

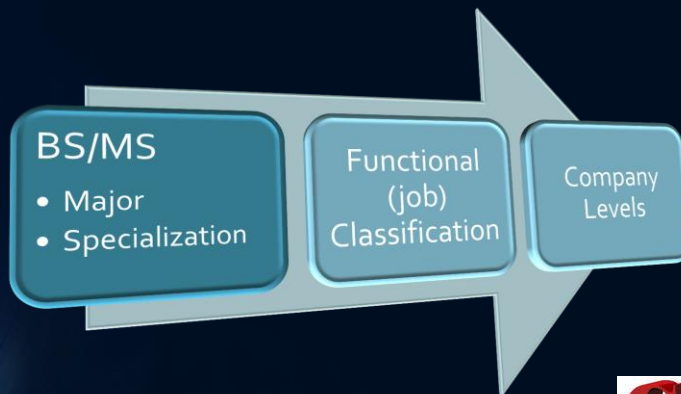


GE105  
Introduction to Engineering Design  
College of Engineering  
King Saud University

# Engineering Functional Jobs

2014-2015

## The Path to a Professional Engineer



## The Path (contn'd)



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## Engineering Functional Jobs

Title	Function	Skill/Knowledge
<i>Research Eng.</i>	<ul style="list-style-type: none"> <li>Solves new problems.</li> <li>Obtains new data.</li> <li>Devises new methods of calculation</li> <li>Gains new knowledge</li> </ul>	<ul style="list-style-type: none"> <li>Perceptiveness</li> <li>Patience</li> <li>Self-Confidence</li> </ul>
<i>Analytical Eng.</i>	<ul style="list-style-type: none"> <li>Models physical problems using math to predict performance.</li> <li>Performs failure analysis</li> </ul>	Math, physics, engineering science, software
<i>Develop. Eng.</i>	<ul style="list-style-type: none"> <li>Develops products, processes, or systems</li> <li>Uses well-known principles and employs existing processes or machines to perform a new function</li> <li>Concerned only with a prototype or model</li> </ul>	<ul style="list-style-type: none"> <li>Ingenuity</li> <li>Creativity</li> <li>Judgment</li> </ul>

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## Engineering Functional Jobs (contn'd)

Title	Function	Skill/Knowledge
<i>Design Eng.</i>	<ul style="list-style-type: none"> <li>Converts concepts and information into detailed plans and specs from which the finished product can be Manufactured</li> <li>Restricted by the state of the art</li> </ul>	<ul style="list-style-type: none"> <li>Creativity</li> <li>Innovation</li> <li>Knowledge of many disciplines</li> <li>Understanding of economics and people</li> </ul>
<i>Production Eng.</i>	<ul style="list-style-type: none"> <li>Devises a schedule to efficiently coordinate materials and personnel</li> <li>Orders raw materials at the optimum times</li> <li>Sets up the assembly line</li> <li>Handles and ships the finished product</li> </ul>	<ul style="list-style-type: none"> <li>Knowledge of design, economics, and psychology.</li> <li>Ability to visualize the overall operation of a project</li> <li>Knowledge of each step of the production effort</li> </ul>

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## Engineering Functional Jobs (contn'd)

Title	Function	SKILLS/Knowledge
<i>Test Eng.</i>	<ul style="list-style-type: none"> <li>Develops and conducts tests to verify that a new product meets design specs</li> <li>Products are tested for structural integrity, performance, and reliability</li> <li>Testing is performed under all expected environmental conditions</li> </ul>	<ul style="list-style-type: none"> <li>Knowledge of statistics, product and process specifications.</li> <li>Measurement techniques</li> <li>Fundamental engineering</li> <li>Aspects of the design</li> </ul>
<i>Operations or Plant Eng.</i>	<ul style="list-style-type: none"> <li>Selects sites for facilities</li> <li>Specifies the layout for all facets of the operation</li> <li>Selects the fixed equipment for climate control, lighting, and communication</li> <li>Responsible for maintenance and modifications</li> </ul>	<ul style="list-style-type: none"> <li>Industrial engineering</li> <li>Economics and law</li> </ul>

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## Engineering Career Path

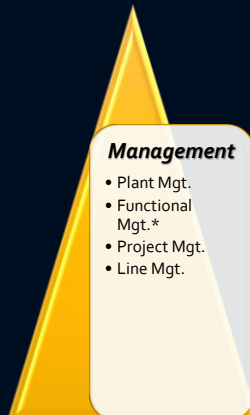
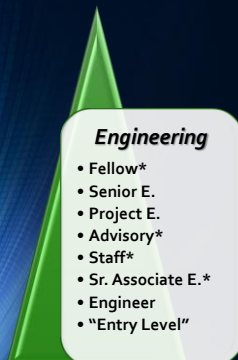


There are at least seven career options for graduating engineering students:

1. Corporate ladder
2. Independent entrepreneur
3. Military or government
4. Engineering and social service aboard
5. Professor/engineer
6. Graduate work outside engineering
7. A mix of first six options

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## Company Levels (Publicly owned)



\*: Large companies

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## Golden Set Of Skills for a Professional Engineer

### (Group A) Good Understanding of:

- Engineering science fundamentals:
  - a. *Physical and life sciences*
  - b. *Information technology*
  - c. *Math (including statistics)*
- The design and manufacturing process
- Good communication skills:
  - *Written*
  - *Verbal*
  - *Graphic*
  - *Listening*

### (Group B) Basic understanding of:

- The context in which engineering is practiced, including:
  - *Economics/business practice*
  - *History*
  - *The environment*
  - *Customer and social needs*
- *A multidisciplinary systems perspective.*
- *The importance of teamwork.*
- *Ethical standards*

### Group C A minimum of:

- Curiosity and a lifelong desire to learn (LLL)
- Ability to think critically and creatively as well as independently and cooperatively
- Flexibility, the ability, and the self-confidence to Adopt/Adapt

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## Other Directions

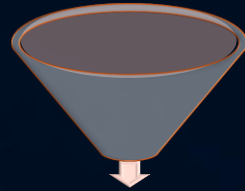
1. Advanced Degrees-Academic Institutions  
(Teaching, researching, publishing, community involvement)
2. Engineering Management (MSE/MBA)
3. Law (Patent law, Corporate Law)
4. Medicine (bioengineering)
5. Government, Defense
6. Engineering Consultant
7. Your Own Business



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## End Notes ...

- Understand that Engineering is a Profession
- Become familiar with Code of Ethics of your Discipline
- Join Student Engineering Societies
- Join other Professional Organizations



*There's more to being an engineer  
than technical competence*