Performance Indicators (PIs): (Engineering programs other than CSE/IT and allied programs)

PI #	PI Description
1.1.1	Apply mathematical techniques such as calculus, linear algebra, and statistics to solve problems
1.1.2	Apply advanced mathematical techniques to model and solve mechanical engineering problems
1.2.1	Apply laws of natural science to an engineering problem
1.3.1	Apply fundamental engineering concepts to solve engineering problems
1.4.1	Apply Mechanical engineering concepts to solve engineering problems.
2.1.1	Articulate problem statements and identify objectives
2.1.2	Identify engineering systems, variables, and parameters to solve the problems
2.1.3	Identify the mathematical, engineering and other relevant knowledge that applies to a given problem
2.2.1	Reframe complex problems into interconnected subproblems
2.2.2	Identify, assemble and evaluate information and resources.
2.2.3	Identify existing processes/solution methods for solving the problem, including forming justified approximations and assumptions
2.2.4	Compare and contrast alternative solution processes to select the best process.
2.3.1	Combine scientific principles and engineering concepts to formulate model/s (mathematical or otherwise) of a system or process that is appropriate in terms of applicability and required accuracy.
2.3.2	Identify assumptions (mathematical and physical) necessary to allow modeling of a system at the level of accuracy required.
2.4.1	Apply engineering mathematics and computations to solve mathematical models
2.4.2	Produce and validate results through skilful use of contemporary engineering tools and models
2.4.3	Identify sources of error in the solution process, and limitations of the solution.
2.4.4	Extract desired understanding and conclusions consistent with objectives and limitations of the analysis
3.1.1	Recognize that need analysis is key to good problem definition
3.1.2	Elicit and document, engineering requirements from stakeholders
3.1.3	Synthesize engineering requirements from a review of the state-of-the-art
3.1.4	Extract engineering requirements from relevant engineering Codes and Standards such as BIS, ISO and ASHRAE.
3.1.5	Explore and synthesize engineering requirements considering health, safety risks, environmental, cultural and societal issues
3.1.6	Determine design objectives, functional requirements and arrive at specifications
3.2.1	Apply formal idea generation tools to develop multiple engineering design solutions
3.2.2	Build models/prototypes to develop diverse set of design solutions
3.2.3	Identify suitable criteria for evaluation of alternate design solutions
3.3.1	Apply formal decision making tools to select optimal engineering design solutions for further development
3.3.2	Consult with domain experts and stakeholders to select candidate engineering design solution for further development
3.4.1	Refine a conceptual design into a detailed design within the existing constraints (of the resources)
3.4.2	Generate information through appropriate tests to improve or revise design
4.1.1	Define a problem, its scope and importance for purposes of investigation
4.1.2	Examine the relevant methods, tools and techniques of experiment design, system calibration, data acquisition, analysis and presentation
4.1.3	Apply appropriate instrumentation and/or software tools to make measurements of physical quantities
4.1.4	Establish a relationship between measured data and underlying physical principles.
4.2.1	Design and develop experimental approach, specify appropriate equipment and procedures
4.2.2	Understand the importance of statistical design of experiments and choose an appropriate experimental design plan based on the study objectives
4.3.1	Use appropriate procedures, tools and techniques to conduct experiments and collect data
4.3.2	Analyze data for trends and correlations, stating possible errors and limitations
4.3.3	Represent data (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 raw data to reach appropriate conclusions

PI #	PI Description
5.1.1	Identify modern engineering tools such as computer aided drafting, modeling and analysis; techniques and resources for engineering activities
5.1.2	Create/adapt/modify/extend tools and techniques to solve engineering problems
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 discipline specific tools
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.
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
6.2.1	Interpret legislation, regulations, codes, and standards relevant to your discipline and explain its contribution to the protection of the public
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
7.2.1	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
8.1.1	Identify situations of unethical professional conduct and propose ethical alternatives
8.2.1	Identify tenets of the ASME professional code of ethics
8.2.2	Examine and apply moral & ethical principles to known case studies
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.
9.2.1	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; Maintain composure in difficult situations
9.3.1	Present results as a team, with smooth integration of contributions from all individual efforts
10.1.1	Read, understand and interpret technical and non-technical information
10.1.2	Produce clear, well-constructed, and wellsupported 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
10.2.1	Listen to and comprehend information, instructions, and viewpoints of others
10.2.2	Deliver effective oral presentations to technical and nontechnical audiences
10.3.1	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
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
11.2.1	Analyze and select the most appropriate proposal based on economic and financial considerations.
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
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
12.2.1	Identify historic points of technological advance in engineering that required practitioners to seek education in order to stay current
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
12.3.1	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.