PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

Competency		Indicators	
1.1	Demonstrate competence in mathematical modelling	1.1.1	Apply the knowledge of linear algebra, calculus, transform techniques and differential equations to solve problems in signal and image procesing, Communication and control theory and circuits deisgn
		1.1.2	Apply the concepts of probability, random proocesses and queuing theory in communication systems, wired and wirelss networks
1.2	Demonstrate competence in basic sciences	1.2.1	Apply laws of basic science to clearly undrestand and define problems relatted to electronics and communication engineering
1.3	Demonstrate competence in engineering fundamentals	1.3.1	Apply various theorems pertaining to general engineering fundamentals in solving real life problems
1.4	Demonstrate competence in specialized engineering knowledge to the program	1.4.1	Apply theory and principles of electronics and communication engineering to solve any given engineering problem

PO 2: Problem analysis: Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

Competency		Indicators	
2.1	Demonstrate an ability to identify and formulate complex engineering problem	2.1.1	Evaluate problem statements and identifies objectives
		2.1.2	Identify various approaches like top-down/bottom-up, partitioning and divide and conquere to solve a complex engineering problem
		2.1.3	Identify mathematical derivative knowledge that applies to a given problem
2.2	Demonstrate an ability to formulate a solution plan and methodology for an engineering problem	2.2.1	Reframe any given anlog and digital system into interconnected subsystems using modular approaches
		2.2.2	Identify micro segments and use heirarchical approach for providing optimized solution.
		2.2.3	Identify existing solution/methods to solve the problem, including forming justified approximations and assumptions
		2.2.4	Compare and contrast alternative solution/methods to select the best methods
		2.2.5	Compare and contrast alternative solution processes to select the best process.
2.3	Demonstrate an ability to formulate and interpret a model	2.3.1	Able to apply design principles of electronics and communication systems to formulate modules of a system with required applicability and performance.
		2.3.2	Identify design constraints for required performance criteria.
2.4	Demonstrate an ability to execute a solution process and analyze results	2.4.1	Applies engineering mathematics to implement the solution.
		2.4.2	Analyze and interpret the results using modern EDA and other simulation tools.
		2.4.3	Identify the limitations of the solution and sources/causes.
		2.4.4	Arrive at conclusions with respect to the objectives.

PO 3: 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 public health and safety, and cultural, societal, and environmental considerations.

Competency	Indicators

3.1	**Demonstrate an ability to define a complex / open ended problem in engineering terms**	**3.1.1**	Able to define a precise problem statement with objectives and scope.
		3.1.2	Able to identify and document design requirements from stake holders as per the given specification/constraints.
		3.1.3	Ability to review state of the art literature and datasheets to synthesize analog and digital systems.
		3.1.4	Ability to choose appropriate quality attributes as defined by ISO/IEC 27000 series and IEEE standard.
		3.1.5	Explore and synthesize system requirements from larger social and professional concerns.
		3.1.6	Ability to develop concept to product specifications
3.2	**Demonstrate an ability to generate a diverse set of alternative design solutions**	**3.2.1**	Ability to explore design alternatives
		3.2.2	Ability to produce a variety of potential design solutions suited to meet functional requirements
		3.2.3	Identify suitable non functional requirements for evaluation of alternate design solutions.
3.3	**Demonstrate an ability to select optimal design scheme for further development**	**3.3.1**	Ability to perform systematic evaluation of the degree to which several design concepts meet the criteria.
		3.3.2	Consult with domain experts and stakeholders to select candidate engineering design solution for further development
3.4	**Demonstrate an ability to advance an engineering design to defined end state**	**3.4.1**	Ability to refine architecture design into a detailed design within the existing constraints.
		3.4.2	Ability to implement and integrate the modules
		3.4.3	Ability to verify the functionalities and validate the design.

PO 4: 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.

Competency		Indicators	
4.1	**Demonstrate an ability to conduct investigations of technical issues consistent with their level of knowledge and nderstanding**	**4.1.1**	Define a problem for purposes of testing, its scope and importance
		4.1.2	Ability to choose appropriate procedure/algorithm, data set and test vectors.
		4.1.3	Ability to choose appropriate hardware/software tools to conduct the experiment.
4.2	**Demonstrate an ability to design experiments to solve open ended problems**	**4.2.1**	Design and develop appropriate procedures/ methodologies based on the study objectives
4.3	**Demonstrate an ability to analyze data and reach a valid conclusion**	**4.3.1**	Use appropriate procedures, tools and techniques to collect and interpret the obtained results
		4.3.2	Critically analyze results for trends and correlations, stating possible errors and limitations
		4.3.3	Represent results (in tabular and/or graphical forms) so as to facilitate analysis and explanation of the data, and drawing of conclusions
		4.3.4	Synthesize information and knowledge about the problem from the obtained results to reach appropriate conclusions

PO 5: 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.

Competency		Indicators	
5.1	**Demonstrate an ability to identify / create modern engineering tools, techniques and resources**	**5.1.1**	Identify modern engineering tools, techniques and resources for engineering activities
		5.1.2	Create/adapt/modify/extend tools and techniques to solve engineering problems

5.2	**Demonstrate an ability to select and apply discipline specific tools, techniques and resources**	**5.2.1**	Identify the strengths and limitations of tools for (i) acquiring information, (ii) modeling and simulating, (iii) monitoring system performance, and (iv) creating engineering designs.
		5.2.2	Demonstrate proficiency in using appropriate EDA and other design and simulation tools
5.3	**Demonstrate an ability to evaluate the suitability and limitations of tools used to solve an engineering problem**	**5.3.1**	Discuss limitations and validate tools, techniques and resources
		5.3.2	Verify the credibility of results from tool use with reference to the accuracy and limitations, and the assumptions inherent in their use.

PO 6: 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.

Competency		Indicators	
6.1	**Demonstrate an ability to describe engineering roles in a broader context, e.g. pertaining to the environment, health, safety, legal and public welfare**	**6.1.1**	Identify and describe various engineering roles; particularly as pertains to protection of the public and public interest at global, regional and local level
6.2	**Demonstrate an understanding of professional engineering regulations, legislation and standards**	**6.1.2**	Interpret legislation, regulations, codes, and standards relevant to your discipline and explain its contribution to the protection of the public

PO 7: 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

Competency		Indicators	
7.1	**Demonstrate an understanding of the impact of engineering and industrial practices on social, environmental and in economic contexts**	**7.1.1**	Identify risks/impacts in the life-cycle of an engineering product or activity
		7.1.2	Understand the relationship between the technical, socio economic and environmental dimensions of sustainability
7.2	**Demonstrate an ability to apply principles of sustainable design and development**	**7.2.1**	Describe management techniques for sustainable development
		7.2.2	Apply principles of preventive engineering and sustainable development to an engineering activity or product relevant to the discipline

PO 8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

Competency		Indicators	
8.1	**Demonstrate an ability to recognize ethical dilemmas**	**8.1.1**	Identify situations of unethical professional conduct and propose ethical alternatives
8.2	**Demonstrate an ability to apply the Code of Ethics**	**8.2.1**	Identify tenets of IEEE, ABET, NSPE and other professional code of ethics
		8.2.2	Examine and apply moral & ethical principles to known case studies

PO 9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings

Competency		Indicators	
9.1	**Demonstrate an ability to form a team and define a role for each member**	**9.1.1**	Recognize a variety of working and learning preferences; appreciate the value of diversity on a team
		9.1.2	Implement the norms of practice (e.g. rules, roles, charters, agendas, etc.) of effective team work, to accomplish a goal.

9.2	**Demonstrate effective individual and team operations--communication, problem solving, conflict resolution and leadership skills**	**9.2.1**	Demonstrate effective communication, problem solving, conflict resolution and leadership skills
		9.2.2	Treat other team members respectfully
		9.2.3	Listen to other members in difficult situations and maintain combos
9.3	**Demonstrate success in a teambased project**	**9.3.1**	Present results as a team, with smooth integration of contributions from all individual efforts

PO 10: Communication: Communicate effectively on complex engineering activities with the engineering community and with the 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

Competency		Indicators	
10.1	**Demonstrate an ability to comprehend technical literature and document project work**	**10.1.1**	Read, understand and interpret technical and nontechnical information
		10.1.2	Produce clear, well-constructed, and well-supported written engineering documents
		10.1.3	Create flow in a document or presentation - a logical progression of ideas so that the main point is clear
10.2	**Demonstrate competence in listening, speaking, and presentation**	**10.2.1**	Listen to and comprehend information, instructions, and viewpoints of others
		10.2.2	Deliver effective oral presentations to technical and nontechnical audiences
10.3	**Demonstrate the ability to integrate different modes of communication**	**10.3.1**	Create engineering-standard figures, reports and drawings to complement writing and presentations
		10.3.2	Use a variety of media effectively to convey a message in a document or a presentation

PO 11: 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

Competency		Indicators	
11.1	**Demonstrate an ability to evaluate the economic and financial performance of an engineering activity**	**11.1.1**	Describe various economic and financial costs/benefits of an engineering activity
		11.1.2	Analyze different forms of financial statements to evaluate the financial status of an engineering project
11.2	**Demonstrate an ability to compare and contrast the costs/benefits of alternate proposals for an engineering activity**	**11.2.1**	Analyze and select the most appropriate proposal based on economic and financial considerations
11.3	**Demonstrate an ability to plan/manage an engineering activity within time and budget constraints**	**11.3.1**	Identify the tasks required to complete an engineering activity, and the resources required to complete the tasks.
		11.3.2	Use project management tools to schedule an engineering project so it is completed on time and on budget

PO 12: Life-long learning: Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

Competency		Indicators	
12.1	**Demonstrate an ability to identify gaps in knowledge and a strategy to close these gaps**	**12.1.1**	Describe the rationale for requirement for continuing professional development
		12.1.2	Identify deficiencies or gaps in knowledge and demonstrate an ability to source information to close this gap
12.2	**Demonstrate an ability to identify changing**	**12.2.1**	Identify historic points of technological advance in engineering that required practitioners to seek education in order to stay current

12.2	**trends in engineering knowledge and practice**	**12.2.2**	Recognize the need and be able to clearly explain why it is vitally important to keep current regarding new developments in your field
12.3	**Demonstrate an ability to identify and access sources for new information**	**12.3.1**	Source and comprehend technical literature and other credible sources of information
		12.3.2	Analyze sourced technical and popular information for feasibility, viability, sustainability, etc.