



**Graduate Attributes of Knowledge Profile, Complex Engineering Problems and Activities**

**Knowledge Profile**

| S. No.    | Attribute   |
|-----------|---|
| <b>K1</b> | A systematic, theory-based understanding of the natural sciences applicable to the discipline.  |
| <b>K2</b> | Conceptually-based mathematics, numerical analysis, statistics and formal aspects of computer and information science to support analysis and modeling applicable to the discipline.  |
| <b>K3</b> | A systematic, theory-based formulation of Engineering fundamentals required in the Engineering discipline.  |
| <b>K4</b> | Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline.  |
| <b>K5</b> | Knowledge that supports engineering design in a practice area.  |
| <b>K6</b> | Knowledge of engineering practice (technology) in the practice areas in the engineering discipline.   |
| <b>K7</b> | Comprehension of the role of engineering in society and identified issues in engineering practice in the discipline: ethics and the professional responsibility of an engineer to public safety; the impacts of engineering activity: economic, social, cultural, environmental and sustainability. |
| <b>K8</b> | Engagement with selected knowledge in the research literature of the discipline.  |

**Attributes of Complex Engineering Problem**

| S. No.     | Attribute   |
|------------|---|
| <b>EP1</b> | <b>Depth Of Knowledge</b><br>Cannot be resolved without in-depth engineering knowledge at the level of one or more of K3, K4, K5, K6 or K8 which allows a fundamentals-based, first principles analytical approach. |
| <b>EP2</b> | <b>Range Of Conflicting Requirements</b><br>Involve wide-ranging or conflicting technical, engineering and other issues.  |
| <b>EP3</b> | <b>Depth Of Analysis Required</b><br>Have no obvious solution and require abstract thinking and originality in analysis to formulate suitable models.   |
| <b>EP4</b> | <b>Familiarity Of Issues Encountered</b><br>Involve infrequently encountered issues.  |
| <b>EP5</b> | <b>Extent Of Applicable Codes</b><br>Outside problems encompassed by standards and codes of practice for professional engineering.  |
| <b>EP6</b> | <b>Extent Of Stake Holders Involvements</b><br>Involve diverse groups of stakeholders with widely varying needs.  |
| <b>EP7</b> | <b>Consequences</b><br>Have significant consequences in the range of context.   |
| <b>EP8</b> | <b>Interdependence</b><br>High level problems including many component parts or sub-problems.   |

**Attributes of Complex Engineering Activities**

| S. No.     | Attribute   |
|------------|---|
| <b>EA1</b> | <b>Range of Resources</b><br>Involve the use of diverse resources (and for this purpose resources include people, money, equipment, materials, information and technologies).   |
| <b>EA2</b> | <b>Level of Interaction</b><br>Require resolution of significant problems arising from interactions between wide-ranging or conflicting technical, engineering or other issues. |
| <b>EA3</b> | <b>Innovation</b><br>Involve creative use of engineering principles and research-based knowledge in novel ways.   |
| <b>EA4</b> | <b>Consequences to Society and Environment</b><br>Have significant consequences in a range of contexts, characterized by difficulty of prediction and mitigation.               |
| <b>EA5</b> | <b>Familiarity</b><br>Can extend beyond previous experiences by applying principles-based approaches.   |