

Engineering Technology: Third Year (2014)

Third Year Engineering Integrated Area Research Design, Implementation and Maintenance 2.G

1 Demonstrate integrated area research introductory knowledge. 2.G.01

- 1 Identify and explain additional engineering areas such as, but not limited to: Manufacturing, Aerospace, Environmental, Nuclear, Mining, Green/Sustainable Technologies, Geological, Agricultural, Marine and Ocean. 2.G.01.01
- 2 Identify an emerging or other engineering area for student research. 2.G.01.02
- 3 Present an emerging or other engineering area's design for a business plan. 2.G.01.03

2 Explain and apply integrated area research principles and techniques, and use design tools and materials according to current industry and OSHA standards. 2.G.02

- 1 Develop a working design of a system used in an emerging or other selected engineering area. 2.G.02.01
- 2 Identify components of design for the selected emerging or other engineering area. 2.G.02.02
- 3 Identify how a component or subsystem of a design relates to core engineering learning area(s). 2.G.02.03

3 Build and implement integrated area research designs. 2.G.03

- 1 Build a model of a system for a selected emerging or other engineering area based on a business plan and working design. 2.G.03.01
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Third Year Elective Engineering Area Design Template 2.H

1 Demonstrate elective engineering area introductory knowledge and skills. 2.H.01

- 1 Identify an elective engineering area (EEA) of interest. 2.H.01.01
- 2 Present initial research and rationale of the feasibility for further engineering study and activities within the EEA of choice. 2.H.01.02
- 3 Determine and demonstrate knowledge of essential scientific discoveries for the EEA. 2.H.01.03
- 4 Determine and demonstrate knowledge of the mathematics required for success in engineering within the EEA. 2.H.01.04
- 5 Describe the engineering history within the EEA. 2.H.01.05
- 6 Explain the evolution and the state of the art of the technology (both devices and processes) within the EEA. 2.H.01.06
- 7 Identify and demonstrate knowledge of the design tools, design techniques and materials utilized in the EEA. 2.H.01.07
- 8 Identify and demonstrate knowledge of implementing and building a design within the EEA. 2.H.01.08
- 9 Identify and demonstrate knowledge of the tools, techniques, skills and materials utilized in the maintenance of the system for the EEA. 2.H.01.09
- 10 Comprehensively review and document your introductory EEA findings. Note: this is to strengthen your understanding of the feasibility of continuing your EEA efforts to include engineering design, implementation and maintenance within this domain. 2.H.01.10

2 Explain and apply elective engineering area principles, and techniques and use design tools and materials according to current industry and OSHA standards. 2.H.02

- 1 Analyze or reverse engineer a design of a system, subsystem or component, typical of your EEA. 2.H.02.01
- 2 Demonstrate a working knowledge of the design techniques typical of your EEA industry. 2.H.02.02
- 3 Create or recreate an initial EEA design (i.e. schematics, drawing, flowcharts, psuedocode, etc.) using elementary design tools typical to the chosen engineering domain. 2.H.02.03
- 4 Specify materials and/or components for your EEA design. 2.H.02.04
- 5 Determine a maintenance strategy for your EEA design. 2.H.02.05
- 6 After review and update of the initial design, create or recreate a working design (if possible, using computer aided design (CAD) tools) typical of your EEA industry. 2.H.02.06
- 7 Follow the engineering design process through all stages of your EEA design or emulated design. 2.H.02.07

3 Build and implement elective engineering area designs. 2.H.03

- 1 Build a model or working prototype of your EEA design or redesign. Or, alternatively, fashion a model of an emulated commercial EEA design. 2.H.03.01
- 2 Specify and document processes that will ensure efficiency in the commercial manufacturing of an EEA design (either yours or an existing one). 2.H.03.02

4 Maintain elective engineering area designs. 2.H.04

- 1 Identify skills required for personnel who will perform maintenance and repair of design(s) typical of your EEA. 2.H.04.01
- 2 Identify the tools and processes for maintenance and repair of your design or of design(s) typical for your EEA. 2.H.04.02
- 3 Practice providing maintenance and/or repair of design(s) typical of your EEA, while keeping a repair log. 2.H.04.03

Engineering Maintenance 2.I

1 Maintain electrical engineering equipment. 2.I.01

- 1 Identify skills for appropriate person(s) for maintenance and repair of electrical equipment. 2.I.01.01
- 2 Identify the tools and processes for appropriate person(s) for maintenance and repair of electrical equipment. 2.I.01.02
- 3 Research and provide preventative maintenance on an electrical system (such as a 3D printer), keeping a log for documentation. Provide corrective maintenance on an electrical system. 2.I.01.03
- 4 Monitor equipment operational indicators to insure that equipment is performing according to manufacturer's specifications. 2.I.01.04

2 Maintain mechanical engineering equipment. 2.I.02

- 1 Identify required skills for maintenance and repair of mechanically designed equipment. 2.I.02.01
- 2 Identify the tools and processes required for maintenance and repair of mechanically designed equipment. 2.I.02.02
- 3 Research and provide preventative maintenance on a mechanical system (such as a bicycle, lathe, or automobile), keeping a log for documentation. Provide corrective maintenance on a mechanical system. 2.I.02.03
- 4 Monitor equipment operational indicators to insure that equipment is performing according to current industry and OSHA standards, 2.I.02.04
- 5 Maintain, inventory, and organize tools and equipment. 2.I.02.05
- 6 Develop and maintain a written log for service and repair of tools and equipment. 2.I.02.06
- 7 Maintain electronic and mechanical devices and gauges as specified by manufacturer, including cleaning, storage and calibration. 2.I.02.07
- 8 Store, retrieve, copy, and output drawing files depending upon system setup. 2.I.02.08

3 Maintain automated systems engineering equipment. 2.I.03

- 1 Identify skills required for maintenance and repair of an automated system. 2.I.03.01
- 2 Identify the tools and processes required for maintenance and repair of an automated system. 2.I.03.02
- 3 Research and provide preventative maintenance on an automated system (such as a robot), keeping a log for documentation. Provide corrective maintenance on an automated system. 2.I.03.03
- 4 Monitor operational indicators to insure that the automated system is performing according to current industry and OSHA standards. 2.I.03.04

4 Maintain civil engineering/architecture equipment. 2.I.04

- 1 Identify skills required for maintenance and repair of a structure. 2.I.04.01
- 2 Identify the tools and processes required for maintenance and repair of a structure. 2.I.04.02
- 3 Research and describe preventative maintenance on a system (such as a bridge), keeping a log for documentation. Provide corrective maintenance on a system. 2.I.04.03
- 4 Monitor structural operational indicators to insure that the system is performing according to current industry and OSHA standards. 2.I.04.04

5 Maintain integrated area research equipment. 2.I.05

- 1 Identify skills required for maintenance and repair of integrated areas equipment. 2.I.05.01
- 2 Identify the tools and processes required for maintenance and repair of integrated areas equipment. 2.I.05.02
- 3 Research and provide preventative maintenance on integrated areas system, keeping a log for documentation. Provide corrective maintenance on another engineering areas system. 2.I.05.03