



**KING ABDULAZIZ UNIVERSITY  
FACULTY OF ENGINEERING  
AERONAUTICAL ENGINEERING DEPARTMENT**

## Indicators of Program Outcomes

### Outcome (a): an ability to apply knowledge of mathematics, science, and engineering

a.1	Use Math, Science, and Engineering Fundamentals to formulate the problem and devise appropriate solution strategies.
a.2	Consistently implement solution strategy and get correct answers.
a.3	Apply engineering judgment to evaluate answers.

### Outcome (b): an ability to design and conduct experiments, as well as to analyze and interpret data.

b.1	Correctly describe the problem with clear objectives that are complete, specific, concise, and measurable and are written using correct technical terminology free from linguistic errors.
b.2	Identify dependent and independent variables as well as the range for both and the appropriate increments for measurements.
b.3	Identify appropriate available sensors, instrumentation, and/or software tools to measure physical quantities.
b.4	Design a reliable experiment that solves the problem.
b.5	Deal responsibly with safety and environmental issues related to experimentation.
b.6	Identify, evaluate, and minimize sources of experimental uncertainty.
b.7	Record and represent data in a meaningful way.
b.8	Analyze data appropriately.
b.9	Make a reasonable judgment about the results of the experiment.

### Outcome (c): an ability to design a system, component, or process to meet desired needs within realistic constraints.

c.1	Correctly Describe the problem with clear objectives that are complete, specific, and concise including identification of customer needs and transforming them into design requirements.
c.2	Plan an effective design strategy including a plan of attack, decomposition of work into subtasks, development of a timetable.
c.3	Develop several potential solutions and compares them to find the best baseline.
c.4	Develop solutions that include economic, safety, environmental and other realistic constraints.
c.5	Integrate prior knowledge of mathematics, science, and engineering principles to the design problem.
c.6	Use computer tools and engineering resources effectively.
c.7	Define practical measures of effectiveness and use economic and other constraints to correctly optimize the baseline design.
c.8	Evaluate the solution by comparing the performance of the final design to customer demands and existing products if any.
c.9	Support design procedure with documentation and references.

### Outcome (d): an ability to function on multi-disciplinary teams

d.1	Achieve goal while functioning on a multidisciplinary and/or diverse team.
d.2	Manage teamwork effectively by integrating different skills and abilities of team members.
d.3	Regularly report, evaluate, and improve performance inside the team.

**Outcome (e): an ability to identify, formulate, and solve engineering problems**

e.1	Capture essential information and distinguish them from extraneous data.
e.2	Consistently and efficiently apply engineering principles with no conceptual errors and few if any procedural errors.
e.3	Recognize the absence of necessary information and make reasonable approximations.
e.4	Present easy-to-follow steps which are logical and adequately detailed.
e.5	Reach correct and reasonable solutions.

**Outcome (f): an understanding of professional and ethical responsibilities**

f.1	Identify and explain the impact of an engineering decision on multiple constituencies.
f.2	Identify engineering codes of ethics and act in accordance with them.
f.3	Identify alternatives by seeking multiple viewpoints and possible impact.
f.4	Use codes of ethics, input from constituencies and common sense to evaluate choices and take decisions while accepting responsibility for decisions.

**Outcome (g): an ability to communicate effectively**

g.1	Present correct technical information written at the appropriate level for the intended reader.
g.2	Prepare correctly formatted written documents that contain few, if any, typographical or grammatical errors.
g.3	Prepare well organized written documents which contain an introduction that interests and orients a reader, a body that is relevant and covers important points and conclusions with summary and recommendations, when appropriate.
g.4	Present authentic work with references that credit work from other sources.
g.5	Deliver efficient oral presentations that maintain audience interest.
g.6	Make effective use of visual aids during oral presentations.
g.7	Prepare well-organized presentations which contain an introduction that interests and orients the audience, a body that is relevant and covers important points and conclusions with recommendations, when appropriate.
g.8	Use allotted time appropriately when delivering an oral presentation.
g.9	Demonstrate self confident in answering questions correctly and completely during oral presentations.

**Outcome (h): the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.**

h.1	Demonstrate a deep understanding of the <u>immediate and long-term</u> issues involved on users and non-users locally and globally of a project, product, practice, or event.
h.2	Demonstrate a deep understanding of applied <u>economic factors</u> of related products and the impact they may have on the economy at large as well as long term trends.
h.3	Demonstrate a deep understanding of the <u>immediate and long-term implications to society</u> in the creation and/or use of a product or project, and the overall potential benefits and risks to society.
h.4	Demonstrate a deep understanding of applied <u>environmental factors</u> of related products and their long-term impact. Ability to propose efficient solutions to minimize or fully disclose all negative environmental impacts.

**Outcome (i): a recognition of the need for, and an ability to engage in life-long learning**

i.1	Go beyond what is required in completing an assignment by bringing information from outside sources.
i.2	Access information from a variety of sources and critically assess their quality, validity, and accuracy.
i.3	Analyze new content by breaking it down, comparing, contrasting, recognizing patterns, and/or interpreting information.
i.4	Regularly reflect on the learning process, evaluate personal performance and progress, and take required actions and improvements.

**Outcome (j): a knowledge of contemporary issues**

j.1	Identify contemporary issues (e.g. bioethics, energy crises, terrorism, global warming, globalization, pollution, mobile technology and communications, information management and security) and explain their impact and what makes them particularly problematic or controversial in the present time.
j.2	Suggest reasonable theories regarding the root causes of contemporary problems.
j.3	Identify possible solutions to contemporary problems, as well as any limitations of such strategies.

**Outcome (k): an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice**

k.1	Apply engineering principles to formulate problems without conceptual errors.
k.2	Apply calculus, differential equations, algebra, and advanced math techniques to solve engineering problems.
k.3	Use discipline related commercial packages. Present work documents that are word processed, clear, and contain well integrated computer-made graphs, figures, and illustrations that enhance comprehension.
k.4	Use discipline related modern non-conventional measuring instruments efficiently.
k.5	Devise and maintain user-friendly web pages with helpful graphics and frequent updates. Use the internet to gather and disseminate information.
k.6	Demonstrate competence in discipline related professional practices