



Koneru Lakshmaiah Education Foundation

(Category -1, Deemed to be University estd. u/s. 3 of the UGC Act, 1956)

♦ Approved by AICTE ♦ ISO 21001:2018 Certified

Campus: Green Fields, Vaddeswaram - 522 302, Guntur District, Andhra Pradesh, INDIA.

Phone No. +91 8645 - 350 200; www.klef.ac.in; www.klef.edu.in; www.kluniversity.in

Admin Off: 29-35-38, Museum Road, Governerpet, Vijayawada - 520 002, Ph: +91 - 866 - 3500122, 25/6129

Department of Electronics and Communication Engineering

Program: M.Tech. – Radar & Communications

Academic Year 2025–2026

| Course Code | Course Name | CO No | CO Description |
|-------------|---|-------|--|
| 25EC 5101 | Modern Digital and Wireless Communication | CO1 | Understand and analyze digital communication system models and performance metrics. |
| | | CO2 | Design wireless communication links considering channel effects and noise. |
| | | CO3 | Apply equalization and coding techniques to mitigate ISI and errors. |
| | | CO4 | Evaluate transceiver architectures for modern wireless systems. |
| 25EC 5102 | Microwave and Millimetric Wave Circuits | CO1 | Explain microwave circuit theory and transmission line behavior at high frequencies. |
| | | CO2 | Design microwave resonators and filters for specific applications. |
| | | CO3 | Analyze waveguide and millimeter-wave circuit characteristics. |
| | | CO4 | Develop microwave components using practical design constraints. |
| 25EC 5103 | Radar Engineering & MM Radar | CO1 | Explain basic radar principles and system architectures. |
| | | CO2 | Analyze radar wave propagation and target detection methods. |
| | | CO3 | Design radar signal processing stages for range, Doppler, and angle estimation. |
| | | CO4 | Apply radar concepts to remote sensing and mm-wave radar systems. |
| 25EC 5104 | RF System and Antenna Design | CO1 | Understand RF system architecture and building blocks. |
| | | CO2 | Design RF amplifiers, oscillators, and matching networks. |
| | | CO3 | Analyze antenna parameters and radiation characteristics. |
| | | CO4 | Develop antenna and RF front-end systems for wireless applications. |
| 25EC 51A1 | EMI & EMC | CO1 | Explain the sources and effects of electromagnetic interference. |
| | | CO2 | Apply shielding and grounding |

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| | | | | techniques to reduce EMI. |
| | | CO3 | CO | Analyze EMI using mathematical and simulation models. |
| | | CO4 | CO | Design EMI/EMC compliant electronic systems. |
| 25EC 51A2 | Microwave Semiconductor Devices | CO1 | CO2 | Understand the operation of microwave semiconductor devices. |
| | | CO2 | CO3 | Analyze high-frequency characteristics of diodes and transistors. |
| | | CO3 | CO4 | Design microwave circuits using active devices. |
| | | CO4 | CO1 | Evaluate performance of high-frequency components. |
| 25EC 51A3 | Smart Antennas | CO1 | CO2 | Explain smart antenna concepts and array configurations. |
| | | CO2 | CO3 | Apply DOA estimation algorithms for signal direction finding. |
| | | CO3 | CO4 | Implement adaptive beamforming techniques. |
| | | CO4 | CO1 | Analyze performance of smart antenna systems in wireless networks. |
| 25EC 51A4 | Embedded Systems & VLSI for Wireless Communication | CO1 | CO2 | Understand embedded system architecture for communication systems. |
| | | CO2 | CO3 | Design VLSI blocks for RF transceivers. |
| | | CO3 | CO4 | Implement SDR-based wireless communication systems. |
| | | CO4 | CO1 | Evaluate power, area, and speed trade-offs in VLSI design. |
| 25EC 51B1 | Phased Array Systems | CO1 | CO2 | Understand phased array antenna principles and scanning techniques. |
| | | CO2 | CO3 | Analyze feed network and phase shifter designs. |
| | | CO3 | CO4 | Design frequency and electronically scanned arrays. |
| | | CO4 | CO1 | Evaluate beam steering and sidelobe control methods. |
| 25EC 51B2 | GPS & Global Satellite Systems | CO1 | | Understand GPS signal structure and |

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| 25EC 51B3 | Next Generation Networking & Communication Technologies | CO1 | Evaluates network performance of various communication technologies. | satellite orbits. |
| | | CO2 | Designs user-based service applications. | Analyze GPS errors and clock synchronization issues. |
| | | CO3 | Designs user-based service applications. | Apply positioning and navigation algorithms. |
| | | CO4 | Designs user-based service applications. | Evaluate performance of different satellite navigation systems. |
| 25EC 51B4 | Deep Learning with Artificial Intelligence | CO1 | Understands AI and deep learning. | Explain modern wireless networking technologies and architectures. |
| | | CO2 | Applies CNN and RNN models for signal processing problems. | Analyze GPRS, LTE and 4G protocols. |
| | | CO3 | Applies deep learning in communication and radar systems. | Design communication networks with QoS considerations. |
| | | CO4 | Evaluates AI models using standard metrics. | Evaluate performance of next-gen wireless networks. |
| 25EC 5205 | 4G, 5G and Modern Wireless Technologies | CO1 | Understands 4G and 5G system architectures and protocols. | Understand fundamentals of AI and deep learning. |
| | | CO2 | Applies propagation models and capacity limits. | Implement CNN and RNN models for signal processing problems. |
| | | CO3 | Designs cellular communication systems. | Apply deep learning in communication and radar systems. |
| | | CO4 | Evaluates performance of modern wireless standards. | Evaluate performance of AI models using standard metrics. |
| 25EC 5206 | Advanced Communication Systems & Networks | CO1 | Understands advanced wireless communication concepts. | Explain 4G and 5G system architectures and protocols. |
| | | CO2 | Applies spectrum sharing and MU-MIMO techniques. | Analyze propagation models and capacity limits. |
| | | CO3 | Applies cryptography and security in communication systems. | Design cellular communication systems. |
| | | CO4 | Designs next-generation wireless networks. | Evaluate performance of modern wireless standards. |
| 25EC 5207 | Modern Radar Systems & Autonomous Vehicles | CO1 | Explains MIMO radar and automotive radar principles. | Understands advanced wireless communication concepts. |

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| 25EC 5208 | Optical Networks & Satellite Communications | CO2 | Analyze radar signal processing for autonomous vehicles. |
| | | CO3 | Design radar-based sensing for vehicle applications. |
| | | CO4 | Evaluate performance of automotive radar systems. |
| | | CO1 | Understand satellite communication system design. |
| 25EC 52C1 | Estimation & Detection Theory | CO2 | Explain optical fiber components and WDM systems. |
| | | CO3 | Design optical and satellite communication links. |
| | | CO4 | Evaluate network performance and link budgets. |
| | | CO1 | Understand detection and estimation theory fundamentals. |
| 25EC 52C2 | Radar Signal Processing & System | CO2 | Apply estimation techniques such as MMSE and ML. |
| | | CO3 | Implement Kalman filtering for dynamic systems. |
| | | CO4 | Analyze receiver performance in noisy environments. |
| | | CO1 | Understand radar equations and system components. |
| 25EC 52C3 | High-Performance Communication Networking | CO2 | Analyze clutter and noise effects in radar systems. |
| | | CO3 | Implement signal processing for target detection. |
| | | CO4 | Design phased array radar systems. |
| | | CO1 | Explain high-speed communication network architectures. |
| 25EC 52C4 | Cryptography & Networking Security | CO2 | Analyze TCP/IP and optical networking technologies. |
| | | CO3 | Apply security mechanisms in networking. |
| | | CO4 | Evaluate performance of packet-switched networks. |
| | | CO1 | Explain principles of cryptography and security protocols. |

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| 25EC 52D1 | Machine Learning & Soft Computing in Communication | CO2 | Implement encryption and decryption algorithms. |
| | | CO3 | Analyze security vulnerabilities in networks. |
| | | CO4 | Design secure communication systems. |
| | | CO1 | Understand ML and soft computing techniques. |
| 25EC 52D2 | Remote Sensing & Sensors | CO2 | Apply ML for wireless and radar applications. |
| | | CO3 | Implement deep learning models for communication systems. |
| | | CO4 | Evaluate ML model performance in real-world scenarios. |
| | | CO1 | Understand remote sensing principles and sensor technologies. |
| 25EC 52D4 | Automotive Electronics & Avionics | CO2 | Analyze satellite and airborne sensor data. |
| | | CO3 | Apply data processing techniques for remote sensing images. |
| | | CO4 | Evaluate sensor system performance. |
| | | CO1 | Explain automotive electronic systems and sensors. |
| 25IE 5149 | Seminar | CO2 | Analyze control systems used in vehicles and avionics. |
| | | CO3 | Design autonomous vehicle electronic systems. |
| | | CO4 | Evaluate avionics system performance and safety. |
| | | CO1 | Develop effective technical presentation skills. |
| 25IE 5250 | Term Paper | CO2 | Improve scientific communication and delivery methods. |
| | | CO3 | Demonstrate audience engagement techniques. |
| | | CO4 | Analyze technical topics and present them clearly. |
| | | CO1 | Identify and define research problems. |
| | | CO2 | Conduct literature survey and technical analysis. |

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| | | | | | | CO3 | Develop and document research findings. | | | |
| | | | | | | CO4 | Present research work in a structured format. | | | |
| 25TS 5101 | Technical Skilling-I | | | | | CO1 | Understand system modeling and visualization tools. | | | |
| | | | | | | CO2 | Apply system design techniques for engineering problems. | | | |
| | | | | | | CO3 | Develop simulation models for scientific concepts. | | | |
| | | | | | | CO4 | Present design solutions using visualization methods. | | | |
| 25TS 5102 | Technical Skilling-II | | | | | CO1 | Apply advanced system design methods. | | | |
| | | | | | | CO2 | Develop and analyze engineering algorithms. | | | |
| | | | | | | CO3 | Use advanced visualization tools for system design. | | | |
| | | | | | | CO4 | Evaluate system performance and optimization techniques. | | | |
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