

About FENC

In 1998 the University of Technology, Jamaica (UTech) was reorganized into five Faculties. Emerging from the rationalization of the university's academic and administrative units, the Faculty of Engineering and Computing (FENC) became an entity. FENC comprises the following schools:

- School of Engineering
- School of Computing and Information Technology

FENC is the second largest such faculty in the Caribbean region and it is also the second largest faculty within UTech.

Vision Statement

To be the preferred partner in providing education and training for engineering and computing scholarship in Jamaica and the Caribbean.

Mission Statement

Build an education and training framework that responds to local and regional needs by:

- Promoting excellence in staff, students and graduates.
- Emphasizing quality in teaching and research.
- Developing relevant curricula based on student-centred learning concepts.
- Fostering innovative use of technology in teaching methods and laboratory exercises.

- Maintaining a strong commitment to research, service and teamwork.
- Developing applied research projects for industrial renewal.
- Building collaboration with engineering and computing training institutions locally and internationally.



Contact

Student Affairs Office

Faculty of Engineering & Computing

University of Technology, Jamaica

237 Old Hope Road, Kingston 6

Phone: (876)-927-1680-8, Exts. 2163-2165

Application & Registration

1. Applications should be made on the prescribed form, which is available at the Student Affairs Office.
2. Course Participants are encouraged to register in advance by completing and submitting the application form
3. Final Payments should be made at least **two weeks** before commencement of the course. Payments are accepted in Cash, Debit/Credit Cards, or Manager's Cheques.

Cancellation

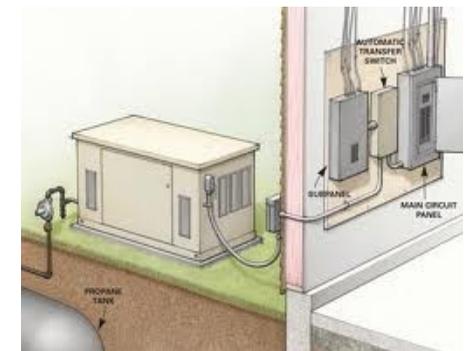
1. Courses may be cancelled where enrolment is insufficient, in which case, a refund of course fees will be made.
2. Student cancellation must be received one (1) week prior to the commencement of the course, failing which the individual or sponsor will be held responsible for the payment of fees.



University of Technology,
Jamaica

Faculty of Engineering & Computing

Advanced Stand-by Generator Maintenance



"Solution Driven, Development Bound"

OBJECTIVE

This course is designed to provide participants with specific skills and knowledge of stand-by generator systems and applications in industry. The course refers to a typical stand-by generator system, applicable to a wide range of users and includes: wiring diagram, alternator connection, system trouble-shooting, maintenance, installation, sizing, voltage regulation, engine controls, engine governors, transfer switches and system repairs.

PRE-REQUISITE

Successful completion of the Basic Generator module or Electrical Power Diploma or HEART level 3 Electrical. A pre-test will be conducted.

COURSE OUTLINE

UNIT I: The Generator System (8 Hours)

Upon completion of this unit, the participant should be able to;

- Describe a generator set and its application to essential and nonessential loads
- Outline the environmental impact of the generator set
- Describe system grounding and over-current protection.
- Understand safety requirements for portable generator systems.
- Identify suitable locations to place generator set
- Sizing calculations for generator set using data from name plate and load demand

- Identify different types of generator set noises, airborne and structure-borne
- Reduce generator set noise using acoustic materials and vibration dampers
- Analyze a proper ventilation system for generator set room construction
- Perform preventative maintenance to generator set (Lab)
- Discuss options for predictive maintenance methods for large installations
- Participate in problem-solving exercises where common faults and case studies are explored (Lab)

UNIT II: The Engine (10 hours)

Upon completion of this unit, the participant should be able to:

- Analyze fuel injection mechanisms: mechanical and electronic
- Understand fuel delivery using mechanical or electronic governor control
- Select the correct battery size for engines (Lab)
- Perform battery care and treatment (Lab)
- Connect the battery to engine starter (Lab)
- Size battery charger using formulas (Lab)
- Dismantle an engine starter circuit and be aware of shut down methods; identify parts and their function (Lab)
- Understand the relationship between engine speed and output frequency

UNIT III: The Transfer Switch (10 Hours)

Upon completion of this unit, the participant should be able to:

- Adopt safe working practices when working on transfer switches
- Describe the operation/application of automatic transfer switches including sizing
- Review the purpose of the:
 - time delay to start relay
 - time delay to transfer relay
 - time delay to retransfer relay
 - time delay to stop
- Determine common transfer-switch failure, e.g. transfer and re-transfer
- Set generator phase rotation to match that of utility phase (Lab)
- Determine why a generator set will not start (Lab)
- Determine why a generator set will not shut down (Lab)
- Explain the functions of auxiliary (micro) switch (Lab)
- Explain two start generator set (Lab)
- Draw function diagram of transfer switch (Lab)
- Service a transfer switch (Lab)
Participate in problem-solving exercise using case studies (lab)

UNIT IV : The Alternator (10 Hours)

Upon completion of this unit, the participant should be able to:

- Explore AC generators and excitation systems
- Review the function of voltage regulator and suggest adjustments.

- Differentiate between self and separate excitation alternator
- Explain the function of rotating diodes
- Perform tests on the main stator and rotor (Lab)
- Perform tests on the exciter rotor and stator (Lab)
- Check the functionality of the permanent magnet rotor and stator (Lab)
- Manipulate star, delta and star-delta connections on alternator output wiring

BREAKDOWN OF HOURS

- | | |
|-----------------------------|---------------|
| • Lectures/Discussion/Demos | 18hrs |
| • Laboratory | 20 hrs |
| • Assessment | 2 hrs |
| TOTAL COURSE HOURS: | 40 hrs |

INSTRUCTIONAL/LEARNING

APPROACHES

Lecture, handouts, class activities and lab-work.

ASSESSMENT PROCEDURES

- | | |
|------------------|-------------|
| 1. Assignments | 25% |
| 2. In-class Test | 25% |
| 3. Laboratory | 50% |
| TOTAL | 100% |

AWARD

On successful completion of the course, that is, where a student gains a mark of 50% or above, the individual will be awarded a "Certificate of Competence."