



# The Kavery Engineering College

(Approved by AICTE, New Delhi & Affiliated to Anna University)  
Mecheri, Mettur Tk. Salem Dt - 636 453.

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## DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

### PROGRAMME: M.E - APPLIED ELECTRONICS

#### VISION

- ❖ To be a centre of excellence in education, training and research in Electronics and Communication Engineering to cultivate technically competent professionals for Industry and Society.

#### MISSION

- ❖ To import knowledge and skills to face challenges in Electronics and Communication Engineering.
- ❖ To provide ethical and value based education to address the social needs.
- ❖ To provide innovative environment to learning global atonements.

#### PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

- ❖ To enable graduates to develop solutions to real world problems in the frontier areas of Applied Electronics.
- ❖ To enable the graduates to adapt to the latest trends in technology through self learning and to pursue research to meet out the demands in industries and Academia.
- ❖ To enable the graduates to exhibit leadership skills and enhance their abilities through lifelong learning.
- ❖ To become entrepreneurs to develop indigenous solutions.

#### PROGRAM OUTCOMES (POs)

- ❖ Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- ❖ Problem analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- ❖ Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the



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public health and safety, and the cultural, societal, and environmental considerations.

- ❖ Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- ❖ Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
- ❖ The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- ❖ Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- ❖ Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- ❖ Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- ❖ Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- ❖ Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- ❖ Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## **PROGRAM SPECIFIC OUTCOMES (PSOs)**

- ❖ To critically evaluate the design and provide optimal solutions to problem areas in advanced signal processing, digital system design, embedded systems and VLSI design.
- ❖ To enhance and develop electronic systems using modern engineering hardware and software tools.
- ❖ To work professionally and ethically in applied electronics and related areas.



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## COURSE OUTCOMES (COs)

<b>Regulation</b>	2021
<b>Semester</b>	01
<b>Course Code</b>	MA4101
<b>Course Name</b>	Applied Mathematics for Electronics Engineers
<b>Course Outcome</b>	<ul style="list-style-type: none"><li>❖ Apply the concepts of fuzzy sets, fuzzy logic, fuzzy prepositions and fuzzy quantifiers and in relate.</li><li>❖ Analyze the performance in terms of probabilities and distributions achieved by the determined solutions.</li><li>❖ Use some of the commonly encountered two dimensional random variables and extend to multivariate analysis.</li><li>❖ Classify various random processes and solve problems involving stochastic processes.</li><li>❖ Use queueing models to solve practical problems</li></ul>

<b>Regulation</b>	2021
<b>Semester</b>	01
<b>Course Code</b>	AP4151
<b>Course Name</b>	Advanced Digital Signal Processing
<b>Course Outcome</b>	<ul style="list-style-type: none"><li>❖ Describe the basics of Digital Signal Processing and Discrete Time Transforms.</li><li>❖ Design and implement FIR/IIR digital filters using various structures</li><li>❖ Estimate power spectrum using appropriate parametric/non-parametric method.</li><li>❖ Analyze discrete time system at different sampling frequencies using the concept of Multirate signal processing</li><li>❖ Design discrete time system for the given application using Multi rate signal processing</li></ul>

<b>Regulation</b>	2021
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<b>Semester</b>	01
<b>Course Code</b>	Ap4152
<b>Course Name</b>	Advanced Digital System Design
<b>Course Outcome</b>	<ul style="list-style-type: none"><li>❖ Analyze and design synchronous sequential circuits.</li><li>❖ Analyze hazards and design asynchronous sequential circuits.</li><li>❖ Knowledge on the testing procedure for combinational circuit and PLA.</li><li>❖ Able to design PLD and ROM.</li><li>❖ Design and use programming tools for implementing digital circuits of industry standards.</li></ul>

<b>Regulation</b>	2021
<b>Semester</b>	01
<b>Course Code</b>	AP4153
<b>Course Name</b>	Semiconductor Devices and Modeling
<b>Course Outcome</b>	<ul style="list-style-type: none"><li>❖ Explore the properties of MOS capacitors.</li><li>❖ Analyze the various characteristics of MOSFET devices</li><li>❖ Describe the various CMOS design parameters and their impact on performance of the device.</li><li>❖ Discuss the device level characteristics of BJT transistors.</li><li>❖ Identify the suitable mathematical technique for simulation.</li></ul>

<b>Regulation</b>	2021
<b>Semester</b>	01
<b>Course Code</b>	VL4152
<b>Course Name</b>	Digital CMOS VLSI Design
<b>Course Outcome</b>	<ul style="list-style-type: none"><li>❖ Use mathematical methods and circuit analysis models in analysis of CMOS digital circuits</li></ul>



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	<ul style="list-style-type: none"><li>❖ Create models of moderately sized static CMOS combinational circuits that realize specified digital functions and to optimize combinational circuit delay using RC delay models and logical effort</li><li>❖ Design sequential logic at the transistor level and compare the tradeoffs of sequencing elements including flip-flops, transparent latches</li><li>❖ Understand design methodology of arithmetic building blocks</li><li>❖ Design functional units including ROM and SRAM</li></ul>
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<b>Regulation</b>	2021
<b>Semester</b>	01
<b>Course Code</b>	AP4111
<b>Course Name</b>	Electronics System Design Laboratory
<b>Course Outcome</b>	<ul style="list-style-type: none"><li>❖ Design an instrumentation amplifier and voltage regulator</li><li>❖ Design a PCB layout using CAD tool</li><li>❖ Write a Verilog code for various combinational and sequential circuits</li><li>❖ Develop a memory module with FPGA</li><li>❖ Design an PLL circuit</li></ul>

<b>Regulation</b>	2021
<b>Semester</b>	01
<b>Course Code</b>	AP4112
<b>Course Name</b>	Signal Processing Laboratory
<b>Course Outcome</b>	<ul style="list-style-type: none"><li>❖ Obtain the ability to apply knowledge of linear algebra, random process and multirate signal processing in various signal processing applications.</li><li>❖ Develop the student's ability on conducting engineering experiments,</li></ul>



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	<p>analyze experimental observations scientifically</p> <ul style="list-style-type: none"> <li>❖ Become familiar to fundamental principles of linear algebra</li> <li>❖ Familiarize the basic operations of filter banks through simulations</li> <li>❖ Apply the principles of random process in practical applications</li> </ul>
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<b>Regulation</b>	2021
<b>Semester</b>	02
<b>Course Code</b>	AP4201
<b>Course Name</b>	Analog and Mixed Signal IC Design
<b>Course Outcome</b>	<ul style="list-style-type: none"> <li>❖ Carry out research and development in the area of analog and mixed signal IC design.</li> <li>❖ Well versed with the MOS fundamentals, small signal models and analysis of MOSFET based circuits.</li> <li>❖ Analyse and model data converters architecture</li> <li>❖ Understand and Design different mixed signal circuits for various applications as per the user specifications.</li> <li>❖ Analyze and design mixed signal circuits such as Comparator, ADCs, DACs, PLL.</li> </ul>

<b>Regulation</b>	2021
<b>Semester</b>	02
<b>Course Code</b>	AP4251
<b>Course Name</b>	Industrial Internet of Things
<b>Course Outcome</b>	<ul style="list-style-type: none"> <li>❖ Understand the basic concepts and Architectures of Internet of Things.</li> <li>❖ Understand various IoT Layers and their relative importance.</li> <li>❖ Realize the importance of Data Analytics in IoT.</li> <li>❖ Study various IoT platforms and Security</li> <li>❖ Understand the concepts of Design Thinking</li> </ul>



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<b>Regulation</b>	2021
<b>Semester</b>	02
<b>Course Code</b>	AP4202
<b>Course Name</b>	Power Conservation Circuits for Electronics
<b>Course Outcome</b>	<ul style="list-style-type: none"><li>❖ Describe the characteristics, operation of power switching devices and identify their ratings and applications.</li><li>❖ Understand the requirements SCR Protection, Describe the Functioning of SCR their Construction and Performance.</li><li>❖ Analyze and Design the Converter Based on SCR for various Industrial Applications.</li><li>❖ Demonstrate ability to understand High Frequency, Heating Systems, Timers, Relevant Sensors &amp; Actuator and their Application in Industrial Setting.</li><li>❖ Demonstrate the ability to understand and apply Data Communication, Telemetry &amp; SCADA System in Industrial Applications.</li></ul>

<b>Regulation</b>	2021
<b>Semester</b>	02
<b>Course Code</b>	AP4203
<b>Course Name</b>	Embedded Systems
<b>Course Outcome</b>	<ul style="list-style-type: none"><li>❖ Able to design an Embedded system</li><li>❖ Understand a general and single purpose processor</li><li>❖ Explain different protocols</li><li>❖ Discuss state machine and design process models</li><li>❖ Outline embedded software development tools and RTOS</li></ul>

<b>Regulation</b>	2021
<b>Semester</b>	02



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<b>Course Code</b>	AP4001
<b>Course Name</b>	Applications Specific Integrated Circuits
<b>Course Outcome</b>	<ul style="list-style-type: none"><li>❖ To architect ASIC library design</li><li>❖ To develop programmable ASIC logic cells</li><li>❖ To design I/O cells and interconnects</li><li>❖ To understand logic synthesis, placement and routing</li><li>❖ To identify new developments in SOC and low power design</li></ul>

<b>Regulation</b>	2021
<b>Semester</b>	02
<b>Course Code</b>	AP4003
<b>Course Name</b>	VLSI Design Techniques
<b>Course Outcome</b>	<ul style="list-style-type: none"><li>❖ Analyze the characteristics of CMOS transistor</li><li>❖ Identify the methods to distribute clock and reduce power dissipation in CMOS circuits.</li><li>❖ Design combinational and sequential circuits</li><li>❖ Analyze the methods to test the CMOS circuits</li><li>❖ Synthesize the combinational and sequential circuits using Verilog HDL</li></ul>

<b>Regulation</b>	2021
<b>Semester</b>	02
<b>Course Code</b>	AP4211
<b>Course Name</b>	VLSI Design Laboratory
<b>Course Outcome</b>	<ul style="list-style-type: none"><li>❖ Program in Verilog/VHDL for combinational and sequential circuits and implement the program in FPGA</li><li>❖ Implement FIR and IIR filters in FPGA</li></ul>



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	<ul style="list-style-type: none"><li>❖ Implement data path design and interfaces</li><li>❖ Handle CAD tools to draw/edit, and analyze the CMOS circuits.</li><li>❖ Program and interface the Arduino Boards using Embedded C</li></ul>
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<b>Regulation</b>	2021
<b>Semester</b>	02
<b>Course Code</b>	AP4212
<b>Course Name</b>	Mini Project
<b>Course Outcome</b>	<ul style="list-style-type: none"><li>❖ On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology</li></ul>

<b>Regulation</b>	2021
<b>Semester</b>	03
<b>Course Code</b>	VL4072
<b>Course Name</b>	CAD for VLSI Design
<b>Course Outcome</b>	<ul style="list-style-type: none"><li>❖ Use various VLSI design methodologies</li><li>❖ Understand different data structures and algorithms required for VLSI design.</li><li>❖ Develop algorithms for partitioning and placement.</li><li>❖ Develop algorithms for floor planning and routing.</li><li>❖ Design algorithms for modeling, simulation and synthesis.</li></ul>

<b>Regulation</b>	2021
<b>Semester</b>	03
<b>Course Code</b>	AP4008
<b>Course Name</b>	Advanced Microprocessors And Microcontrollers Architectures



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<b>Course Outcome</b>	<ul style="list-style-type: none"><li>❖ To understand the fundamentals of microprocessor architecture</li><li>❖ To know and appreciate the high performance features in CISC architecture.</li><li>❖ To know and appreciate the high performance features in RISC architecture.</li><li>❖ To perceive the basic features in Motorola microcontrollers.</li><li>❖ To interpret and understand PIC Microcontroller.</li></ul>
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<b>Regulation</b>	2021
<b>Semester</b>	03
<b>Course Code</b>	AP4011
<b>Course Name</b>	Advanced Digital Image Processing
<b>Course Outcome</b>	<ul style="list-style-type: none"><li>❖ To understand image formation and the role of human visual system plays in perception of gray and color image data.</li><li>❖ To apply image processing techniques in both the spatial and frequency (Fourier) domains.</li><li>❖ To design image analysis techniques in the form of image segmentation and to evaluate the methodologies for segmentation.</li><li>❖ To conduct independent study and analysis of feature extraction techniques.</li><li>❖ To understand the concepts of image registration and image fusion.</li><li>❖ To analyze the constraints in image processing when dealing with 3D data sets and to apply image processing algorithms in practical applications</li></ul>

<b>Regulation</b>	2021
<b>Semester</b>	03
<b>Course Code</b>	AP4251
<b>Course Name</b>	Industrial Internet of Things
<b>Course Outcome</b>	<ul style="list-style-type: none"><li>❖ Understand the basic concepts and Architectures of Internet of Things.</li><li>❖ Understand various IoT Layers and their relative importance.</li></ul>



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	<ul style="list-style-type: none"><li>❖ Realize the importance of Data Analytics in IoT.</li><li>❖ Study various IoT platforms and Security</li><li>❖ Understand the concepts of Design Thinking.</li></ul>
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<b>Regulation</b>	2021
<b>Semester</b>	03
<b>Course Code</b>	AP4311
<b>Course Name</b>	Project Work I
<b>Course Outcome</b>	<ul style="list-style-type: none"><li>❖ At the end of the course the students will have a clear idea of their area of work and they will be in a position to carry out the remaining phase II work in a systematic way</li></ul>

<b>Regulation</b>	2021
<b>Semester</b>	04
<b>Course Code</b>	AP4411
<b>Course Name</b>	Project Work II
<b>Course Outcome</b>	<ul style="list-style-type: none"><li>❖ On Completion of the project work students will be in a position to take up any challenging practical problems and find solution by formulating proper methodology</li></ul>