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BENT414 Testing and Fault-finding in Electrical and Electronic Circuits

ECTS Value: 5 ECTS
Self-Study Hours: 64

Contact Hours: 25
Assessment Hours: 36

Overall Objectives and Outcomes

This module gives the skills and knowledge to understand electrical and electronic circuits for repairs and modifications. The Module also provides the knowledge and skills necessary to fault-find electrical and electronic circuits from system to component level. First, workbench tools and equipment used to construct circuits are described followed by test bench equipment and settings. Then, the basic voltage, current and resistance tests from system to component levels are explained. Finally, the use of test bench equipment in relation to different scenarios and practical fault-find scenarios are depicted with standard equipment.

By the end of this module, the learner will be able to:

Competences

a. identify tools and equipment used to construct circuits: soldering iron; wire stripper; side cutter; long nose pliers; third hand; de-soldering pump; solder wick; track cutter;
b. label test bench equipment and settings. Test Bench Equipment: multi-meter; oscilloscope; signal generator;
c. understand the operation of electronic components within circuit and basic voltage, current and resistance tests from system to component levels.

Knowledge

a. handle and use appropriate tools and equipment, applying suitable safety precautions when working on electronic equipment, to construct circuits: soldering iron; wire stripper; side cutter; long nose pliers; third hand; de-soldering pump; solder wick; track cutter;
b. understand the operation of test bench equipment and settings and apply analytical skills. Test Bench Equipment: multi-meter; oscilloscope; signal generator;
c. apply a systematic approach to fault finding and locate a range of faults to component level.

Skills

a. fault-find a circuit;
b. repair a malfunctioning circuit.

Assessment Methods

This module will be assessed through: Research Assignment: (50%), Presentation (20%), Practical Assignment (30%).

Suggested Readings

Core Reading List:

1. Al Williams, (2004). Build your own printed Circuit Board. McGraw-Hill.
2. Anderson, E.L. and Klyatis, L.M. (2018).Reliability Prediction and Testing Textbook. Wiley.
3. Simpson, A. (1976). Testing Methods and Reliability: Electronics. Palgrave Macmillan.

Useful Online Resources:

1. PCB Design Tutorial - http://alternatezone.com/electronics/pcbdesign.htm
2. National Instruments Circuit Design Suite - http://www.ni.com/multisim
3. The Electronics Club - http://electronicsclub.info

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