

INFORMATION ABOUT COMPLEX ENGINEERING PROBLEMS (WP), COMPLEX ENGINEERING ACTIVITIES (EA), COMPLEX ENGINEERING ACTIVITIES (EA)

GENERAL INFORMATION

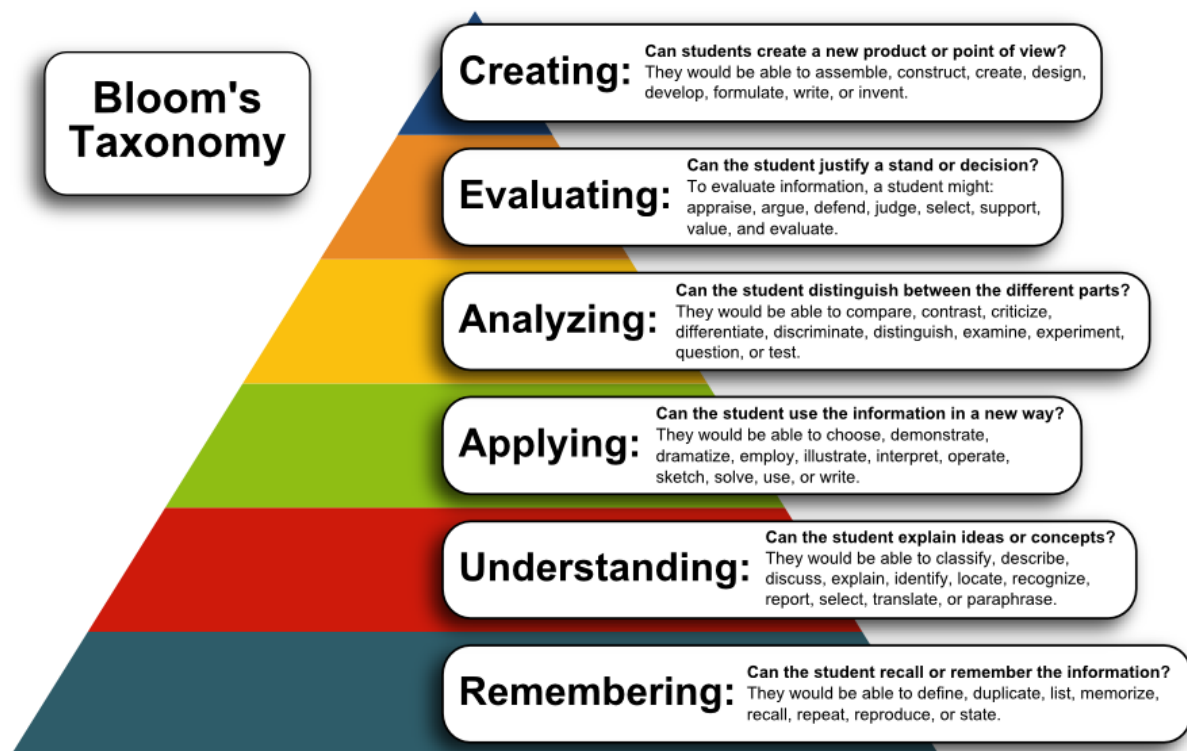
Engineering Applications

Emphasis on engineering applications in degree programmes aims to ensure that all engineering graduates have a sound understanding of up-to-date industrial practice, in particular:

Electrical and Electronic Engineering:

1. To appreciate the characteristic behaviour of materials in electrical and electronic systems.
2. To be able to analyse and design electrical and electronic systems from devices/components made of various materials.
3. To understand the concepts of generation, transmission and distribution of low and high voltage power.
4. To appreciate cost effectiveness and energy consumption of component/device equipment selection, manufacturing process and integration process.
5. To appreciate the range of manufacturing methods currently available and the skills which they require in people for their use.
6. To understand the whole process of industrial decision making in design, manufacturing and use and how it is influenced not only by technical ideas but also by the practical constraints of financial and human resources and by the business and social environment of engineering.

BLOOM'S TAXONOMY



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COMPLEX ENGINEERING PROBLEMS (WP)

No.	Attribute	Complex problems have characteristic WP1 and some or all of WP2 to WP7:
WP1	Depth of Knowledge Required	Cannot be resolved without in-depth engineering knowledge at the level of one or more of WK3, WK4, WK5, WK6 or WK8 which allows a fundamental-based, first principles analytical approach.
WP2	Range of conflicting requirements	Involve wide-ranging or conflicting technical, engineering and other issues.
WP3	Depth of analysis required	Have no obvious solution and require abstract thinking, originality in analysis to formulate suitable models.
WP4	Familiarity of issues	Involve infrequently encountered issues.
WP5	Extent of applicable codes	Are outside problems encompassed by standards and codes of practice for professional engineering.
WP6	Extent of stakeholder involvement and level of conflicting requirements	Involve diverse groups of stakeholders with widely varying needs.
WP7	Interdependence	Are high level problems including many component parts or sub-problems.

COMPLEX ENGINEERING ACTIVITIES (EA)

No.	Attribute	Complex activities mean (engineering) activities or projects that have some or all of the following characteristics:
EA1	Range of resources	Involve the use of diverse resources (and for this purpose resources includes people, money, equipment, materials, information and technologies).
EA2	Level of interactions	Require resolution of significant problems arising from interactions between wide ranging or conflicting technical, engineering or other issues.
EA3	Innovation	Involve creative use of engineering principles and research-based knowledge in novel
EA4	Consequences to society and the environment	Have significant consequences in a range of contexts, characterised by difficulty of prediction and mitigation.
EA5	Familiarity	Can extend beyond previous experiences by applying principles-based approaches.

KNOWLEDGE PROFILE (WK)

No.	Knowledge Profile
WK1	A systematic, theory-based understanding of the natural sciences applicable to the discipline.
WK2	Conceptually-based mathematics , numerical analysis, statistics and formal aspects of computer and information science to support analysis and modelling applicable to the discipline.
WK3	A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline.
WK4	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.
WK5	Knowledge that supports engineering design in a practice area.
WK6	Knowledge of engineering practice (technology) in the practice areas in the engineering discipline.
WK7	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.
WK8	Engagement with selected knowledge in the research literature of the discipline.