety requirements. Wafer cleaning processes and wet chemical etching techniques. Impurity incorporation: Solid State diffusion modelling and technology; Ion Implantation modelling, technology and damage annealing; characterisation of Impurity profiles. Oxidation : Kinetics of Silicon dioxide growth both for thick, thin and ultrathin films. Oxidation technologies in VLSI and ULSI; Characterisation of oxide films; High k and low k dielectrics for ULSI. Lithography : Photolithography, E-beam lithography and newer lithography techniques for VLSI/ULSI; Mask generation. Chemical Vapour Deposition techniques : CVD techniques for deposition of polysilicon, silicon dioxide, silicon nitride and metal films; Epitaxial growth of silicon; modelling and technology. Metal film deposition : Evaporation and sputtering techniques. Failure mechanisms in metal interconnects; Multi-level metallisation schemes. Plasma and Rapid Thermal Processing: PECVD, Plasma etching and RIE techniques; RTP techniques for annealing, growth and deposition of various films for use in ULSI. Process integration for NMOS, CMOS and Bipolar circuits; Advanced MOS technology.	18
2	Introduction to Embedded systems design: Introduction to Embedded system, Embedded System Project Management, ESD and Codesign issues in System development Process, Design cycle in the development phase for an embedded system, Use of target system or its emulator and In-circuit emulator, Use of software tools for development of an ES.	12

References:

1. Embedded Systems by Raj Kamal, TMH, 2006.
2. The 8051 Microcontroller by K Ayala, 3rd Ed., Thomson Delmar Learning, 2007.
3. S.K. Ghandhi, VLSI Fabrication Principles, John Wiley Inc., New York, 1994(2nd Edition).
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