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| Module Title: | Satellite and Microwave Systems |
| Language of Instruction: | English |
| Credits: | 5 |
| NFQ Level: | 6 |
| Module Delivered In | 1 programme(s) |
| Teaching & Learning Strategies: | Combination of lectures and practical laboratory sessions. Lectures will take the form of traditional theory and tutorials. Laboratory sessions take the form of individual & group work. |
| Module Aim: | To understand the application of information theory and digital communications concepts in the design of microwave wireless communication systems and to appreciate the operational conditions and constraints of modern microwave systems. |
| Learning Outcomes | |
| <i>On successful completion of this module the learner should be able to:</i> | |
| LO1 | Understand terrestrial and satellite microwave transmission fundamentals. |
| LO2 | Consider and select microwave antenna types appropriate to given scenarios. |
| LO3 | Determine antenna installation considerations, physical, alignment and path loss. |
| LO4 | Contrast the types of transmission lines associated with microwave and satellite systems. |
| LO5 | Test and maintain terrestrial and satellite microwave transmission systems. |
| Pre-requisite learning | |
| Module Recommendations <i>This is prior learning (or a practical skill) that is recommended before enrolment in this module.</i> | |
| No recommendations listed | |
| Incompatible Modules <i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module.</i> | |
| No incompatible modules listed | |
| Co-requisite Modules | |
| No Co-requisite modules listed | |
| Requirements <i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.</i> | |
| No requirements listed | |

Module Content & Assessment

Indicative Content

Fundamentals of Microwave Radio

Spectrum, propagation characteristics, Fresnel zone.

Fundamentals of Satellite Systems

Characteristics of Satellites, System Elements, Satellite Orbit Configurations, Frequency Spectrum Allocations, Satellite Network Architectures, Point-to-Multipoint Networks, Point-to-Point Networks, VSAT Networks, Propagation on the Earth-Space Link.

Microwave link Engineering

Antenna choice, positioning, Link Requirements, Electromagnetic Environments, Capacity, Feed Assemblies, Shields and Radomes, High-performance Antennas, High Capacity Antennas, Direct Radio Integration.

Transmission Lines

Types of Waveguide, Flanges, Pressurization, Dehydrators, Waveguide assembly.

Antenna installation

Antenna Path Alignment, Antenna Path Loss, Transmission Line Loss, Compass Readings and Azimuth Markers.

Testing and Maintenance

VSWR, Test Equipment, Maintenance.

Assessment Breakdown

%

Continuous Assessment

100.00%

Continuous Assessment

| Assessment Type | Assessment Description | Outcome addressed | % of total | Assessment Date |
|---------------------------|---|-------------------|------------|-----------------|
| Multiple Choice Questions | MCQ: The students will be given MCQs to assess their knowledge of terrestrial and satellite microwave systems during the semester. | 1,2,3,4,5 | 60.00 | n/a |
| Written Report | Each student will be given an aspect of satellite communications to research and report on. This will include a presentation to their peers at the end of the semester. | 1,2,3,4,5 | 40.00 | n/a |

No Project

No Practical

No End of Module Formal Examination

Continuous Assessment

| Assessment Type | Assessment Description | Outcome addressed | % of total | Assessment Date |
|---------------------------|---|-------------------|------------|-----------------|
| Multiple Choice Questions | MCQ: The students will be given MCQs to assess their knowledge of terrestrial and satellite microwave systems during the semester. | 1,2,3,4,5 | 60.00 | n/a |
| Written Report | Each student will be given an aspect of satellite communications to research and report on. This will include a presentation to their peers at the end of the semester. | 1,2,3,4,5 | 40.00 | n/a |

No Project

No Practical

No End of Module Formal Examination

SETU Carlow Campus reserves the right to alter the nature and timings of assessment

Module Workload

| Workload: Full Time | | |
|----------------------------|------------------|--|
| <i>Workload Type</i> | <i>Frequency</i> | <i>Average Weekly Learner Workload</i> |
| Lab/Lecture | Every Week | 3.00 |
| Independent Learning Time | Every Week | 3.00 |
| Total Hours | | 6.00 |

Module Delivered In

| Programme Code | Programme | Semester | Delivery |
|----------------|---|----------|-----------|
| CW_EESYS_B | Bachelor of Engineering (Honours) in Electronic Engineering | 4 | Mandatory |