TRON06019
Interface Electronics 1

Full Title	Interface Electronics 1		
Status	Uploaded to Banner	**Start Term**	201600
NFQ Level	06	**ECTS Credits**	10
Attendance	75 %		
Module Code	TRON06019	**Duration**	Stage - Full Academic Year - (30 Weeks)
Grading Mode		**Department**	Electronic Computer Software
Module Author	Marcus Rahilly		
Co Authors	Nigel Flynn, James Mooney, Theresa Costello		

Module Description

This module uses lectures and practical labs to teach the principles of electronics as used in the interface between computers and real world applications. The module also provides an introduction to communications technology.

Students who do not attend at least 75% of the module's practical sessions without medical and/or sports certificates or other exceptional mitigating circumstances will be required to 'repeat and attend' this module.

	Learning Outcomes ***on completion of this module the learner will/should be able to;***
1.	identify, select and explain the operation of electronic components such as Resistors, Capacitors, Transistors, Timer IC's, Transformers and Diodes;
2.	interpret schematic diagrams, construct electronic interface circuits, take electrical measurements;
3.	identify and list the various risk factors associated with working in an electrical environment;
4.	explain and apply the underlying technologies used in communication systems.

Indicative Syllabus

Health and Safety

- Fatal and non-fatal consequences of electric shock.

DC Circuits

- Current, potential difference and resistance;
- Ohm's Law;
- Kirchhoff's current law & Kirchhoff's voltage law;
- Series and Parallel Circuits;
- Voltage and Current Divider networks;
- Measure of DC quantities using digital multi-meters.

AC Circuits

- AC vs. DC signals, AC generation;
- Mean and RMS values of AC waveforms;
- Measurement of RMS values using multi-meters;
- Measure voltage & frequency.

Transistor

- Transistor as a switch and voltage level shifter;
- Hfe, power rating and pin-outs.

Diode, LED and Zeners

- Operating characteristics;
- Calculation of series resistors;
- Rectification and suppression of back EMF.

Opto-Isolator

- Operating characteristics;
- Circuit isolation.

TTL logic gates

- Electrical characteristics;
- Truth tables for AND, OR, NOT and NAND gates.

Transformers

- Identification, definition and application of transformers;
- Operation and losses within transformers;
- Step-up and step-down transformers including calculations.

Workshop skills

- Identify correct component orientation and markings;
- Read schematics and build circuits on breadboard.

Communication System Technology

- Wave characteristics and phenomena;
- Analogue and digital transmission, bit rate;
- Optical and radio frequency transmission;
- Antennas and propagation;
- Cellular networks.

Teaching and Learning Strategy

The module is predominantly practical in nature. The teaching is part didactic and part student led. The student experience is one where practical tasks are undertaken and as problems are encountered or a deficit of knowledge is identified the lecturer can respond appropriately. The student is required to write a report on their work and is encouraged to engage with the lecturer for feedback on same as the work progresses. The student will, as part of a team, present a session of peer teaching based on the module subject matter.

Assessment Strategy

Formative:

- Build circuits, measure, observe and document results with feedback from the lecturer.
- MCQ's at end of topic.

Summative:

- Lab reports, lab exam and written/online assessments.
- Peer Teaching Session where a group of students prepare a topic from the syllabus and present it to the class.
- Written final exam

Students who do not attend at least 75% of the module’s practical sessions without medical and/or sports certificates or other exceptional mitigating circumstances will be required to ‘repeat and attend’ this module.

Repeat Assessment Strategies

Students will be required to submit written material to show competency in the subject areas that they have under-performed in.

The telecoms lab skills exam may be retaken in early September.

The written portion may be re-assessed during the Autumn repeat exams.

Arrangements will be made where possible for students with certified absences, to repeat the practical sessions.

Professional Body applicable to Placement Modules

Legal Requirements

Indicative Coursework and Continuous Assessment:		65 %		
Form	***Title***	***Percent***	***Week (Indicative)***	***Learning Outcomes***
Practical Evaluation	Lab Assignments	20 %	OnGoing	1,2
Group Project	Peer Teaching - Cross Modular link to Communications	10 %	Week 16	1,2
Multiple Choice	Interface Continuous Assessment	10 %	OnGoing	1
Practical Evaluation	Telecoms Lab Exam	10 %	End of Year	4
Multiple Choice	Telecoms Continuous Assessment	10 %	Week 25	4
Written Report	Written report on Health and Safety	5 %	Week 4	3

End of Semester / Year Formal Exam:		35 %		
Form	***Title***	***Percent***	***Week (Indicative)***	***Learning Outcomes***
Closed Book Exam	Final Exam	35 %	End of Year	1,2,4

Full Time Average Weekly Workload:			4.50 Hours		
Type	***Description***	***Location***	***Hours***	***Frequency***	***Weekly Avg***
Practical	Interface Lab	Engineering Laboratory	2	Weekly	2.00
Independent Learning	Independent Learning	Not Specified	2	Weekly	2.00
Lecture	Telecoms Lecture	Lecture Theatre	1	Fortnightly	0.50
Practical	Telecoms Lab	Engineering Laboratory	2	Fortnightly	1.00
Lecture	Interface Lecture	Lecture Theatre	1	Weekly	1.00

Recommended Reading Book List
Valkenburgh, V., *Basic Electricity: Complete Course, Volumes 1-5 in 1* Prompt Publications. ISBN 0790610418 ISBN-13 9780790610412
Duncan, T., *Electronics for Today and Tomorrow*. Trans-Atlantic Publications, Inc.. ISBN 0719574137 ISBN-13 9782091910734

Online Resources
Moodle

Other Resources
Moodle

Additional Information
Moodle

Programme Membership

AL_EWIRC_7 201700 Bachelor of Engineering in Electronics and Wireless Communications
AL_KCENG_7 201700 Bachelor of Engineering in Computer Engineering
AL_EELCE_C 201700 Higher Certificate in Engineering in Electronics and Computer Engineering
AL_EELCM_7 201800 Bachelor of Engineering in Electronic Communications
AL_ECOMP_6 201900 Higher Certificate in Engineering in Computer Engineering
AL_KNMCI_8 201900 Bachelor of Science (Honours) in Network Management and Cloud Infrastructure
AL_KNTWM_7 201900 Bachelor of Science in Network Management