SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

COURSE STRUCTURE & SYLLABUS
M.Tech ECE VLSI System Design

(Applicable for batches admitted from 2023-2024)

... Empowering Minds

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY (A)

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

I Semester

S.No	Course No	Course Name	Subject Codes	Category	L	T	P	Credits
1	PC	CMOS Analog IC Design	M23EC11		3	0	0	3
2	PC	CMOS Digital IC design	M23EC12		3	0	0	3
3	PE	1. VLSI Technology 2. Nanomaterials and Nanotechnology 3. MEMS Technology	M23EC13A M23EC13B M23EC13C		3	0	0	3
4	PE	1. Device Modeling 2.Nano-electronics 3.Photonics	M23EC14A M23EC14B M23EC14C		3	0	0	3
5		Research methodology and IPR	M23EC15		2	0	0	2
6	Lab 1	CMOS Analog IC Design Lab	M23EC16		0	0	4	2
7	Lab 2	CMOS Digital IC Design Lab	M23EC17		0	0	4	2
8	Aud 1	Audit course-1	M23EC18		2	0	0	0
				Total				18

II Semester

S.No	Course No	Course Name	Subject Codes	Category	L	T	P	Credits
1	PC	Mixed Signal & RF IC Design	M23EC21		3	0	0	3
2	PC	Physical Design Automation	M23EC22		3	0	0	3
3	PE	1. Design For Testability 2. IOT & its Applications 3. VLSI Signal Processing	M23EC23A M23EC23B M23EC23C		3	0	0	3
4	PE	1.Network Security & Cryptography 2.Microcontrollers & programmable Digital Signal Processors 3. Low Power VLSI Design	M23EC24A M23EC24B M23EC24C		3	0	0	3
5	Lab 1	Mixed Signal IC Design Lab	M23EC25		0	0	4	2
6	Lab 2	Physical Design Automation Lab	M23EC26		0	0	4	2
7	MP	Mini Project	M23EC27		0	0	4	2
8	Aud 2	Audit Course – 2	M23EC28		2	0	0	0
				Total				18

*Students be encouraged to go to Industrial Training/Internship for at least 2-3 weeks during semester break.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

III Semester*								
S.No	**Course No**	**Course Name**	**Subject Codes**	**Category**	**L**	**T**	**P**	**Credits**
1	PE	1. Scripting Languages for VLSI 2. Digital System Design & Verification 3. Hardware Software co-design	M23EC31A M23EC31B M23EC31C		3	0	0	3
2	OE	1. Business Analytics 2. Industrial Safety 3. Operations Research 4. Cost Management of Engineering Projects 5. Composite Materials 6. Waste to Energy	M23EC32A M23EC32B M23EC32C M23EC32D M23EC32E M23EC32F		3	0	0	3
3	Dissertation	Dissertation Phase -I /Industrial Project **(to be continued and evaluated next semester)**	M23EC33		0	0	20	10#
				Total				16

#Evaluated and Displayed in IV Semester Marks list.

*Students going for Industrial Project/Thesis will complete these courses through MOOCs

IV Semester								
S.No	**Course No**	**Course Name**	**Subject Codes**	**Category**	**L**	**T**	**P**	**Credits**
1	Dissertation	Project/ Dissertation Phase-II **(continued from III semester)**	M23EC41		0	0	32	16
				Total				16

Audit Course 1& 2

1. English for Research Paper Writing
2. Disaster Management
3. Sanskrit for Technical Knowledge
4. Value Education
5. Constitution of India
6. Pedagogy Studies
7. Stress Management by Yoga
8. Personality Development through Life Enlightenment Skills

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

I Year – I Semester		L	P	C
		3	0	3

CMOS Analog IC Design

Course objectives:

- This course focuses on theory, analysis and design of analog integrated circuits in both Bipolar and Metal-Oxide-Silicon (MOS) technologies.
- Basic design concepts, issues and tradeoffs involved in analog IC design are explored.
- Intuitive understanding and real-life applications are emphasized throughout the course.
- To learn about Design of CMOS Op Amps, Compensation of Op Amps, Design of Two-Stage Op Amps, Power Supply Rejection Ratio of Two-Stage Op Amps, Cascade Op Amps, Measurement Techniques of OP Amp.
- To know about Characterization of Comparator, Two-Stage, Open-Loop Comparators, Improving the Performance of Open-Loop Comparators, Discrete-Time Comparators etc.

UNIT -I

Basic MOS Device Physics – General Considerations, MOS I/V Characteristics, Second Order effects, MOS Device models. Short Channel Effects and Device Models. Single Stage Amplifiers – Basic Concepts, Common Source Stage, Source Follower, Common Gate Stage, Cascode Stage.

UNIT -II:

Differential Amplifiers – Single Ended and Differential Operation, Basic Differential Pair, CommonMode Response, Differential Pair with MOS loads, Gilbert Cell. Passive and Active Current Mirrors– Basic Current Mirrors, Cascode Current Mirrors, Active Current Mirrors.

UNIT -III:

Frequency Response of Amplifiers – General Considerations, Common Source Stage, SourceFollowers, Common Gate Stage, Cascode Stage, Differential Pair. Noise – Types of Noise, Representation of Noise in circuits, Noise in single stage amplifiers, Noise in Differential Pairs.

UNIT -IV:

Feedback Amplifiers – General Considerations, Feedback Topologies, Effect of Loading.OperationalAmplifiers – General Considerations, One Stage Op Amps, Two Stage Op Amps, Gain Boosting,Common – Mode Feedback, Input Range limitations, Slew Rate, Power Supply Rejection, Noise in Op Amps. Stability and Frequency Compensation.

UNIT -V:

Characterization of Comparator, Two-Stage, Open-Loop Comparators, Other Open-Loop Comparators, Improving the Performance of Open-Loop Comparators, Discrete-Time Comparators.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

Text Books:

1. B.Razavi, "Design of Analog CMOS Integrated Circuits", 2nd Edition, McGraw Hill Edition2016.
2. Paul. R.Gray& Robert G. Meyer, "Analysis and Design of Analog Integrated Circuits", Wiley, 5th Edition, 2009.

Reference Books:

1. T. C. Carusone, D. A. Johns & K. Martin, "Analog Integrated Circuit Design", 2nd Edition,Wiley, 2012.
2. P.E.Allen&D.R. Holberg, "CMOS Analog Circuit Design", 3rd Edition, Oxford University Press, 2011.
3. R. Jacob Baker, "CMOS Circuit Design, Layout, and Simulation", 3rd Edition, Wiley, 2010.
4. Recent literature in Analog IC Design.

Course Outcomes:

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

- Design MOSFET based analog integrated circuits.
- Analyze analog circuits at least to the first order.
- Appreciate the trade-offs involved in analog integrated circuit design.
- Understand and appreciate the importance of noise and distortion in analog circuits.
- Analyze complex engineering problems critically in the domain of analog IC design for conducting research.
- Solve engineering problems for feasible and optimal solutions in the core area of analog ICs.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

I Year – I Semester		L	P	C
		3	0	3

CMOS Digital IC Design

Course objectives:

- To understand the fundamental properties of digital Integrated circuits using basic MOSFET equations and to develop skills for various logic circuits using CMOS related design styles.
- The course also involves analysis of performance metrics.
- To teach fundamentals of CMOS Digital integrated circuit design such as importance of Pseudo logic, Combinational MOS logic circuits, and Sequential MOS logic circuits.
- To teach the fundamentals of Dynamic logic circuits and basic semiconductor memories which are the basics for the design of high performance digital integrated circuits.

UNIT-I: MOS Design

Pseudo NMOS Logic – Inverter, Inverter threshold voltage, Output high voltage, Output Low voltage, Gain at gate threshold voltage, Transient response, Rise time, Fall time, Pseudo NMOS logic gates, Transistor equivalency, CMOS Inverter logic.

UNIT-II: Combinational MOS Logic Circuits:

MOS logic circuits with NMOS loads, Primitive CMOS logic gates – NOR & NAND gate, Complex Logic circuits design – Realizing Boolean expressions using NMOS gates and CMOS gates, AOI and OAI gates, CMOS full adder, CMOS transmission gates, Designing with Transmission gates.

UNIT-III: Sequential MOS Logic Circuits

Behaviour of bistable elements, SR Latch, Clocked latch and flip flop circuits, CMOS D latch and edge triggered flip-flop.

UNIT-IV: Dynamic Logic Circuits

Basic principle, Voltage Bootstrapping, Synchronous dynamic pass transistor circuits, Dynamic CMOS transmission gate logic, High performance Dynamic CMOS circuits.

UNIT-V: Semiconductor Memories

Types, RAM array organization, DRAM – Types, Operation, Leakage currents in DRAM cell and refresh operation, SRAM operation Leakage currents in SRAM cells, Flash Memory- NOR flash and NAND flash.

Text Books:

1. Digital Integrated Circuit Design – Ken Martin, Oxford University Press, 2011.
2. CMOS Digital Integrated Circuits Analysis and Design – Sung-Mo Kang, Yusuf Leblebici,TMH, 3rd Ed., 2011.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

Reference Books:

1. Introduction to VLSI Systems: A Logic, Circuit and System Perspective – Ming-BO Lin, CRC Press, 2011
2. Digital Integrated Circuits – A Design Perspective, Jan M. Rabaey, Anantha Chandrakasan Borivoje Nikolic, 2nd Ed., PHI.

Course Outcomes:

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

- Demonstrate advanced knowledge in Static and dynamic characteristics of CMOS, Alternative CMOS Logics, Estimation of Delay and Power, Adders Design.
- Classify different semiconductor memories.
- Analyze, design and implement combinational and sequential MOS logic circuits.
- Analyze complex engineering problems critically in the domain of digital IC design for conducting research.
- Solve engineering problems for feasible and optimal solutions in the core area of digital ICs.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

I Year – I Semester		L	P	C
		3	0	3

VLSI Technology
(Elective I)

UNIT 1: MOS Transistors

Introduction, The Structure of MOS Transistors, The Fluid Model, The MOS Capacitor, The MOS Transistor, Modes of Operation of MOS Transistors, Electrical Characteristics of MOS Transistors, Threshold Voltage, Transistor Trans conductance g_m, Figure of Merit, Body Effect, Channel-Length Modulation, MOS Transistors as a Switch, Transmission Gate

UNIT 2: MOS Fabrication Technology

Introduction, Basic Fabrication Processes, Wafer Fabrication, Oxidation, Mask Generation, Photolithography, Diffusion, Deposition. N-MOS Fabrication Steps, CMOS Fabrication Steps, n-Well Process, p-Well Process, Twin-Tub Process, Latch-Up Problem and Its Prevention, Use of Guard Rings, Use of Trenches, Short-Channel Effects-Channel Length Modulation Effect. Drain-Induced Barrier Lowering, Channel Punch Through, Hot carrier effect, Velocity Saturation Effect

UNIT 3: Layout Design Rules

Scaling Theory, Scalable CMOS Design Rules, CMOS Process Enhancements, Transistors, Interconnects, Circuit Elements, Efficient layout Design techniques

UNIT 4: Combinational Logic Networks

Layouts for logic networks. Delay through networks. Power optimization.Switch logic networks. Combinational logic testing

UNIT 5: Sequential Systems

Memory cells and Arrays, clocking disciplines, sequential circuit Design, Performance Analysis,Power optimization, Design validation and testing.

Text Books:

1. Principals of CMOS VLSI Design-N.H.EWeste, K. Eshraghian, 2nd Edition, Addison Wesley.

2. CMOS Digital Integrated Circuits Analysis and Design – Sung-Mo Kang, Yusuf Leblebici, TMH, 3rd Ed., 2011.

3. Low-Power VLSI Circuits and Systems,Ajit Pal, SPRINGER PUBLISHERS

4. Modern VLSI Design – Wayne Wolf, 3rd Ed., 1997, Pearson Education.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

Reference Books:

1. Digital Integrated Circuit Design – Ken Martin, Oxford University Press, 2011.

2. Digital Integrated Circuits – A Design Perspective, Jan M. Rabaey, AnanthaChandrakasan, Borivoje Nikolic, 2nd Ed., PHI.

Course outcomes

At the end of the course the student able to

- Understand the basics of MOS transistors and also the characteristics of MOS transistors.
- Learn about the MOS fabrication process and short channel effects.
- Learn about the basic rules in layout designing.
- Analyse various combinational logic networks and sequential systems.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

I Year – I Semester		L	P	C
		3	0	3

Nanomaterials & Nanotechnology
(Elective I)

UNIT I

Introduction of nano materials and nanotechnologies, Features of nanostructures, Applications of nano materials and technologies. Nano dimensional Materials 0D, 1D, 2D structures – Size Effects – Fraction of Surface Atoms –Specific Surface Energy and Surface Stress – Effect on the Lattice Parameter – Phonon Density of States – the General Methods available for the Synthesis of Nanostructures – precipitate – reactive– hydrothermal/solvo thermal methods – suitability of such methods for scaling – potential Uses.

UNIT II

Fundamentals of nano materials, Classification, Zero-dimensional nano materials, One-dimensional nano materials, Two-dimensional nano materials, Three dimensional nano materials. Low-Dimensional Nano materials and its Applications, Synthesis, Properties, and Applications of Low-Dimensional Carbon-Related Nano materials.

UNIT III

Micro- and Nanolithography Techniques, Emerging Applications Introduction to Micro electro mechanical Systems (MEMS), Advantages and Challenges of MEMS, Fabrication Technologies, Surface Micromachining, Bulk Micromachining, Molding. Introduction to Nano Phonics.

UNIT IV

Introduction, Synthesis of CNTs - Arc-discharge, Laser-ablation, Catalytic growth, Growth mechanisms of CNT‟s - Multi-walled nano tubes, Single-walled nano tubes Optical properties of CNT‟s, Electrical transport in perfect nano tubes, Applications as case studies. Synthesis and Applications of CNT's.

UNIT V

Ferroelectric materials, coating, molecular electronics and nano electronics, biological and environmental, membrane based application, polymer based application.

Text Books:

1. Kenneth J. Klabunde and Ryan M. Richards, “Nanoscale Materials in Chemistry”, 2nd edition,John Wiley and Sons, 2009.
2. I Gusev and A ARempel, “Nanocrystalline Materials”, Cambridge International Science Publishing, 1st Indian edition by Viva Books Pvt. Ltd. 2008.
3. B. S. Murty, P. Shankar, Baldev Raj, B. B. Rath, James Murday, “Nanoscience and Nanotechnology”, Tata McGraw Hill Education 2012.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

Reference Books:

1. Bharat Bhushan, "Springer Handbook of Nanotechnology", Springer, 3rd edition, 2010.
2. Kamal K. Kar, "Carbon Nanotubes: Synthesis, Characterization and Applications", Research Publishing Services; 1 st edition, 2011, ISBN-13: 978-9810863975.

Course Outcomes:

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

- To understand the basic science behind the design and fabrication of nano scale systems.
- To understand and formulate new engineering solutions for current problems and competing technologies for future applications.
- To be able make inter disciplinary projects applicable to wide areas by clearing and fixing the boundaries in system development.
- To gather detailed knowledge of the operation of fabrication and characterization devices to achieve precisely designed systems

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

I Year – I Semester		L	P	C
		3	0	3

MEMS Technology
(Elective I)

UNIT-I: Introduction to MEMS

Introduction to MEMS & Real world Sensor/Actuator examples (DMD, Air-bag, pressure sensors). MEMS Sensors in Internet of Things (IoT), Bio-Medical Applications

UNIT-II: MEMS Materials and Their Properties

Materials (eg. Si, SiO2, SiN, Cr, Au, Ti, SU8, PMMA, Pt); Important properties: Young modulus, Poisson‟s ratio, density, piezo-resistive coefficients, TCR, Thermal Conductivity, Material Structure. Understanding Selection of materials based on applications.

UNIT-III: MEMS Fab Processes – 1

Understanding MEMS Processes & Process parameters for: Cleaning, Growth &Deposition, Ion Implantation & Diffusion, Annealing, Lithography. Understanding selection of Fab processes based on Applications.

UNIT-IV: MEMS Fab Processes – 2

Understanding MEMS Processes & Process parameters for: Wet & Dry etching, Bulk& Surface Micromachining, Die, Wire & Wafer Bonding, Dicing, Packaging. Understanding selection of Fab processes based on Applications

UNIT-V: MEMS Devices

Architecture, working and basic quantitative behaviour of Cantilevers, Micro heaters, Accelerometers, Pressure Sensors, Micro mirrors in DMD, Inkjet printer-head. Understanding steps involved in Fabricating above devices

Text Books:

1. An Introduction to Micro electromechanical Systems Engineering; 2nd Ed - by N.Maluf, K Williams; Publisher: Artech House Inc
2. Practical MEMS - by Ville Kaajakari; Publisher: Small Gear Publishing
3. Micro system Design - by S. Senturia; Publisher: Springer

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

Reference Books:

1. Analysis and Design Principles of MEMS Devices - MinhangBao; Publisher:Elsevier Science.
2. Fundamentals of Micro fabrication - by M. Madou; Publisher: CRC Press; 2 edition
3. Micro Electro Mechanical System Design - by J. Allen; Publisher: CRC Press
4. Micro machined Transducers Sourcebook - by G. Kovacs; Publisher: McGraw-Hill

Course Outcomes:

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

- To understand the basic concepts of MEMS technology and working of MEMS devices.
- To understand and selecting different materials for current MEMS devices and competing Technologies for future applications
- To understanding the concepts of fabrication process of MEMS, Design and Packaging Methodology.
- To analyze the various fabrication techniques in the manufacturing of MEMS Devices.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

I Year – I Semester		L	P	C
		3	0	3

Device Modelling
(Elective II)

UNIT I

2-terminal MOS device: threshold voltage modelling (ideal case as well as considering the effects of Qf, Φms and Dit.).

UNIT II

C-V characteristics (ideal case as well as taking into account the effects of Qf, Φms and Dit);MOS capacitor as a diagnostic tool (measurement of non-uniform doping profile, estimation of Qf, Φms and Dit)

UNIT III

4-terminal MOSFET: threshold voltage (considering the substrate bias); above threshold I-V modelling (SPICE level 1,2,3 and 4).

UNIT IV

Sub threshold current model; scaling; effect of threshold tailoring implant (analytical modelling of threshold voltage using box approximation); buried channel MOSFET. Short channel, DIBL and narrow width effects; small signal analysis of MOSFETs (Meyer‟smodel)

UNIT V

SOI MOSFET: basic structure; threshold voltage modelling Advanced topics: hot carriers in channel; EEPROMs; CCDs; high-K gate dielectrics.

Text Books:

1. D.G.Ong , “Modern MOS Technology: Processes, Devices and Design”, McGraw Hill,1984.
2. Y.Taur and T.H.Ning, “Fundamentals of modern VLSI Devices” Cambridge Univ. Press,1998.
3. S.M.Sze, “Physics of Semiconductor Devices” Wiley,1981.

Course Outcomes:

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

- To understand the physics of 2-terminal MOSoperation and its characteristics
- To understand the physics of 4-terminal MOSFEToperation and its characteristics
- To analyze the SOI MOSFET electrical characteristics

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

I Year – I Semester		L	P	C
		3	0	3
Nanoelectronics (Elective II)				

UNIT I

Properties of Individual Nanoparticles: Introduction, Metal Nano Clusters, Semiconducting Nanoparticles, Rare Gas and Molecular Clusters, Methods of Synthesis.

UNIT II

The nanoscale MOSFET, FinFETs, Vertical MOSFETs, limits to scaling, system integration limits (interconnect issues etc.), Resonant Tunnelling Transistors.

Carbon NanoStructures: Introduction, Carbon Molecules, Carbon Clusters, Carbon Nano Tubes, Application of Carbon Nanotubes.

UNIT III

Carbon Nanotubes for Data Processing – Introduction, Electronic Properties, Synthesis of Carbon Nanotubes, Carbon Nanotube Interconnects, Carbon Nanotubes Field Effect Transistors (CNTFETs), Nanotubes for Memory Applications, Prospects of an All-CNT Nanoelectronics.

Neuroelectronic Interfacing: Semiconductor Chips with Ion Channels, Nerve Cells, and Brain: Introduction, Iono-Electronic Interface, Neuron-Silicon Circuits, Brain-Silicon Chips.

UNIT IV

Optical 3-D Time-of-Flight Imaging System: Introduction, Taxonomy of Optical 3-D Techniques, CMOS Imaging, CMOS 3-D Time-of-Flight Image Sensor, Application Examples

Pyroelectric Detector Arrays for IR Imaging: Introduction, Operation Principle of Pyroelectric IR Detectors, Pyroelectric Materials, Realized Devices, Characterization, and Processing Issues

UNIT V

Electronic Noses: Introduction, Operating Principles of Gas Sensor Elements, Electronic Noses, Signal Evaluation, Dedicated Examples. 2-D Tactile Sensors and Tactile Sensor Arrays: Introduction, Definitions and Classifications, Resistive Touch screens, Ultrasonic Touch screens, Robot Tactile Sensors, Fingerprint Sensors

Text Books:

1. Introduction to Nanotechnology, C.P. Poole Jr., F.J. Owens, Wiley (2003),
2. Nano electronics and Information Technology (Advanced Electronic Materials and Novel Devices), WaserRanier ,Wiley-VCH,2003

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

Reference Books:

1. Nanosystems, K.E. Drexler,Wiley (1992).
2. The Physics of Low-Dimensional Semiconductors, John H. Davies, “Cambridge University Press, "1998

Course Outcomes:

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

- To understand and challenges due to scaling on CMOS devices
- To analyze and explain working of novel MOS based silicon devices and various multi gate devices.
- To understand working of spin electronic devices
- To understand nanoelectronic systems and building blocks such as: low dimensional semiconductors, heterostructures, carbon nanotubes, quantum dots, nano wires etc.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

I Year – I Semester		L	P	C
		3	0	3

PHOTONICS
(Elective II)

UNIT - I: Laser systems

General description, Laser structure, Single mode laser theory, Excitation mechanism andworking of: CO2, Nitrogen, Argon ion, Excimer, X-ray, Free-electron, Dye, Nd:YAG,Alexanderite and Ti:sapphire lasers, Diode pumped solid state laser, Optical parametricoscillator (OPO) lasers. Optical amplifiers- Semiconductor optical amplifiers, Erbium dopedwaveguide optical amplifiers, Raman amplifiers, Fiber Lasers. Laser Applications-Lasers inIsotope separation, Laser interferometry and speckle metrology, Velocity measurements.

UNIT - II: Properties of laser Radiation

Introduction, Laser linewidth, Laser frequency stabilization, Beam divergence, Beamcoherence, Brightness, Focusing properties of laser radiation, Q-switching, Methods of Q- switching:Rotating-mirror method, Electro-optic Q-switching, Acoustic-optic Q-switching and Passive Q-switching, Mode locking, Methods of mode locking: Active and passive modelocking techniques, Frequency doubling and Phase conjugation

UNIT - III: Opto-electronic Devices -I

Introduction, P-N junction diode, Carrier recombination and diffusion in P-N junction,Injection efficiency, Internal quantum efficiency, Hetero-junction, Double hetero-junction,Quantum well, Quantum dot and Super lattices; LED materials, Device configuration andefficiency.

UNIT - IV: Opto-electronic Devices -II

Light extraction from LEDs, LED structures-single heterostructures, doubleheterostructures, Device performances and applications, Quantum well lasers; Photodiodeand Avalanche photodiodes (APDs), Laser Diodes-Amplification, Feedback and oscillation,Power and efficiency, Spectral and spatial characteristics.

UNIT – V: Modulation of Light

Introduction, Birefringence, Electro-optic effect, Pockels and Kerr effects, Electro-opticPhasemodulation, Electro-optic amplitude modulation, Electro-optic modulators: scanning and switching, Acousto-optic effect, Acousto-optic modulation, Raman-Nath and Bragg modulators: deflectors and spectrum analyzer, Magneto-optic effect, Faraday rotator as anoptical isolator. Advantages of optical modulation.

Text books:

1. Lasers: Principles and applications by J.WilsonAndJ.F.B.Hawkes, Prentice, Hall of India, New Delhi, 1996.
2. Laser fundamentals, W.T.Silfvast, Foundation books, New Delhi, 1999.
3.Semi conductoropto electronics devices, P. Bhattacharya, Prentice – Hall of India, New Delhi, 1995.17

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

Reference Books:

1. Optical fiber communications, John M. Senior, Prentice-Hall of India, New Delhi, 2001
2. Optoelectronics: An Introduction, J.WilsonAndJ.F.B.Hawkes, Prentice-Hall of India, New Delhi, 1996.
3.Electro-Optical devices, M.A. Karim, Boston, Pws-Kent Publishers, 1990

Course Outcomes:

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

- Classify the Optical sources and detectors and to discuss their principle.
- Familiar with Design considerations of fiber optic systems.
- To perform characteristics of optical fiber, sources and detectors, design as well as conduct experiments in software and hardware, analyze the results to provide valid conclusions.
- apply the principles of atomic physics to materials used in optics and photonics;
- calculate properties of and design modern optical fibres and photonic crystals;
- use the tools, methodologies, language and conventions of physics to test and communicate ideas and explanations;
- integrate several components of the course in the context of a new situation (unique to postgraduate coursework).

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

I Year – I Semester		L	P	C
		3	0	3

Research Methodology & IPR (Elective II)

Unit 1:
Meaning of research problem, Sources of research problem, Criteria Characteristics ofa good research problem, Errors in selecting a research problem, Scope and objectives ofresearch problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations

Unit 2:
Effective literature studies approaches, analysis Plagiarism, Research ethics. Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee

Unit 3:
Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process ofPatenting and Development: technological research, innovation, patenting, development.International Scenario: International cooperation on Intellectual Property. Procedure for grantsof patents, Patenting under PCT.

Unit 4:
Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patentinformation and databases. Geographical Indications.

Unit 5:
New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies,IPR and IITs.

Text Books:

1. Stuart Melville and Wayne Goddard, “Research methodology: an introduction for science & engineering students“”
2. Wayne Goddard and Stuart Melville, “Research Methodology: An Introduction”
3. Ranjit Kumar, 2nd Edition , “Research Methodology: A Step by Step Guide for beginners”
4. Halbert, “Resisting Intellectual Property”, Taylor & Francis Ltd ,2007.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

Reference Books:

1. Mayall , "Industrial Design", McGraw Hill, 1992.
2. Niebel , "Product Design", McGraw Hill, 1974.
3. Asimov , "Introduction to Design", Prentice Hall, 1962.
4. Robert P. Merges, Peter S. Menell, Mark A. Lemley, " Intellectual Property in New
5. Technological Age", 2016.
6. T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008

Course Outcomes:

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

- Understand research problem formulation.
- Analyze research related information
- Follow research ethics
- Understand that today‟s world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.
- Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.
- Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

I Year – I Semester		L	P	C
		0	4	2

CMOS Analog IC Design Lab

- The students are required to design and implement any TEN Experiments using CMOS 130nm Technology with Mentor Graphics Tool/ Cadence/ Synopsys/Industry Equivalent Standard Software.
- The students are required to implement LAYOUTS of any SIX Experiments using CMOS 130nm Technology with Mentor Graphics Tool/ Cadence/ Synopsys/Industry Equivalent Standard Software. and Compare the results with Pre-Layout Simulation.

List of Experiments:

1. MOS Device Characterization and parametric analysis
2. Common Source Amplifier
3. Common Source Amplifier with source degeneration
4. Cascode amplifier
5. simple current mirror
6. cascode current mirror.
7. Wilson current mirror.
8. Differential Amplifier
9. Operational Amplifier
10. Sample and Hold Circuit
11. Direct-conversion ADC
12. R-2R Ladder Type DAC

Lab Requirements:
Software:
Mentor Graphics – Pyxis Schematic, IC Station, Calibre, ELDO Simulator
Hardware:
Personal Computer with necessary peripherals, configuration and operating System.

Course Outcomes:

1. Have the ability to explain the VLSI Design Methodologies using Mentor Graphics Tools
2. Grasp the significance of various cmos analog circuits in full-custom IC Design flow
3. Have the ability to explain the Physical Verification in Layout Design
4. Fully Appreciate the design and analyze of analog and mixed signal simulation
5. Grasp the Significance of Pre-Layout Simulation and Post-Layout Simulation

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

I Year – I Semester		L	P	C
		0	4	2

CMOS Digital IC Design Lab

- The students are required to design and implement the Circuit and Layout of any TEN Experiments using CMOS 130nm Technology with Mentor Graphics Tool/ Cadence/ Synopsys/Industry Equivalent Standard Software.

List of Experiments:

1. Inverter Characteristics.
2. NAND and NOR Gate
3. XOR and XNOR Gate
4. 2:1 Multiplexer
5. Full Adder
6. RS-Latch
7. Clock Divider
8. JK-Flip Flop
9. Synchronous Counter
10. Asynchronous Counter
11. Static RAM Cell
12. Dynamic Logic Circuits
13. Linear Feedback Shift Register

Lab Requirements:

Software:

Mentor Graphics Tool/ Cadence/ Synopsys/Industry Equivalent Standard Software

Hardware:

Personal Computer with necessary peripherals, configuration and operating System.

Course Outcomes:

1. Have the ability to explain the VLSI Design Methodologies using Mentor Graphics Tools
2. Grasp the significance of various design logic Circuits in full-custom IC Design.
3. Have the ability to explain the Physical Verification in Layout Extraction
4. Fully Appreciate the design and analyze of CMOS Digital Circuits
5. Grasp the Significance of Pre-Layout Simulation and Post-Layout Simulation

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

I Year – II Semester		L	P	C
		3	0	3

Mixed Signal & RF IC Design

Course Objectives:

- To understand the design of basic cells like Op-Amp, against process and temperature variations meeting the mixed signal specifications.
- To be able to design comparators that can meet the high speed requirements of digital circuitry.
- To be able to design a complete mixed signal system that includes efficient data conversion and RF circuits with minimizing switching.
- To understand the design bottlenecks specific to RF IC design, linearity related issues, and ISI.
- To have a comprehensive idea about different multiple access techniques, wireless standards and various transceiver architectures

UNIT -I

Basic Building Blocks, OpAmp, Capacitors, Switches, Non-overlapping Clocks, Basic Operation and Analysis, ResistorEquivalence of a Switched Capacitor, Parasitic-Sensitive Integrator,Parasitic-InsensitiveIntegrators, Signal-Flow-Graph Analysis, Noise in Switched-CapacitorCircuit

UNIT -II:

Ideal D/A Converter, Ideal A/D Converter, Quantization Noise, Deterministic Approach, Stochastic Approach, Signed Codes, Performance Limitations, Resolution, Offset and Gain
Error, Accuracy and Linearity
Integrating Converters, Successive-Approximation Converters, DAC-Based SuccessiveApproximation, Charge-Redistribution A/D, Resistor-Capacitor Hybrid, Speed Estimate forCharge-Redistribution Converters, Error Correction in Successive-Approximation Converters

UNIT -III:

Basic Phase-Locked Loop Architecture, Voltage Controlled Oscillator, Divider PhaseDetector, Loop Filer, The PLL in Lock, Linearized Small-Signal Analysis, Second-Order PLL Model,Limitations of the Second-Order Small-Signal Model, PLL Design Example, Jitter andPhase Noise, Period Jitter , P-Cycle Jitter, Adjacent Period Jitter, other SpectralRepresentations of Jitter, Probability Density Function of Jitter, Ring Oscillators , LCOscillators , phase Noise of Oscillators, jitter and Phase Noise in PLLS

UNIT -IV:

INTRODUCTION TO RF AND WIRELESS TECHNOLOGY: Complexity comparison, Design bottle necks, Applications, Analog and digital systems, Choice of Technology. BASICCONCEPTS IN RF DESIGN: Nonlinearity and time variance, ISI, Random process and noise, sensitivity and dynamic range, passive impedance transformation.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

UNIT -V:

Multiple Access: Techniques and wireless standards, mobile RF communication,FDMA, TDMA, CDMA, Wireless standards.
Transceiver Architectures: General considerations, receiver architecture, Transmitter Architecture, transceiver performance tests,case studies.
Amplifiers, Mixers And Oscillators: LNAs, down conversion mixers, CascadedStages, oscillators, Frequency synthesizers.

Text Books:

1. David A Johns, Ken Martin: Analog IC design, Wiley 2008.
2. R Gregorian and G C Temes: Analog MOS integrated circuits for signal processing, Wiley 1986

Reference Books:

1. Roubik Gregorian: Introduction to CMOS Op-amps and comparators, Wiley, 2008.
2. Behzad Razavi, RF Microelectronics Prentice Hall of India, 2001
3. Thomas H. Lee, The Design of CMOS Radio Integrated Circuits, Cambridge University Press.

Course Outcomes:

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

- Design basic cells like Op-Amp, against process and temperature variations meeting the mixed signal specifications
- Design comparators that can meet the high speed requirements of digital circuitry.
- Design a complete mixed signal system that includes efficient data conversion and RF circuits with minimizing switching.
- Understand the design bottlenecks specific to RF IC design, linearity related issues and ISI
- Comprehend different multiple access techniques, wireless standards and various transceiver architectures

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

I Year – II Semester		L	P	C
		3	0	3

Physical Design Automation

Course Objectives:

- To understand the relationship between design automation algorithms and various constraints posed by VLSI fabrication and design technology.
- To learn the design algorithms to meet the critical design parameters.
- To know the layout optimization techniques and map them to the algorithms
- To understand proto-type EDA tools and know how to test its efficacy

UNIT -I

VLSI design Cycle, Physical Design Cycle, Design Rules, Layout of Basic Devices, and Additional Fabrication, Design styles: full custom, standard cell, gate arrays, field programmable gate arrays, sea of gates and comparison, system packaging styles, multi-chip modules. Design rules, layout of basic devices, fabrication process and its impact on physical design, interconnect delay, noise and cross talk, yield and fabrication cost.

UNIT -II:

Factors, Complexity Issues and NP-hard Problems, Basic Algorithms (Graph and Computational Geometry): graph search algorithms, spanning tree algorithms, shortest path algorithms, matching algorithms, min-cut and max-cut algorithms, Steiner tree algorithms

UNIT -III:

Basic Data Structures, atomic operations for layout editors, linked list of blocks, bin based methods, neighbour pointers, corner stitching, multi-layer operations.

UNIT -IV:

Graph algorithms for physical design: classes of graphs, graphs related to a set of lines, graphs related to set of rectangles, graph problems in physical design, maximum clique and minimum coloring, maximum k-independent set algorithm, algorithms for circle graphs.

UNIT -V:

Partitioning algorithms: design style specific partitioning problems, group migrated algorithms, simulated annealing and evolution, and Floor planning and pin assignment, Routing and placement algorithms

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

Text Books:

1. NaveedShervani, Algorithms for VLSI Physical Design Automation, 3rd Edition, Kluwer Academic, 1999.
2. Charles J Alpert, Dinesh P Mehta, Sachin S Sapatnekar, Handbook of Algorithms forPhysical Design Automation, CRC Press, 2008

Course Outcomes:

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

- Understand the relationship between design automation algorithms and Various constraints posed by VLSI fabrication and design technology.
- Adapt the design algorithms to meet the critical design parameters.
- Identify layout optimization techniques and map them to the algorithms
- Develop proto-type EDA tool and test its efficacy

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

I Year – II Semester		L	P	C
		3	0	3

Design for Testability
(Elective III)

UNIT -I

Testing Philosophy, Role of Testing, Digital and Analog VLSI Testing, VLSI TechnologyTrends affecting Testing, Types of Testing, Fault Modeling: Defects, Errors and Faults,Functional Versus Structural Testing, Levels of Fault Models, Single Stuck-at Fault.

UNIT -II:

Simulation for Design Verification and Test Evaluation, Modeling Circuits for Simulation, Algorithms for True-value Simulation, Algorithms for Fault Simulation.

UNIT -III:

SCOAP Controllability and Observability, High Level Testability Measures, Digital DFT and Scan Design: Ad-Hoc DFT Methods, Scan Design, Partial-Scan Design, Variations of Scan.

UNIT -IV:

The Economic Case for BIST, Random Logic BIST: Definitions, BIST Process, PatternGeneration, Response Compaction, Built-In Logic Block Observers, Test-Per-Clock, Test-PerScanBISTSystems,CircularSelf-TestPathSystem,MemoryBIST, DelayFaultBIST.

UNIT -V:

Motivation, System Configuration with Boundary Scan: TAP Controller and Port, BoundaryScan Test Instructions, Pin Constraints of the Standard, Boundary Scan Description Language: BDSL Description Components, Pin Descriptions.

Text Books:

1. Essentials of Electronic Testing for Digital, Memory and Mixed Signal VLSI Circuits -M.L. Bushnell, V. D. Agrawal, Kluwer Academic Pulishers.

Reference Books:

1. Digital Systems and Testable Design - M. Abramovici, M.A.Breuer and A.D Friedman, Jaico Publishing House.
2. Digital Circuits Testing and Testability - P.K. Lala, Academic Press.

Course Outcomes:

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

- Demonstrate advanced knowledge in The basic faults that occur in digital systems, Testing of stuck at faults for digital circuits, Design for testability.
- Analyze testing issues in the field of digital system design critically for conducting research.
- Solve engineering problems by modeling different faults for fault free simulation in digital circuits.
- Apply appropriate research methodologies and techniques to develop new testing strategies for digital and mixed signal circuits and systems.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

I Year – II Semester		L	P	C
		3	0	3

IOT & its Apllications
(Elective III)

UNIT I:Fundamentals of IoT- Evolution of Internet of Things, Enabling Technologies, IoT Architectures,oneM2M, IoT World Forum (IoTWF) and Alternative IoT models, Simplified IoT Architecture and Core IoT Functional Stack, Fog, Edge and Cloud in IoT, Functional blocks of an IoT ecosystem, Sensors, Actuators, Smart Objects and Connecting Smart Objects.

IoT Platform overview: Overview of IoT supported Hardware platforms such as: Raspberry pi, ARM Cortex Processors, Arduino and Intel Galileo boards.

UNIT II: IoT Protocols- IT Access Technologies: Physical and MAC layers, topology and Security of IEEE 802.15.4, 802.15.4g, 802.15.4e, 1901.2a, 802.11ah and Lora WAN, Network Layer: IP versions, Constrained Nodes and Constrained Networks, Optimizing IP for IoT: From 6LoWPAN to 6Lo, Routing over Low Power and Lossy Networks, Application Transport Methods: Supervisory Control and Data Acquisition, Application Layer Protocols: CoAP and MQTT.

UNIT III: Design And Development- Design Methodology, Embedded computing logic, Microcontroller, System on Chips, IoT system building blocks, Arduino, Board details, IDE programming, Raspberry Pi, Interfaces and Raspberry Pi with Python Programming.

UNIT IV: Data Analytics And Supporting Services- Structured Vs Unstructured Data and Data in Motion Vs Data in Rest, Role of Machine Learning – No SQL Databases, Hadoop Ecosystem, Apache Kafka, Apache Spark, Edge Streaming Analytics and Network Analytics, Xively Cloud for IoT, Python Web Application Framework, Django, AWS for IoT, System Management with NETCONF-YANG

UNIT V: Case Studies/Industrial Applications: IoT applications in home, infrastructures, buildings, security, Industries, Home appliances, other IoT electronic equipments. Use of Big Data and Visualization in IoT, Industry 4.0 concepts.

Sensors and sensor Node and interfacing using any Embedded target boards (Raspberry Pi / Intel Galileo/ARM Cortex/ Arduino)

Text Books:

1.IoT Fundamentals: Networking Technologies, Protocols and Use Cases for Internet of Things, David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Rob Barton and Jerome Henry, Cisco Press, 2017

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

Reference Books:

1. Internet of Things – A hands-on approach, ArshdeepBahga, Vijay Madisetti, Universities Press, 2015
2. The Internet of Things – Key applications and Protocols, Olivier Hersent, David Boswarthick, Omar Elloumi and Wiley, 2012 (for Unit 2).
3. "From Machine-to-Machine to the Internet of Things – Introduction to a New Age of Intelligence",Jan Ho¨ ller, VlasiosTsiatsis, Catherine Mulligan, Stamatis, Karnouskos, Stefan Avesand. David Boyle and Elsevier, 2014.
4. Architecting the Internet of Things,Dieter Uckelmann, Mark Harrison, Michahelles and Florian (Eds), Springer, 2011.
5. Recipes to Begin, Expand, and Enhance Your Projects, 2nd Edition,Michael Margolis, Arduino Cookbook and O"Reilly Media, 2011.

Course Outcomes:

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

- Apply the Knowledge in IOT Technologies and Data management.
- Determine the values chains Perspective of M2M to IOT.
- Implement the state of the Architecture of an IOT.
- Compare IOT Applications in Industrial & real world.
- Demonstrate knowledge and understanding the security and ethical issues of an IOT.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

I Year – II Semester		L	P	C
		3	0	3

VLSI Signal Processing
(Elective III)

UNIT -I

Introduction to DSP: Typical DSP algorithms, DSP algorithms benefits, Representation of DSP algorithms Pipelining and Parallel Processing

Introduction, Pipelining of FIR Digital filters, Parallel Processing, Pipelining and Parallel Processing for Low Power Retiming Introduction, Definitions and Properties, Solving System of Inequalities, Retiming Techniques

UNIT –II

Folding and Unfolding: Folding- Introduction, Folding Transform, Register minimization Techniques, Register minimization in folded architectures, folding of Multirate systems

Unfolding- Introduction, An Algorithm for Unfolding, Properties of Unfolding, critical Path, Unfolding and Retiming, Applications of Unfolding

UNIT -III

Systolic Architecture Design: Introduction, Systolic Array Design Methodology, FIR Systolic Arrays, Selection of Scheduling Vector, Matrix Multiplication and 2D Systolic Array Design, Systolic Design for Space Representations contain Delays.

UNIT -IV

Fast Convolution: Introduction – Cook-Toom Algorithm – Winogard algorithm – Iterated Convolution – Cyclic Convolution – Design of Fast Convolution algorithm by Inspection

UNIT – V

Digital lattice filter structures, bit level arithmetic, architecture, redundant arithmetic.
Numerical strength reduction, synchronous, wave and asynchronous pipe lines, low power design.
Low Power Design:Scaling Vs Power Consumption, Power Analysis, Power Reduction techniques, Power Estimation Approaches

Text Books:

1. Keshab K. Parthi[A1] , VLSI Digital signal processing systems, design and implementation[A2] , Wiley, Inter Science, 1999.
2. Mohammad Isamail and Terri Fiez, Analog VLSI signal and information processing, McGraw Hill, 1994
3. S.Y. Kung, H.J. White House, T. Kailath, VLSI and Modern Signal Processing, Prentice Hall, 1985.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

Course Outcomes

On successful completion of the module, students will be able to:

1. Ability to modify the existing or new DSP architectures suitable for VLSI.
2. Understand the concepts of folding and unfolding algorithms and applications.
3. Ability to implement fast convolution algorithms.

Low power design aspects of processors for signal processing and wireless applications.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

I Year – II Semester		L	P	C
		3	0	3

Network Security & Cryptography
(Elective IV)

Unit 1:Security

Need, security services, Attacks, OSI Security Architecture, one time passwords, Model forNetwork security, Classical Encryption Techniques like substitution ciphers, Transpositionciphers, Cryptanalysis of Classical Encryption Techniques.

Number Theory

Introduction, Fermat‟s and Euler‟s Theorem, The Chinese Remainder Theorem, EuclideanAlgorithm, Extended Euclidean Algorithm, and Modular Arithmetic.

Unit 2: Private-Key (Symmetric) Cryptography

Block Ciphers, Stream Ciphers, RC4 Stream cipher, Data Encryption Standard (DES),AdvancedEncryption Standard (AES), Triple DES, RC5, IDEA, Linear and DifferentialCryptanalysis.

Unit 3:Public-Key (Asymmetric) Cryptography

RSA, Key Distribution and Management, Diffie-Hellman Key Exchange, Elliptic CurveCryptography, Message Authentication Code, hash functions, message digest algorithms:MD4 MD5, Secure Hash algorithm, RIPEMD-160, HMAC.

Unit 4:Authentication

IP and Web Security Digital Signatures, Digital Signature Standards, Authentication Protocols,Kerberos, IP security Architecture, Encapsulating Security Payload, Key Management, WebSecurity Considerations, Secure Socket Layer and Transport Layer Security, Secure ElectronicTransaction.

Unit 5:System Security

Intruders, Intrusion Detection, Password Management, Worms, viruses, Trojans, VirusCountermeasures, Firewalls, Firewall Design Principles, Trusted Systems.

Text Books:

1. William Stallings, “Cryptography and Network Security, Principles and Practices”, Pearson Education, 3rd Edition.
2. Charlie Kaufman, Radia Perlman and Mike Speciner, “Network Security, Private
3. Communication in a Public World”, Prentice Hall, 2nd Edition

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

Reference Books:

1. Christopher M. King, Ertem Osmanoglu, Curtis Dalton, "Security Architecture, Design Deployment and Operations", RSA Pres,
2. Stephen Northcutt, LenyZeltser, Scott Winters, Karen Kent, and Ronald W. Ritchey,
3. "Inside Network Perimeter Security", Pearson Education, 2nd Edition
4. Richard Bejtlich, "The Practice of Network Security Monitoring: Understanding Incident

Course Outcomes:

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

- Identify and utilize different forms of cryptography techniques.
- Incorporate authentication and security in the network applications.
- Distinguish among different types of threats to the system and handle the same.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

I Year – II Semester		L	P	C
		3	0	3

Microcontrollers and Programmable Digital Signal Processors (Elective IV)

Unit 1:
ARM Cortex-M3 processor: Applications, Programming model – Registers, Operationmodes,Exceptions and Interrupts, Reset Sequence Instruction Set, Unified Assembler Language,Memory Maps, Memory Access Attributes, Permissions, Bit-Band Operations, Unaligned andExclusive Transfers. Pipeline, Bus Interfaces

Unit 2:
Exceptions, Types, Priority, Vector Tables, Interrupt Inputs and Pending behavior, Fault Exceptions, Supervisor and Pendable Service Call, Nested Vectored Interrupt Controller, BasicConfiguration, SYSTICK Timer, Interrupt Sequences, Exits, Tail Chaining, Interrupt Latency.

Unit 3:
LPC 17xx microcontroller- Internal memory, GPIOs, Timers, ADC, UART and other serialinterfaces, PWM, RTC, WDT

Unit 4:
Programmable DSP (P-DSP) Processors:Harvard architecture, Multi port memory, architectural structure of P-DSP- MAC unit, Barrelshifters, Introduction to TI DSP processor family

Unit 5:
VLIW architecture and TMS320C6000 series, architecture study, data paths, cross paths,Introduction to Instruction level architecture of C6000 family, Assembly Instructions memoryaddressing, for arithmetic, logical operationsCode Composer Studio for application development for digital signal processing,On chip peripherals, Processor benchmarking

Text Books:
1. Joseph Yiu, “The definitive guide to ARM Cortex-M3”, Elsevier, 2nd Edition
2. Venkatramani B. and Bhaskar M. “Digital Signal Processors: Architecture, Programming and Applications” , TMH , 2nd Edition
3. Sloss Andrew N, Symes Dominic, Wright Chris, “ARM System Developer's Guide: Designing and Optimizing”, Morgan Kaufman Publication

Reference Books:
1.. Steve furber, “ARM System-on-Chip Architecture”, Pearson Education
2. Frank Vahid and Tony Givargis, “Embedded System Design”, Wiley
3. Technical references and user manuals on www.arm.com, NXP Semiconductorwww.nxp.com and Texas Instruments www.ti.com

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

- Compare and select ARM processor core based SoC with several features/peripherals based on requirements of embedded applications.
- Identify and characterize architecture of Programmable DSP Processors
- Develop small applications by utilizing the ARM processor core and DSP processor basedplatform.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

I Year – II Semester		L	P	C
		3	0	3

LOW POWER VLSI DESIGN
(Elective IV)

UNIT-I: Sources of Power Dissipation

Introduction, Short-Circuit Power Dissipation, Switching Power Dissipation, Dynamic Power for a Complex Gate, Reduced Voltage Swing, Switching Activity, Leakage Power Dissipation, p–n Junction Reverse-Biased Current, Band-to-Band Tunneling Current, Sub threshold Leakage Current, Short-Channel Effects

UNIT 2: Supply Voltage Scaling for Low Power

Device Feature Size Scaling, Constant-Field Scaling, Constant-Voltage Scaling, Architectural-Level Approaches: Parallelism for Low Power, Pipelining for Low Power, Combining Parallelism with Pipelining, Voltage Scaling Using High-Level Transformations: Multilevel Voltage Scaling Challenges in MVS Voltage Scaling Interfaces, Static Timing Analysis Dynamic Voltage and Frequency Scaling

UNIT-3: Switched Capacitance Minimization

Probabilistic Power Analysis: Random logic signals, probability and frequency, probabilistic power analysis techniques, signal entropy, Bus Encoding: Gray Coding, One-Hot Coding, Bus-Inversion, T0 Coding, Clock Gating, Gated-Clock FSMs FSM State Encoding, FSM Partitioning, Pre computation, Glitching Power Minimization

UNIT 4: Leakage Power Minimization

Fabrication of Multiple Threshold Voltages, Multiple Channel Doping, Multiple Oxide CMOS, Multiple Channel Length, Multiple Body Bias, VTCMOS Approach, MTCMOS Approach, Power Gating, Clock Gating Versus Power Gating, Power-Gating Issues, Isolation Strategy, State Retention Strategy, Power-Gating Controller, Power Management, Combining DVFS and Power Management

UNIT 5: Low power clock distribution & Simulation Power Analysis

Low power clock distribution: Power dissipation in clock distribution, single driver versus distributed buffers, Zero skew versus tolerable skew, chip and package co design for clock network.

Simulation Power Analysis: SPICE circuit simulators, gate level logic simulation, capacitive power estimation, architecture level analysis, data correlation analysis of DSP systems, Monte Carlo Simulation

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

Text Books:

1. Low-Power VLSI Circuits and Systems,Ajit Pal, SPRINGER PUBLISHERS
2. Practical Low Power Digital VlsiDesign , Gary Yeap Motorola, Springer Science Business Media, LLC.

Reference Books:

1. Low Power CMOS Design – Anantha Chandrakasan, IEEE Press/Wiley International, 1998. 2
2. MassoudPedram, Jan M. Rabaey , "Low power design methodologies ", Kluwer Academic Publishers.
3. Low Power CMOS VLSI Circuit Design – A. Bellamour, M. I. Elamasri, Kluwer Academic Press, 1995.

Course Outcomes:

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

- Identify the sources of power dissipation in digital IC systems & understand the impact of power on system performance and reliability.
- Characterize and model power consumption & understand the basic analysis methods.
- Understand leakage sources and reduction techniques.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

I Year – II Semester		L	P	C
		0	4	2
Mixed Signal IC Design Lab				

Detailed Syllabus:

Cycle 1:

1) Fully compensated op-amp with resistor and miller compensation
2) High speed comparator design

i. Two stage cross coupled clamped comparator
ii. Strobed Flip-flop

3) Data converter

Cycle 2:

1) Switched capacitor circuits

i. Parasitic sensitive integrator
ii. Parasitic insensitive integrator

2) Design of PLL
3) Design of VCO
4) Bandgap reference circuit
5) Layouts of All the circuits Designed and Simulated

Software:

Mentor Graphics/ Cadence/ Tanner/Industry Equivalent Standard Software Tools

Hardware:

Personal Computer with necessary peripherals, configuration and operating System.

Reading:

1) David A johns, Ken Martin, Analog Integrated Circuit Design, Wiley, 2008.
2) R. Gregorian and G.C Ternes, Analog MOS Integrated Circuits for Signal Processing, Wiley, 1986.
3) Roubik Gregorian, Introduction to CMOS OpAmp and Comparators, Wiley, 1999.
4) Alan Hastlings, The art of Analog Layout, Wiley, 2005.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

I Year – II Semester		L	P	C
		0	4	2
Physical Design Automation Lab				

Detailed syllabus:
Cycle 1:

1) Graph algorithms
a) Graph search algorithms
i. Depth first search
ii. Breadth first search
b) Spanning tree algorithm
i. Kruskal‟s algorithm
c) Shortest path algorithm
i. Dijkstra algorithm
ii. Floyd- Warshall algorithm
d) Steiner tree algorithm

2) Computational geometry algorithm
a) Line sweep method
b) Extended line sweep method

Cycle 2:
3) Partitioning algorithms
I) Group migration algorithms
a) Kernighan –Lin algorithm
b) Extensions of Kernighan-Lin algorithm
i) Fiduccias –Mattheyses algorithm
ii) Goldberg and Burstein algorithm
II) Simulated annealing and evolution algorithms
a) Simulated annealing algorithm
b) Simulated evolution algorithm
III) Metric allocation method

4) Floor planning algorithms
i) Constraint based methods
ii) Integer programming based methods
iii) Rectangular dualization based methods
iv) Hierarchical tree based methods
v) Simulated evolution algorithms
vi) Time driven Floorplanning algorithms

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

5) Routing algorithms

I) Two terminal algorithms
a) Maze routing algorithms
i)Lee‟s algorithm
ii) Soukup‟s algorithm
iii) Hadlock algorithm
b) Line-Probe algorithm
c) Shortest path based algorithm
II) Multi terminal algorithm
a) Stenier tree based algorithm
i) SMST algorithm
ii) Z-RST algorithm

Software required: C/C++ Programming Language /Relevant software

Reading:

1) Naveed Shervani, Algorithms for Physical Design Automation, 3rd Edition, Kluwer Academic,1998.
2) Charles J Alpert, Dinesh P Mehta, Sachin S. Sapatnekar, Handbook of Algorithms for Physical Design Automation, CRC Press,2008.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

I Year – II Semester		L	P	C
		0	4	2
Mini Project				

Syllabus Contents

The students are required to search / gather the material / information on a specific a topic comprehend it and present / discuss in the class.

Course Outcomes

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

1. Understand of contemporary / emerging technology for various processes and systems.
2. Share knowledge effectively in oral and written form and formulate documents

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

II Year – I Semester		L	P	C
		3	0	3

Scripting Languages for VLSI (Elective V)

UNIT-I:

Introduction to Scripts and Scripting: Basics of Linux, Origin of Scripting languages, scriptingtoday, Characteristics and uses of scripting languages.

PERL: Introduction to PERL, Names and values, Variables and assignment, Scalar expressions,Control structures, Built-in functions, Collections of Data, working with arrays, Lists and hashes,

Simple input and output, Strings, Patterns and regular expressions, Subroutines, Scripts withargumentS.

UNIT-II:

Advanced PERL: Finer points of Looping, Subroutines, Using Pack and Unpack, working with files, Type globs, Eval, References, Data structures, Packages, Libraries and modules, Objects, Objectsand modules in action, tied variables, interfacing to the operating systems, Security issues.

UNIT-III:

TCL: The TCL phenomena, Philosophy, Structure, Syntax, Parser, Variables and data in TCL,Control flow, Data structures, Simple input/output, Procedures, Working with Strings, Patterns,Filesand Pipes, Example code.

UNIT-IV:

Advanced TCL: The eval, source, exec and up-level commands, Libraries and packages,Namespaces, trapping errors, Event-driven programs, Making applications 'Internet-aware','Nuts-and-bolts' internet programming, Security issues, TCL and TK integration.

UNIT-V:

PYTHON: Introduction to PYTHON language, PYTHON-syntax, statements, functions, Built-in functionsand Methods, Modules in PYTHON, Exception Handling.

Text Books:

1. The World of Scripting Languages- David Barron, Wiley Student Edition, 2010.
2. PYTHON Web Programming, Steve Holden and David Beazley, New Riders Publications

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

References:

1. TCL/TK: A Developer's Guide- ClifFlynt, 2003, Morgan Kaufmann Series.
2. Core PYTHON Programming, Chun, Pearson Education, 2006.
3. Learning Perl, Randal L. Schwartz, O‟ Reilly publications 6th edition 2011.
4. Linux: The Complete Reference", Richard Peterson McGraw Hill Publications, 6th Edition,2008.

Course Outcomes:

At the end of this course, the student will be able to:

- Gain fluency in programming with scripting languages
- Create and run scripts using PERL/TCL/PYTHON in CAD Tools
- Demonstrate the use of PERL/PYTHON/ TCL in developing system and web applications

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

II Year – I Semester		L	P	C
		3	0	3
Digital Design & Verification (Elective V)				

Unit 1

Revision of basic Digital systems: Combinational Circuits, Sequential Circuits, Logic families.Synchronous FSM and asynchronous design, Meta-stability, Clock distribution and issues, basicbuilding blocks like PWM module, pre-fetch unit, programmable counter, FIFO, Booth'smultiplier, ALU, Barrel shifter etc.

Unit 2

Verilog/VHDL Comparisons and Guidelines, Verilog: HDL fundamentals, simulation, and testbenchdesign, Examples of Verilog codes for combinational and sequential logic, Verilog AMS. IP and Prototyping: IP in various forms: RTL Source code, Encrypted Source code, Soft IP,Netlist, Physical IP, and Use of external hard IP during prototyping, Case studies, and Speedissues.

Unit 3

System Verilog and Verification: Verification guidelines, Data types, procedural statements androutines, connecting the test bench and design, Assertions, Basic OOP concepts, Randomization. Testing of logic circuits: Fault models, BIST, JTAG interface Introduction to basic scripting language: Perl, Tcl/Tk

Unit 4

Current challenges in physical design: Roots of challenges, Delays: Wire load models GenericPDflow, Challenges in PD flow at different steps, SI Challenge - Noise & Crosstalk, IR Drop,Process effects: Process Antenna Effect &Electro migration

Unit 5

Programmable Logic Devices: Introduction, Evolution: PROM, PLA, PAL, Architecture of PAL's,Applications, Programming PLD's, FPGA with technology: Anti-fuse, SRAM, EPROM, MUX,FPGA structures, and ASIC Design Flows, Programmable Interconnections, Coarse grainedreconfigurable devices

Text Books:

1. Douglas Smith, “HDL Chip Design: A Practical Guide for Designing, Synthesizing &
2. Simulating ASICs & FPGAs Using VHDL or Verilog”, Doone publications, 1998.
3. Samir Palnitkar, “Verilog HDL: A guide to Digital Design and Synthesis”, Prentice Hall,2nd Edition, 2003.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

Reference Books:

1. Doug Amos, Austin Lesea, Rene Richter, "FPGA based Prototyping Methodology Manual", Synopsys Press, 2011.
2. Christophe Bobda, "Introduction to Reconfigurable Computing, Architectures, Algorithmsand Applications", Springer, 2007.
3. Janick Bergeron, "Writing Testbenches: Functional Verification of HDL Models", SecondEdition, Springer, 2003.

Course Outcomes:

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

- Familiarity of Front end design and verification techniques and create reusable test environments.
- Verify increasingly complex designs more efficiently and effectively.
- Use EDA tools like Cadence, Mentor Graphics.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

II Year – I Semester		L	P	C
		3	0	3

Hardware Software Co-Design
(Elective V)

UNIT-I:

Co- Design Issues: Co- Design Models, Architectures, Languages, A Generic Co-design Methodology.

Co- Synthesis Algorithms: Hardware software synthesis algorithms: hardware – software partitioning distributed system co-synthesis.

UNIT-II:

Prototyping and Emulation

Prototyping and emulation techniques, prototyping and emulation environments, future developments in emulation and prototyping architecture specialization techniques, system communication infrastructure

Target Architectures

Architecture Specialization techniques, System Communication infrastructure, Target Architecture and Application System classes, Architecture for control dominated systems (8051-Architectures for High performance control), Architecture for Data dominated systems (ADSP21060, TMS320C60), Mixed Systems.

UNIT-III:

Compilation Techniques and Tools for Embedded Processor Architectures

Modern embedded architectures, embedded software development needs, compilation technologies, practical consideration in a compiler development environment.

UNIT-IV:

Design Specification and Verification

Design, co-design, the co-design computational model, concurrency coordinating concurrent computations, interfacing components, design verification, implementation verification, verification tools, Interface verification.

UNIT-V: Languages for System-Level Specification and Design-I

System-level specification, design representation for system level synthesis, system level specification languages. **Languages for System-Level Specification and Design-II**

Heterogeneous specifications and multi language co-simulation, the cosyma system and Lycos system.

Text Books:

1. Hardware / Software Co- Design Principles and Practice – Jorgen Staunstrup, Wayne Wolf – 2009, Springer.
2. Hardware / Software Co- Design - Giovanni De Micheli, Mariagiovanna Sami, 2002, Kluwer Academic Publishers.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

Reference Books:

1. A Practical Introduction to Hardware/Software Co-design -Patrick R. Schaumont - 2010 – Springer Publications.

Course outcomes

At the end of the course the student able to

- About the Hardware-Software Code sign Methodology.
- How to select a target architecture and how a prototype is built and how emulation of a prototype is done.
- Brief view about compilation technologies and compiler development environment.
- Understand the importance of system level specification languages and multi-language co-simulation.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

II Year – I Semester		L	P	C
		0	20	10
(DISSERTATION) DISSERTATION PHASE – I AND PHASE - II				

Syllabus Contents:

The dissertation / project topic should be selected / chosen to ensure the satisfaction of the urgent need to establish a direct link between education, national development and productivity and thus reduce the gap between the world of work and the world of study. The dissertation should have the following

- Relevance to social needs of society
- Relevance to value addition to existing facilities in the institute
- Relevance to industry need
- Problems of national importance
- Research and development in various domain

The student should complete the following:

- Literature survey Problem Definition
- Motivation for study and Objectives
- Preliminary design / feasibility / modular approaches
- Implementation and Verification
- Report and presentation

The dissertation stage II is based on a report prepared by the students on dissertation allotted to them. It may be based on:

- Experimental verification / Proof of concept.
- Design, fabrication, testing of Communication System.
- The viva-voce examination will be based on the above report and work.

Guidelines for Dissertation Phase – I and II at M. Tech. (Electronics):

- As per the AICTE directives, the dissertation is a yearlong activity, to be carried out and evaluated in two phases i.e. Phase – I: July to December and Phase – II: January to June.
- The dissertation may be carried out preferably in-house i.e. department‟s laboratories and centers OR in industry allotted through department‟s T & P coordinator.
- After multiple interactions with guide and based on comprehensive literature survey, the student shall identify the domain and define dissertation objectives. The referred literature should preferably include IEEE/IET/IETE/Springer/Science Direct/ACM journals in the areas of Computing and Processing (Hardware and Software), Circuits-Devices and Systems, Communication-Networking and Security, Robotics and Control Systems, Signal Processing and Analysis and any other related domain. In case of Industry sponsored projects, the relevant application notes, while papers, product catalogues should be referred and reported.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

- Student is expected to detail out specifications, methodology, resources required, critical issues involved in design and implementation and phase wise work distribution, and submit the proposal within a month from the date of registration.
- Phase – I deliverables: A document report comprising of summary of literature survey, detailed objectives, project specifications, paper and/or computer aided design, proof of concept/functionality, part results, A record of continuous progress.
- Phase – I evaluation: A committee comprising of guides of respective specialization shall assess the progress/performance of the student based on report, presentation and Q &A. In case of unsatisfactory performance, committee may recommend repeating the Phase-I work.
- During phase – II, student is expected to exert on design, development and testing of the proposed work as per the schedule. Accomplished results/contributions/innovations should be published in terms of research papers in reputed journals and reviewed focused conferences OR IP/Patents.
- Phase – II deliverables: A dissertation report as per the specified format, developed system in the form of hardware and/or software, a record of continuous progress.
- Phase – II evaluation: Guide along with appointed external examiner shall assess the progress/performance of the student based on report, presentation and Q &A. In case of unsatisfactory performance, committee may recommend for extension or repeating the work

Course Outcomes:

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

- Ability to synthesize knowledge and skills previously gained and applied to an in-depth study and execution of new technical problem.
- Capable to select from different methodologies, methods and forms of analysis to produce a suitable research design, and justify their design.
- Ability to present the findings of their technical solution in a written report.
- Presenting the work in International/ National conference or reputed journals.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

II Year – I Semester		L	P	C
		3	0	3

BUSINESS ANALYTICS
(Open Elective V)

Unit1:

Business analytics: Overview of Business analytics, Scope of Business analytics, Business Analytics Process, Relationship of Business Analytics Process and organisation, competitive advantages of Business Analytics.

Statistical Tools: Statistical Notation, Descriptive Statistical methods,

Review of probability distribution and data modelling, sampling and estimation methods overview.

Unit 2:

Trendiness and Regression Analysis: Modelling Relationships and Trends in Data, simple Linear Regression.Important Resources, Business Analytics Personnel, Data and modelsfor Business analytics, problem solving, Visualizing and Exploring Data, Business Analytics Technology

Unit 3:

Organization Structures of Business analytics, Team management, Management Issues, Designing Information Policy, Outsourcing, Ensuring Data Quality, Measuring contribution of Business analytics, Managing Changes.Descriptive Analytics, predictive analytics, predicative Modelling, Predictive analytics analysis,DataMining,Data Mining Methodologies, Prescriptive analytics and its step in the business analytics Process, Prescriptive Modelling, nonlinear Optimization.

Unit 4:

Forecasting Techniques: Qualitative and Judgmental Forecasting, Statistical Forecasting Models, Forecasting Models for Stationary Time Series, Forecasting Models for Time Series with a Linear Trend, Forecasting Time Series with Seasonality, Regression Forecasting with Casual Variables, Selecting Appropriate Forecasting Models.

Monte Carlo Simulation and Risk Analysis: Monte CarleSimulation

Using Analytic Solver Platform, New-Product Development Model, Newsvendor Model, Overbooking Model, Cash Budget Model.

Unit 5:

Decision Analysis: Formulating Decision Problems, DecisionStrategies with the without Outcome Probabilities, Decision Trees, The Value of Information, Utility and Decision Making.

Recent Trends in : Embedded and collaborative business intelligence,Visual data recovery, Data Storytelling and Data journalism

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

Reference:

1. Business analytics Principles, Concepts, and Applications by Marc J. Schniederjans, Dara G. Schniederjans, Christopher M. Starkey, Pearson FTPress.
2. Business Analytics by James Evans, personsEducation.

Course Outcomes:

- Students will demonstrate knowledge of data analytics.
- Students will demonstrate the ability of think critically in making decisions based on data and deep analytics.
- Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making.
- Students will demonstrate the ability to translate data into clear, actionable insights

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

II Year – I Semester		L	P	C
		3	0	3

INDUSTRIAL SAFETY
(Open Elective V)

Unit-1:

Industrial safety: Accident, causes, types, results and control, mechanical and electrical hazards, types, causes and preventive steps/procedure, describe salient points of factories act 1948 for health and safety, wash rooms, drinking water layouts, light, cleanliness, fire, guarding, pressure vessels, etc, Safety color codes. Fire prevention and firefighting, equipment and methods.

Unit-2:

Fundamentals of maintenance engineering: Definition and aim of maintenance engineering, Primary and secondary functions and responsibility of maintenance department, Types of maintenance, Types and applications of tools used for maintenance, Maintenance cost & its relation with replacement economy, Service life of equipment.

Unit-3:

Wear and Corrosion and their prevention: Wear- types, causes, effects, wear reduction methods, lubricants-types and applications, Lubrication methods, general sketch, working and applications, i. Screw down grease cup, ii. Pressure grease gun, iii. Splash lubrication, iv. Gravity lubrication, v. Wick feed lubrication vi. Side feed lubrication, vii. Ring lubrication, Definition, principle and factors affecting the corrosion. Types of corrosion, corrosion prevention methods.

Unit-4:

Fault tracing: Fault tracing-concept and importance, decision treeconcept, need and applications, sequence of fault finding activities, show as decision tree, draw decision tree for problems in machine tools, hydraulic, pneumatic,automotive, thermal and electrical equipment‟s like, I. Any one machine tool, ii. Pump iii. Air compressor, iv. Internal combustion engine,v. Boiler,vi .Electrical motors, Types of faults in machine tools and their generalcauses.

Unit-5:

Periodic and preventive maintenance: Periodic inspection-concept and need, degreasing, cleaning and repairing schemes, overhauling of mechanical components, overhauling of electrical motor, common troubles and remedies of electric motor, repair complexities and its use, definition, need, steps and advantages of preventive maintenance. Steps/procedure for periodic and preventive maintenance of: I. Machine tools, ii. Pumps, iii.Air compressors, iv. Diesel generating (DG) sets, Program and schedule of preventive maintenance of mechanical and electrical equipment, advantages of preventive maintenance. Repair cycle concept and importance

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

Reference:

1. Maintenance Engineering Handbook, Higgins & Morrow, Da InformationServices.
2. Maintenance Engineering, H. P. Garg, S. Chand andCompany.
3. Pump-hydraulic Compressors, Audels, McgrewHillPublication.
4. Foundation Engineering Handbook, Winterkorn, Hans, Chapman &HallLondon

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

II Year – I Semester		L	P	C
		3	0	3

OPERATIONS RESEARCH
(Open Elective V)

Unit 1:
Optimization Techniques, Model Formulation, models, General L.R Formulation, Simplex Techniques, Sensitivity Analysis, Inventory Control Models

Unit 2
Formulation of a LPP - Graphical solution revised simplex method - duality theory - dual simplex method - sensitivity analysis - parametric programming

Unit 3:
Nonlinear programming problem - Kuhn-Tucker conditions min cost flow problem - max flow problem - CPM/PERT

Unit 4
Scheduling and sequencing - single server and multiple server models - deterministic inventory models - Probabilistic inventory control models - Geometric Programming.

Unit 5
Competitive Models, Single and Multi-channel Problems, Sequencing Models, Dynamic Programming, Flow in Networks, Elementary Graph Theory, Game Theory Simulation

References:

1. H.A. Taha, Operations Research, An Introduction, PHI, 2008
2. H.M. Wagner, Principles of Operations Research, PHI, Delhi, 1982.
3. J.C. Pant, Introduction to Optimisation: Operations Research, Jain Brothers, Delhi, 2008
4. Hitler Libermann Operations Research: McGraw Hill Pub. 2009
5. Pannerselvam, Operations Research: Prentice Hall of India 2010
6. Harvey M Wagner, Principles of Operations Research: Prentice Hall of India 2010

Course Outcomes:

At the end of the course, the student should be able to

1. Students should able to apply the dynamic programming to solve problems of discreet and continuous variables.
2. Students should able to apply the concept of non-linear programming
3. Students should able to carry out sensitivity analysis
4. Student should able to model the real world problem and simulate it.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

II Year – I Semester		L	P	C
		3	0	3

COST MANAGEMENT OF ENGINEERING PROJECTS
(Open Elective)

Introduction and Overview of the Strategic Cost Management Process

Cost concepts in decision-making; Relevant cost, Differential cost, Incremental cost and Opportunity cost. Objectives of a Costing System; Inventory valuation; Creation of a Database for operational control; Provision of data for Decision-Making.

Project: meaning, Different types, why to manage, cost overruns centres, various stages of project execution: conception to commissioning. Project execution as conglomeration of technical and non- technical activities.Detailed Engineering activities. Pre project execution main clearances and documents Project team: Role of each member. Importance Project site: Data required with significance. Project contracts.Types and contents. Project execution Project cost control. Bar charts and Network diagram. Project commissioning: mechanical and process

Cost Behavior and Profit Planning Marginal Costing; Distinction between Marginal Costing and Absorption Costing; Break-even Analysis, Cost-Volume-Profit Analysis. Various decision-making problems. Standard costing and Variance Analysis. Pricing strategies: Pareto Analysis. Target costing, Life Cycle Costing. Costing of service sector.Just-in-time approach, Material Requirement Planning, Enterprise Resource Planning, Total Quality Management and Theory of constraints.Activity-Based Cost Management, Bench Marking; Balanced Score Card and Value-Chain Analysis.Budgetary Control; Flexible Budgets;Performance budgets; Zero-based budgets.Measurement of Divisional profitability pricing decisions including transfer pricing.

Quantitative techniques for cost management, Linear Programming, PERT/CPM, Transportation problems, Assignment problems, Simulation, Learning Curve Theory.

References:

1. Cost Accounting A Managerial Emphasis, Prentice Hall of India, New Delhi
2. Charles T. Horngren and George Foster, Advanced Management Accounting
3. Robert S Kaplan Anthony A. Alkinson, Management & Cost Accounting
4. Ashish K. Bhattacharya, Principles & Practices of Cost Accounting A. H. Wheeler publisher
5. N.D. Vohra, Quantitative Techniques in Management, Tata McGraw Hill Book Co. Ltd.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

II Year – I Semester		L	P	C
		3	0	3

COMPOSITE MATERIALS
(Open Elective)

UNIT–I:

INTRODUCTION: Definition – Classification and characteristics of Composite materials. Advantages and application of composites. Functional requirements of reinforcement and matrix.Effect of reinforcement (size, shape, distribution, volume fraction) on overall composite performance.

UNIT – II:

REINFORCEMENTS: Preparation-layup, curing, properties and applications of glass fibers, carbon fibers, Kevlar fibers and Boron fibers. Properties and applications of whiskers, particle reinforcements. Mechanical Behavior of composites: Rule of mixtures, Inverse rule of mixtures. Isostrain and Isostress conditions.

UNIT – III:

Manufacturing of Metal Matrix Composites: Casting – Solid State diffusion technique, Cladding – Hot isostaticpressing. Properties and applications. Manufacturing of Ceramic Matrix Composites: Liquid Metal Infiltration – Liquid phase sintering. Manufacturing of Carbon – Carbon composites: Knitting, Braiding, Weaving. Properties and applications.

UNIT–IV:

Manufacturing of Polymer Matrix Composites: Preparation of Moulding compounds and prepregs – hand layup method – Autoclave method – Filament winding method – Compression moulding – Reaction injection moulding. Properties and applications.

UNIT – V:

Strength: Laminar Failure Criteria-strength ratio, maximum stress criteria, maximum strain criteria, interacting failure criteria, hygrothermal failure. Laminate first play failure-insight strength; Laminate strength-ply discount truncated maximum strain criterion; strength design using caplet plots; stress concentrations.

TEXT BOOKS:

1. Material Science and Technology – Vol 13 – Composites by R.W.Cahn – VCH, West Germany.
2. Materials Science and Engineering, An introduction. WD Callister, Jr., Adapted by R. Balasubramaniam, John Wiley & Sons, NY, Indian edition,2007.

References:

1. Hand Book of CompositeMaterials-ed-Lubin.
2. Composite Materials – K.K.Chawla.
3. Composite Materials Science and Applications – Deborah D.L.Chung.
4. Composite Materials Design and Applications – Danial Gay, Suong V. Hoa, and Stephen W. Tasi.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

II Year – I Semester		L	P	C
		3	0	3

WASTE TO ENERGY
(Open Elective)

Unit-I:
Introduction to Energy from Waste: Classification of waste as fuel – Agro based, Forest residue, Industrial waste - MSW – Conversion devices – Incinerators, gasifiers, digestors

Unit-II:
Biomass Pyrolysis: Pyrolysis – Types, slow fast – Manufacture of charcoal – Methods - Yields and application – Manufacture of pyrolytic oils and gases, yields and applications.

Unit-III:
Biomass Gasification: Gasifiers – Fixed bed system – Downdraft and updraft gasifiers – Fluidized bed gasifiers – Design, construction and operation – Gasifier burner arrangement for thermal heating – Gasifier engine arrangement and electrical power – Equilibrium and kinetic consideration in gasifier operation

Unit-IV:
Biomass Combustion: Biomass stoves – Improved chullahs, types, some exotic designs, Fixed bed combustors, Types, inclined grate combustors, Fluidized bed combustors, Design, construction and operation - Operation of all the above biomass combustors.

Unit-V:
Biogas: Properties of biogas (Calorific value and composition) - Biogas plant technology and status - Bio energy system - Design and constructional features - Biomass resources and their classification - Biomass conversion processes - Thermo chemical conversion - Direct combustion - biomass gasification - pyrolysis and liquefaction - biochemical conversion - anaerobic digestion - Types of biogas Plants – Applications - Alcohol production from biomass - Bio diesel production - Urban waste to energy conversion - Biomass energy programme in India.

References:

1. Non Conventional Energy, Desai, Ashok V., Wiley Eastern Ltd., 1990.
2. Biogas Technology - A Practical Hand Book - Khandelwal, K. C. and Mahdi, S. S., Vol. I & II, Tata McGraw Hill Publishing Co. Ltd., 1983.
3. Food, Feed and Fuel from Biomass, Challal, D. S., IBH Publishing Co. Pvt. Ltd., 1991.
4. Biomass Conversion and Technology, C. Y. WereKo-Brobby and E. B. Hagan, John Wiley & Sons, 1996.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

AUDIT 1 and 2: ENGLISH FOR RESEARCH PAPER WRITING

Course objectives:

Students will be able to:

Understand that how to improve your writing skills and level of readability

Learn about what to write in each section

Understand the skills needed when writing a Title Ensure the good quality of paper at very first-time submission

Syllabus

Units	CONTENTS	Hours
1	Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness	4
2	Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticising, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts. Introduction	4
3	Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check.	4
4	key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature,	4
5	skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, skills are needed when writing the Conclusions	4
6	useful phrases, how to ensure paper is as good as it could possibly be the first- time submission	4

Suggested Studies:

1. Goldbort R (2006) Writing for Science, Yale University Press (available on Google Books)
2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press
3. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman‟sbook .
4. Adrian Wallwork , English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

AUDIT 1 and 2: DISASTER MANAGEMENT

Course Objectives: -Students will be able to:

learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.

critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.

develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.

critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in

Syllabus

Units	CONTENTS	Hours
1	**Introduction** Disaster: Definition, Factors And Significance; Difference Between Hazard And Disaster; Natural And Manmade Disasters: Difference, Nature, Types And Magnitude.	4
2	**Repercussions Of Disasters And Hazards**: Economic Damage, Loss Of Human And Animal Life, Destruction Of Ecosystem. Natural Disasters: Earthquakes, Volcanisms, Cyclones, Tsunamis, Floods, Droughts And Famines, Landslides And Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks And Spills, Outbreaks Of Disease And Epidemics, War And Conflicts.	4
3	**Disaster Prone Areas In India** Study Of Seismic Zones; Areas Prone To Floods And Droughts, Landslides And Avalanches; Areas Prone To Cyclonic And Coastal Hazards With Special Reference To Tsunami; Post-Disaster Diseases And Epidemics	4
4	**Disaster Preparedness And Management** Preparedness: Monitoring Of Phenomena Triggering A Disaster Or Hazard; Evaluation Of Risk: Application Of Remote Sensing, Data From Meteorological And Other Agencies, Media Reports: Governmental And Community Preparedness.	4
5	**Risk Assessment** Disaster Risk: Concept And Elements, Disaster Risk Reduction, Global And National Disaster Risk Situation. Techniques Of Risk Assessment, Global Co-Operation In Risk Assessment And Warning, People‟s Participation In Risk Assessment. Strategies for Survival.	4
6	**Disaster Mitigation** Meaning, Concept And Strategies Of Disaster Mitigation, Emerging Trends In Mitigation. Structural Mitigation And Non-Structural Mitigation, Programs Of Disaster Mitigation In India.	4

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

Suggested Readings:

1. R. Nishith, Singh AK, "Disaster Management in India: Perspectives, issues and strategies ""New Royal book Company.
2. Sahni, PardeepEt.Al. (Eds.)," Disaster Mitigation Experiences And Reflections", Prentice Hall Of India, New Delhi.
3. Goel S. L. , Disaster Administration And Management Text And Case Studies" ,Deep &Deep Publication Pvt. Ltd., New Delhi.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

AUDIT 1 and 2: SANSKRIT FOR TECHNICAL KNOWLEDGE

Course Objectives

1. To get a working knowledge in illustrious Sanskrit, the scientific language in the world
2. Learning of Sanskrit to improve brain functioning
3. Learning of Sanskrit to develop the logic in mathematics, science & other subjects enhancing the memory power
4. The engineering scholars equipped with Sanskrit will be able to explore the huge knowledge from ancient literature

Syllabus

Unit	Content	Hours
1	• Alphabets in Sanskrit, • Past/Present/Future Tense, • Simple Sentences	8
2	• Order • Introduction of roots • Technical information about Sanskrit Literature	8
3	• Technical concepts of Engineering-Electrical, Mechanical, Architecture, Mathematics	8

Suggested reading

1. "Abhyaspustakam" – Dr.Vishwas, Samskrita-Bharti Publication, New Delhi
2. "Teach Yourself Sanskrit" Prathama Deeksha-Vempati Kutumbshastri, Rashtriya Sanskrit Sansthanam, New Delhi Publication
3. "India‟s Glorious Scientific Tradition" Suresh Soni, Ocean books (P) Ltd., New Delhi.

Course Output

Students will be able to

1. Understanding basic Sanskrit language
2. Ancient Sanskrit literature about science & technology can be understood
3. Being a logical language will help to develop logic in students

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

AUDIT 1 and 2: VALUE EDUCATION

Course Objectives

Students will be able to

1. Understand value of education and self- development
2. Imbibe good values in students
3. Let the should know about the importance of character

Syllabus

Unit	Content	Hours
1	• Values and self-development –Social values and individual attitudes. Work ethics, Indian vision of humanism. • Moral and non- moral valuation. Standards and principles. • Value judgements	4
2	• Importance of cultivation of values. • Sense of duty. Devotion, Self-reliance. Confidence, Concentration. Truthfulness, Cleanliness. • Honesty, Humanity. Power of faith, National Unity. • Patriotism.Love for nature ,Discipline	6
3	• Personality and Behavior Development - Soul and Scientific attitude. Positive Thinking. Integrity and discipline. • Punctuality, Love and Kindness. • Avoid fault Thinking. • Free from anger, Dignity of labour. • Universal brotherhood and religious tolerance. • True friendship. • Happiness Vs suffering, love for truth. • Aware of self-destructive habits. • Association and Cooperation. • Doing best for saving nature	6
4	• Character and Competence –Holy books vs Blind faith. • Self-management and Good health. • Science of reincarnation. • Equality, Nonviolence ,Humility, Role of Women. • All religions and same message. • Mind your Mind, Self-control. • Honesty, Studying effectively	6

Suggested reading

1 Chakroborty, S.K. “Values and Ethics for organizations Theory and practice”, Oxford University Press, New Delhi

Course outcomes

Students will be able to 1.Knowledge of self-development

2. Learn the importance of Human values 3.Developing the overall personality

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

AUDIT 1 and 2: CONSTITUTION OF INDIA

Course Objectives:

Students will be able to:

1. Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
2. To address the growth of Indian opinion regarding modern Indian intellectuals‟ constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.
3. To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.

Syllabus

Units	Content	Hours
1	**History of Making of the Indian Constitution:** History Drafting Committee, (Composition & Working)	4
2	**Philosophy of the Indian Constitution:** Preamble Salient Features	4
3	**Contours of Constitutional Rights & Duties:** Fundamental Rights Right to Equality Right to Freedom Right against Exploitation Right to Freedom of Religion Cultural and Educational Rights Right to Constitutional Remedies Directive Principles of State Policy Fundamental Duties.	4
4	**Organs of Governance:** Parliament Composition Qualifications and Disqualifications Powers and Functions Executive President Governor Council of Ministers Judiciary, Appointment and Transfer of Judges, Qualifications Powers and Functions	4

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

5	**Local Administration:** District‟s Administration head: Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CE of Municipal Corporation. Pachayati raj: Introduction, PRI: ZilaPachayat. Elected officials and their roles, CEO ZilaPachayat: Position and role. Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy	4
6	**Election Commission:** Election Commission: Role and Functioning. Chief Election Commissioner and Election Commissioners. State Election Commission: Role and Functioning. Institute and Bodies for the welfare of SC/ST/OBC and women.	4

Suggested reading

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.
3. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.
4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.

Course Outcomes:

Students will be able to:

1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
4. Discuss the passage of the Hindu Code Bill of 1956.

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

AUDIT 1 and 2: PEDAGOGY STUDIES

Course Objectives:

Students will be able to:

4. Review existing evidence on the review topic to inform programme design and policy making undertaken by the DfID, other agencies and researchers.
5. Identify critical evidence gaps to guide the development.

Syllabus

Units	Content	Hours
1	**Introduction and Methodology:** • Aims and rationale, Policy background, Conceptual framework and terminology • Theories of learning, Curriculum, Teacher education. • Conceptual framework, Research questions**.** • Overview of methodology and Searching.	4
2	• Thematic overview: Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries. • Curriculum, Teacher education.	2
3	• Evidence on the effectiveness of pedagogical practices • Methodology for the in depth stage: quality assessment of included studies. • How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? • Theory of change. • Strength and nature of the body of evidence for effective pedagogical practices. • Pedagogic theory and pedagogical approaches. • Teachers‟ attitudes and beliefs and Pedagogic strategies.	4
4	• Professional development: alignment with classroom practices and follow-up support • Peer support • Support from the head teacher and the community. • Curriculum and assessment • Barriers to learning: limited resources and large class sizes	4
5	**Research gaps and future directions** • Research design • Contexts • Pedagogy • Teacher education • Curriculum and assessment • Dissemination and research impact.	2

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

Suggested reading

1. Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools, Compare, 31 (2): 245-261.
2. Agrawal M (2004) Curricular reform in schools: The importance of evaluation, Journal of Curriculum Studies, 36 (3): 361-379.
3. Akyeampong K (2003) Teacher training in Ghana - does it count? Multi-site teacher education research project (MUSTER) country report 1. London: DFID.
4. Akyeampong K, Lussier K, Pryor J, Westbrook J (2013) Improving teaching and learning of basic maths and reading in Africa: Does teacher preparation count? International Journal Educational Development, 33 (3): 272–282.
5. Alexander RJ (2001) Culture and pedagogy: International comparisons in primary education. Oxford and Boston: Blackwell.
6. Chavan M (2003) Read India: A mass scale, rapid, „learning to read" campaign. www.pratham.org/images/resource%20working%20paper%202.pdf.

Course Outcomes:

Students will be able to understand:

1. What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?
2. What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
3. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

AUDIT 1 and 2: STRESS MANAGEMENT BY YOGA

Course Objectives

1. To achieve overall health of body and mind
2. To overcome stress

Syllabus

Unit	Content	Hours
1	• Definitions of Eight parts of yog. (Ashtanga)	8
2	Yam and Niyam. Do`s and Don‟t‟s in life. i) Ahinsa, satya, astheya, bramhacharya and aparigraha ii) Shaucha, santosh, tapa, swadhyay, ishwarpranidhan	8
3	• Asan and Pranayam 1. Various yog poses and their benefits for mind & body 2. Regularization of breathing techniques and its effects-Types of pranayam	8

Suggested reading

1. „Yogic Asanas for Group Tarining-Part-I” : Janardan Swami YogabhyasiMandal, Nagpur
2. “Rajayoga or conquering the Internal Nature” by Swami Vivekananda, Advaita Ashrama (Publication Department), Kolkata

Course Outcomes:

Students will be able to:

1. Develop healthy mind in a healthy body thus improving social health also
2. Improve efficiency

SRI VASAVI INSTITUTE OF ENGINEERING & TECHNOLOGY
Approved By AICTE, New Delhi & Affiliated to JNTUK, Kakinada
Accredited by NAAC, NBA(CSE, ECE & ME)
AN AUTONOMOUS INSTITUTE
...Empowering minds

AUDIT 1 and 2: PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS

Course Objectives

1. To learn to achieve the highest goal happily
2. To become a person with stable mind, pleasing personality and determination
3. To awaken wisdom in students

Syllabus

Unit	Content	Hours
1	Neetisatakam-Holistic development of personality • Verses- 19,20,21,22 (wisdom) • Verses- 29,31,32 (pride & heroism) • Verses- 26,28,63,65 (virtue) • Verses- 52,53,59 (dont‟s) • Verses- 71,73,75,78 (do‟s)	8
2	• Approach to day to day work and duties. • Shrimad Bhagwad Geeta : Chapter 2-Verses 41, 47,48, • Chapter 3-Verses 13, 21, 27, 35, Chapter 6-Verses 5,13,17, 23, 35, • Chapter 18-Verses 45, 46, 48.	8
3	• Statements of basic knowledge. • Shrimad Bhagwad Geeta: Chapter2-Verses 56, 62, 68 • Chapter 12 -Verses 13, 14, 15, 16,17, 18 • Personality of Role model. Shrimad Bhagwad Geeta: Chapter2-Verses 17, Chapter 3-Verses 36,37,42, • Chapter 4-Verses 18, 38,39 • Chapter18 – Verses 37,38,63	8

Suggested reading

1. “Srimad Bhagavad Gita” by Swami Swarupananda Advaita Ashram (Publication Department), Kolkata
2. Bhartrihari‟s Three Satakam (Niti-sringar-vairagya) by P.Gopinath, Rashtriya Sanskrit Sansthanam, New Delhi.

Course Outcomes

Students will be able to

1. Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life
2. The person who has studied Geeta will lead the nation and mankind to peace and prosperity
3. Study of Neetishatakam will help in developing versatile personality of students