Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

The School of Engineering

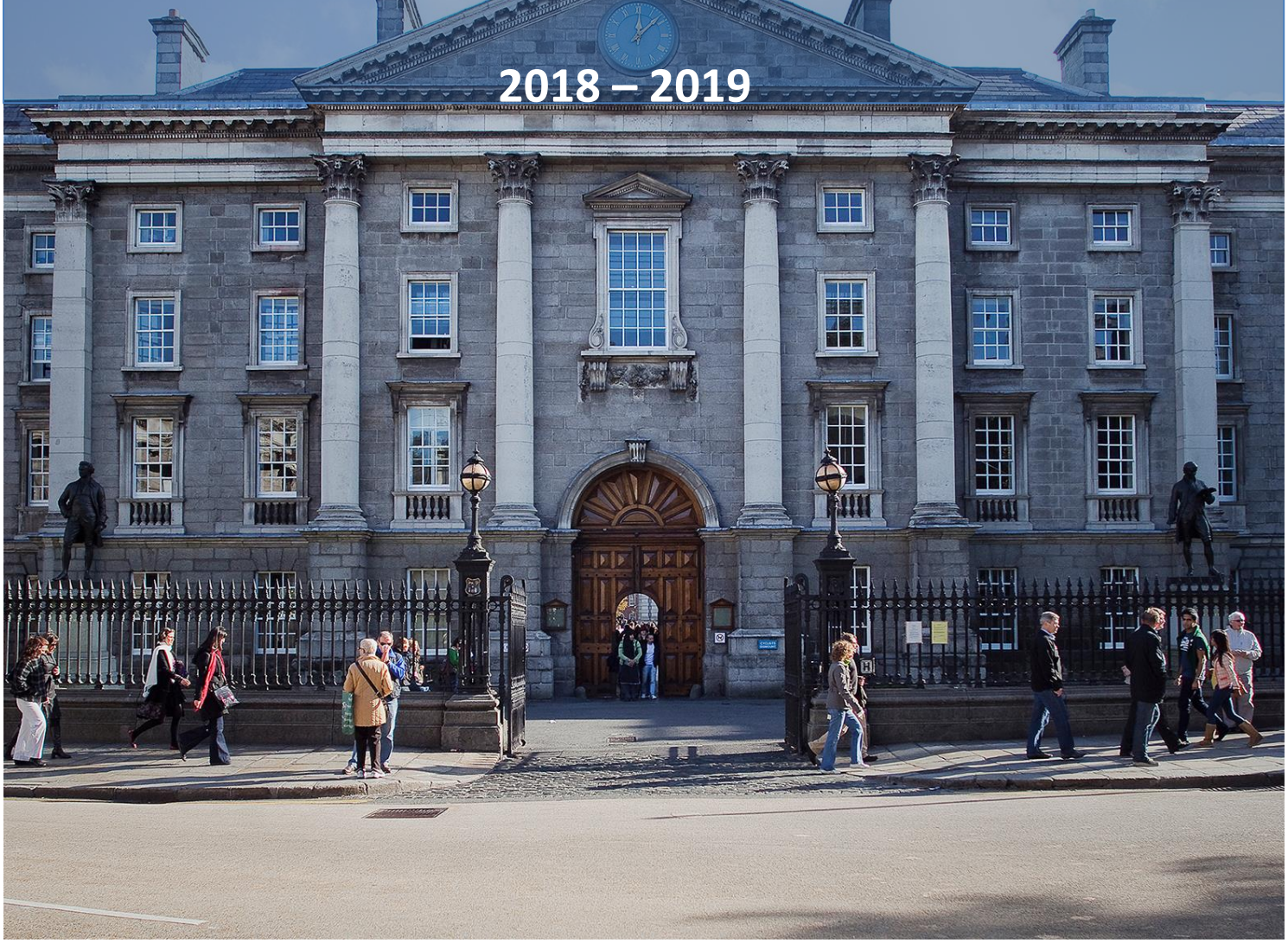
BAI Electronic Engineering (C Stream)

BAI Computer Engineering (D Stream)

BAI Electronic & Computer Engineering (CD Stream)

Junior Sophister Handbook

2018 – 2019



Note: This edition of the School of Engineering Handbook for the Junior Sophister, 3rd year of the BAI Programme in the C, CD and D Streams is intended to provide students with the most important and essential information relating to the course for the academic year 2018-19. Every effort is made to ensure that the information is up-to-date and accurate. In the event of any conflict or inconsistency between the General Regulations published in the University Calendar and information contained in the handbook, the provisions of the General Regulations in the Calendar will prevail.

Introduction

Welcome to the Junior Sophister (JS) specializations: Electronic, Electronic and Computer Engineering and Computer Engineering. As you will know by now, these are referred to as Stream C, Stream CD and Stream D respectively. The objective of the BAI degree offered by the Departments of Electronic and Electrical Engineering and Computer Science is to produce well-rounded graduates, having a strong grounding in analytical skills and the flexibility to adapt to the advances in electronic technology, computer systems and communications systems.

General Information and Contacts

General Regulations

The general regulations outlining academic behaviour, performance and progression for undergraduate studies are outlined in detail in Section II of the College Calendar and can be found at:
http://www.tcd.ie/calendar/undergraduate-studies/general-regulations-and-information.pdf

Emergency Services

In the event of an emergency,

dial Security Services on extension 1999.

Security Services provide a 24-hour service to the College community, 365 days a year. They are the Liaison to the Fire, Garda and Ambulance services and all staff and students are advised to always telephone extension 1999 (+353 1 896 1999) in case of an emergency.
Should you require any emergency or rescue services on campus, you must contact Security Services. This includes chemical spills, personal injury or first aid assistance.
It is recommended that all students save at least one emergency contact in their phone under ICE (In Case of Emergency).

Health and Safety

The School of Engineering policy document on Health and Safety can be found at:

http://www.tcd.ie/Engineering/assets/pdf/School%20Safety%20Statement%202014%20(Final).pdf

School of Engineering Personnel

Head of School of Engineering: Prof. Henry Rice, hrice@tcd.ie

Director of Undergraduate Teaching and Learning: Prof. Alan O' Connor, oconnoaj@tcd.ie

Administrative Officer: Ms Judith Lee, julee@tcd.ie

Student Support

Some of the following Services may prove useful to students in maintaining their academic and personal health and wellbeing:

School of Engineering: http://www.tcd.ie/Engineering/

Student Services: http://www.tcd.ie/students/supports-services/

Senior Tutor and Tutorial Services: https://www.tcd.ie/seniortutor/

Mature Students Office: https://www.tcd.ie/maturestudents/

College Sports: http://www.tcd.ie/Sport/student-sport/ducac/?nodeId=94&title=Sports_Clubs

College Societies: http://trinitysocieties.ie/

Students Union and Representation: https://www.tcdsu.org/

Careers Advisory Service: http://www.tcd.ie/Careers/

Data Protection: https://www.tcd.ie/info_compliance/data-protection/student-data/

Student Disability Services

Do you know what supports are available to you in College if you have a disability or a specific learning disability? If you have a disability or a specific learning disability (such as dyslexia) you may want to register with Student Disability Services. Further information on such services can be found at www.tcd.ie/disability.

The Disability Service office is located in Room 2054, Arts Building (Phone: +353 1 896 3111; E-mail: askds@tcd.ie).

Skills4Study Campus (S4SC)

Skills4studycampus (S4SC) is a fully interactive e-learning resource, which helps students to develop study skills and is suitable for students on all modules and in any year of study. Published by Palgrave Macmillan, core skills are developed through personalized interactive activities, tests and assessments. Utilised by HEIs in UK and in ROI includes UCC and UCD. Feedback from staff has been very encouraging. Fully embedded by School of Nursing (module handbook, skills module) and end of year analysis of academic performance indicates positive correlation with S4SC usage / module completion.

Study skills can be provided 'anytime, anywhere', fully accessible to students living outside of Dublin, or who commute long distances, have family or work commitments, extensive off campus placements, or heavy timetables. Login will be provided via the link on www.tcd.ie/local, additional links might be found on Student Homepage, Orientation website and the student portal my.tcd.ie.

Student 2 Student

S2S offers trained Peer Supporters if you want to talk confidentially to another student or just to meet a friendly face for a coffee and a chat. Peer Supporters are there to assist with everything from giving you the space to talk about things to helping you access resources and services in the

College. You can email us directly to request a meet-up with a Peer Supporter or can pop in to the Parlour to talk directly to one of our volunteers and arrange a meeting.

S2S is supported by the Senior Tutor's Office and the Student Counselling Service.
Webpage: http://student2student.tcd.ie, E-mail: student2student@tcd.ie, Phone: + 353 1 896 2438

Staff/Student Committee

The Staff/Student Committee meets once a semester to discuss matters of interest and concern to students and staff. It comprises class representatives from each year.

Academic Registry

The Academic Registry provides key centralised administrative services to students and staff supporting the best possible Trinity experience. This includes support of the following student life cycle activities: UG & PG Admissions; Fees & Payments; Registration; Lecture Timetables; Study Abroad; Examinations & Assessment; Research Degrees; Graduation; Seanad Eireann; University Senate; Statistical Reporting.

All enquiries should be directed through one of the 4 channels:

- Log an enquiry via ASK AR on the my.tcd.ie portal
- Via email at academic.registry@tcd.ie
- Via phone at #4500 [students] or #4501 [staff]

From there they will be answered directly or escalated to the correct team.

Scheduling and Timetables

The College Term Structure for the 2018-19 Academic Year giving key dates and events is shown on the following page and can be found at:
http://www.tcd.ie/Engineering/undergraduate/pdf/AcademicYearStructure.pdf

The SS Year Timetable is implemented in a combined manner for the C CD and D Streams. It may be modified or altered throughout the academic year and the up-to-date version will always be found at:
http://www.tcd.ie/Engineering/undergraduate/pdf/JStimetable_CCDD.pdf

The Blackboard teaching support tool is used extensively by academic staff in the School of Engineering, for making lecture notes available, publishing tutorial solutions, the submission of class assignments and the provision of results and feedback to students on an individual basis. This facility can be logged into at:
https://tcd.blackboard.com/webapps/login/

Academic Structure

The JS year is broken into two twelve-week semesters. The College calendar, including a link to the academic year structure, can be found at: www.tcd.ie/calendar.

JS Year Coordinator

Prof Nicola Marchetti, Dept. of Electronic & Electrical Engineering, nicola.marchetti@tcd.ie

Prof Jeremy Jones, School of Computer Science and Statistics, jones@scss.tcd.ie

Modules

Modules are available from both departments involved in teaching the C, CD and D Streams. Modules undertaken by Junior Sophister Students are outlined below for all three streams. Module descriptors which give details of the learning outcomes, syllabi, assignments and assessment methods for each module are no longer included in the handbooks. These are published instead on the School of Engineering website at:

http://www.tcd.ie/Engineering/undergraduate/baiyear3/electronic/
http://www.tcd.ie/Engineering/undergraduate/baiyear3/electroniccomputer/
http://www.tcd.ie/Engineering/undergraduate/baiyear3/computer/

Faculty Modules		**Semester**
3E1	Engineering Mathematics V	I
3E4	Management for Engineers	II

EEE Dept Modules		**Semester**
3C1	Signals and Systems	I
3C2	Digital Circuits	I
3C3	Analogue Circuits	II
3C5	Telecommunications	II
3C7	Digital Systems Design	II
3C8	Digital Circuits Designs	II
3C9	Analogue Circuits Design	II
3E3	Probability and Statistics	I

CS Dept Modules		**Semester**
3D1	Microprocessor Systems I	I
3D2	Microprocessor Systems II	II
3D3	Computer Networks	II
3D4	Operating Systems & Concurrent Systems	II
3D5A	Data Structures and Algorithms	I
3D5B	Software Design and Implementation	II
ST2004	Applied Probability I	I

C Stream

Semester 1

Module Title	ECTS	Code
Engineering Mathematics V	5	3E1
Probability and Statistics	5	3E3
Signals and Systems	5	3C1
Digital Circuits	5	3C2
Microprocessors I	5	3D1
Data Structures and Algorithms	5	3D5A

Semester2

Module Title	ECTS	Code
Management for Engineers	5	3E4
Analogue Circuits	5	3C3
Telecommunications	5	3C5
Digital Systems Design	5	3C7
Digital Circuits Designs	5	3C8
Analogue Circuits Design	5	3C9

D Stream

Semester 1

Module Title	ECTS	Code
Engineering Mathematics V	5	3E1
Probability and Statistics	5	3E3
Signals and Systems	5	3C1
Digital Circuits	5	3C2
Microprocessors I	5	3D1
Data Structures and Algorithms	5	3D5A

Semester 2

Module Title	ECTS	Code
Management for Engineers	5	3E4
Digital Systems Design	5	3C7
Computer Networks	5	3D3
Operating Systems & Concurrent Systems	5	3D4
Microprocessor Systems II	5	3D2
Software Design and Implementation	5	3D5B

CD Stream

Semester 1

Module Title	ECTS	Code
Engineering Mathematics V	5	3E1
Probability and Statistics	5	3E3
Signals and Systems	5	3C1
Digital Circuits	5	3C2
Microprocessor Systems I	5	3D1
Data Structures and Algorithms	5	3D5A

Semester 2

Module Title	ECTS	Code
Management for Engineers	5	3E4
Digital Systems Design	5	3C7
Telecommunications	5	3C5
Computer Networks	5	3D3
Microprocessor Systems II	5	3D2
Digital Circuits Design	5	3C8

ECTS

The European Credit Transfer and Accumulation System (ECTS) is an academic credit system based on the estimated student workload required to achieve the objectives and learning outcomes of a module or programme of study. It is designed to enable academic recognition for periods of study, to facilitate student mobility and credit accumulation and transfer. The ECTS is the recommended credit system for higher education in Ireland and across the European Higher Education Area.

The ECTS weighting for a module is a measure of the student input or workload required for that module, based on factors such as the number of contact hours, the number and length of written or verbally presented assessment exercises, class preparation and private study time, laboratory classes, examinations, clinical attendance, professional training placements, and so on.

1 credit represents 20-25 hours estimated student input, so a 10-credit module will be designed to require 200-250 hours of student input including class contact time, assessments and examinations.

For more information and ECTS documentation, see the EU Commission website at http://ec.europa.eu/education/lifelong-learning-policy/doc48_en.ht

Collaboration and Individual Work

Engineering is about co-operation, but also individual effort. The everyday fruits of engineering, such as a jet aircraft or a suspension bridge or a microchip or a DVD player, have been designed and built by teams of hundreds, even thousands, of engineers working together. These engineers exchange ideas and ultimately co-ordinate their efforts to achieve the overall project goal. However, each component of even the largest project is the result of one individual's engineering skill and imagination.

If you want to become a successful engineer, you must develop your own ability to analyse problems. This means that, while it is useful to work as a team initially, you must ultimately produce your own work. For example, in the case of a computing exercise, discuss the task with your classmates, swap ideas on how to solve the problem, but, at the end of the day, implement your own solution. The examinations will test your ability rather than just your knowledge and the only way to develop your ability in engineering analysis is to complete the laboratory and tutorial exercises yourself.

In the academic world, the principal currency is *ideas*. As a consequence, you can see that *plagiarism* – i.e. passing off other people's ideas as your own – is tantamount to theft or fraud.

The College's Calendar entry on plagiarism is as follows:

Plagiarism

82 Plagiarism is interpreted by the University as the act of presenting the work of others as one's own work, without acknowledgement.

Plagiarism is considered as academically fraudulent, and an offence against University discipline. The University considers plagiarism to be a major offence, and subject to the disciplinary procedures of the University.

83 Plagiarism can arise from deliberate actions and also through careless thinking and/or methodology. The offence lies not in the attitude or intention of the perpetrator, but in the action and in its consequences.

Plagiarism can arise from actions such as:

> *(a) copying another student's work;*
> *(b) enlisting another person or persons to complete an assignment on the student's behalf;*
> *(c) quoting directly, without acknowledgement, from books, articles or other sources, either in printed, recorded or electronic format;*
> *(d) paraphrasing, without acknowledgement, the writings of other authors.*
>
> *Examples (c) and (d) in particular can arise through careless thinking and/or methodology where students:*
>
> *(i) fail to distinguish between their own ideas and those of others;*
> *(ii) fail to take proper notes during preliminary research and therefore lose track of the sources from which the notes were drawn;*

(iii) fail to distinguish between information which needs no acknowledgement because it is firmly in the public domain, and information which might be widely known, but which nevertheless requires some sort of acknowledgement;
(iv) come across a distinctive methodology or idea and fail to record its source.

All the above serve only as examples and are not exhaustive.

Students should submit work done in co-operation with other students only when it is done with the full knowledge and permission of the lecturer concerned. Without this, work submitted which is the product of collusion with other students may be considered to be plagiarism.

84 It is clearly understood that all members of the academic community use and build on the work of others. It is commonly accepted also, however, that we build on the work of others in an open and explicit manner, and with due acknowledgement. Many cases of plagiarism that arise could be avoided by following some simple guidelines:

(i) Any material used in a piece of work, of any form, that is not the original thought of the author should be fully referenced in the work and attributed to its source. The material should either be quoted directly or paraphrased. Either way, an explicit citation of the work referred to should be provided, in the text, in a footnote, or both. Not to do so is to commit plagiarism.

(ii) When taking notes from any source it is very important to record the precise words or ideas that are being used and their precise sources.

(iii) While the Internet often offers a wider range of possibilities for researching particular themes, it also requires particular attention to be paid to the distinction between one's own work and the work of others. Particular care should be taken to keep track of the source of the electronic information obtained from the Internet or other electronic sources and ensure that it is explicitly and correctly acknowledged.

85 It is the responsibility of the author of any work to ensure that he/she does not commit plagiarism.

86 Students should ensure the integrity of their work by seeking advice from their lecturers, tutor or supervisor on avoiding plagiarism. All schools and departments should include, in their handbooks or other literature given to students, advice on the appropriate methodology for the kind of work that students will be expected to undertake.

87 If plagiarism as referred to in §82 above is suspected, in the first instance, the head of school, or designate, will write to the student, and the student's tutor advising them of the concerns raised and inviting them to attend an informal meeting with the head of school, or designate, (The director of teaching and learning (undergraduate) may also attend the meeting as appropriate. As an alternative to their tutor, students may nominate a representative from the Students' Union to accompany them to the meeting) and the lecturer concerned, in order to put their suspicions to the student and give the student the opportunity to respond. The student will be requested to respond in writing stating his/her agreement to attend such a meeting and confirming on which of the suggested dates and times it will be possible for the student to attend. If the student does not in this manner agree to attend such a meeting, the head of school, or designate, may refer the case directly to the Junior Dean, who will interview the student and may implement the procedures as referred to under Conduct and College Regulations §2.

88 If the head of school, or designate, forms the view that plagiarism has taken place, he/she must decide if the offence can be dealt with under the summary procedure set out below. In order for this summary procedure to be followed, all parties attending the informal meeting as noted in §87 above must state their agreement in writing to the head of school, or designate. If the facts of the case are in dispute, or if the head of school, or designate, feels that the penalties provided for under the summary procedure below are inappropriate given the circumstances of the case, he/she will refer the case directly to the Junior Dean, who will interview the student and may implement the procedures as referred to under Conduct and College Regulations §2.

89 If the offence can be dealt with under the summary procedure, the head of school, or designate, will recommend to the Senior Lecturer one of the following penalties:

> *(a) that the piece of work in question receives a reduced mark, or a mark of zero; or*
> *(b) if satisfactory completion of the piece of work is deemed essential for the student to rise with his/her year or to proceed to the award of a degree, the student may be required to re-submit the work. However the student may not receive more than the minimum pass mark applicable to the piece of work on satisfactory re-submission.*

90 Provided that the appropriate procedure has been followed and all parties in §87 above are in agreement with the proposed penalty, the Senior Lecturer may approve the penalty and notify the Junior Dean accordingly. The Junior Dean may nevertheless implement the procedures as referred to under Conduct and College Regulations §2.

91 If the case cannot normally be dealt with under the summary procedures, it is deemed to be a Level 4 offence and will be referred directly to the Junior Dean. Nothing provided for under the summary procedure diminishes or prejudices the disciplinary powers of the Junior Dean under the 2010 Consolidated Statutes.

Further to the above, the College has created an online central repository to consolidate all information and resources on plagiarism. The central repository is being hosted by the Library and is located at http://tcd-ie.libguides.com/plagiarism.

All students are also required to complete an online tutorial on avoiding plagiarism. This tutorial, called 'Ready, Steady, Write', is located at http://tcd-ie.libguides.com/plagiarism/ready-steady-write.

Contribution of Junior Sophister Year to BAI Degree

Students should note that the overall average mark obtained at the Junior Sophister Annual Examinations will contribute 20% of the overall result of the BAI degree and grade obtained.

Examinations

BAI/MAI Examination Rules

The Examination Regulations in the School of Engineering comply with the College Council approved Harmonisation Regulations and can be found for the Senior Sophister year on the School website at:
https://www.tcd.ie/Engineering/undergraduate/pdf/ExaminationRules_1819.pdf

External Examiner

The current external examiner associated with the moderation of the BAI/MAI programme in the Dept. of Electronic and Electrical Engineering is:

Prof.dr.ir. R. (Inald) L. Lagendijk
Distinguished professor of Computing-based Society
Delft University of Technology
The Netherlands
https://www.tudelft.nl/staff/r.l.lagendijk/

Absence from Examinations

The following is an extract from the College Calendar outlining the College policy on absence from Examinations:

35 Students who consider that illness may prevent them from attending an examination (or any part thereof) should consult their medical advisor and request a medical certificate for an appropriate period. If a certificate is granted, it must be presented to the student's tutor within three days of the beginning of the period of absence from the examination. The tutor must immediately forward the certificate to the Senior Lecturer. Medical certificates must state that the student is unfit to sit examinations. Medical certificates will not be accepted in explanation for poor performance.
(a) Where a student becomes ill prior to the commencement of the annual examination, they may seek permission through their tutor from the Senior Lecturer to withdraw and take the supplemental examination in that year.
(b) Where illness prevents a student from completing any part of the annual examination and they withdraw from the examination, permission may be given for a supplemental examination to be taken in that year.
(c) Where illness occurs during the writing of an examination paper, it should be reported immediately to the chief invigilator. The student will then be escorted to the College Health Centre. Every effort will be made to assist the student to complete the writing of the examination paper.
Students who consider that other grave cause beyond their control may prevent them from attending an examination (or any part thereof) should consult their tutor who should make representations immediately to the Senior Lecturer that permission be granted for absence from the examination. Regulations (a) and (b) also apply in the case of absence from annual examinations due to other grave cause beyond a student's control.

Regulations (a) and (b) apply only to examinations which are non-final non-degree examinations. However, regulations (a) and (b) apply in all years of those professional courses which permit supplemental examinations in final or degree years.

Professional Accreditation

The integrated BAI/MAI degree programme is professionally accredited by Engineers Ireland and meets the educational requirements for corporate membership of this professional institution and registration as a chartered engineer. Further information can be found at:
http://www.engineersireland.ie/Membership.aspx

Trinity Education Project

The Trinity Education Project is a university wide initiative to 'rearticulate what a Trinity Education should be in the 21st century and to reemphasise our role as a leader in education'. This will enhance the experience of all Trinity students, including those in the school of engineering. The 'high level' graduate attributes span 4 dimensions – academic excellence, critical thinking and effective communication, life-long learning, and global citizenship. The academic and administrative structures will be enhanced to provide student learning-centred assessment, learning spaces, curriculum principles and architecture, internships and study abroad options and technology enhanced learning where appropriate.
While many details in this project have still to be determined, the currently proposed architecture for professional degrees (including engineering) would see 10 ECTS of 'free electives' (modules available to all students in the university, and chosen by the students) made available within the first 4 years of the programme, and 20 ECTS of 'approved modules' (modules from a prescribed menu outside of the students core requirements, but which are recognized as cognate and coherent). The school of engineering is excited by the opportunities to use this new project to provide flexible and agile responses to the needs of our graduates.
For more detail see https://www.tcd.ie/academic-services/tep/

Electronic Engineering Labs

Laboratory Programme Coordinator:

Prof. Nicola Marchetti, Department of Electronic & Electrical Engineering.

Introduction:

The programme of Electronic Engineering Laboratories is intended to complement and enhance the material covered in lectures for the wide range of subjects in the Junior Sophister year. Marks awarded for these laboratories will contribute to the overall mark for the particular subject at Annual and Supplemental Examinations. Each laboratory will require a properly structured report to be written up and submitted by each individual student which will then be marked by the laboratory demonstrator and returned to the student.

Attendance:

Attendance at the laboratories is compulsory and will be monitored throughout the year. Any report submitted by a student who has not attended the corresponding laboratory will not be marked. If a laboratory is missed due to illness or participation in an official College activity this should be certified and arrangements will be made where possible for the laboratory to be undertaken at a later stage. Casual or unexplained absences will not be facilitated. Please also note that laboratories not completed during the teaching semesters cannot be repeated during the summer vacation for supplemental examinations and existing marks will be carried forward to the supplemental results.

Reports:

You are required to write up a properly structured report on each laboratory undertaken. You may also be requested by the demonstrator to save or print out some electronic files from computer simulations as part of the submission. The report may be typed or handwritten. If it is handwritten it must be clearly legible to the demonstrator. The report should begin with a cover page including the following information:

Name: The student's name and ID number.

Title: The code and name of the laboratory.

Date: Date on which laboratory was undertaken.

And the following two statements:

I have read and I understand the plagiarism provisions in the General Regulations of the University Calendar for the current year, found at: http://www.tcd.ie/calendar

I have also completed the Online Tutorial on avoiding plagiarism 'Ready, Steady, Write', located at http://tcd-ie.libguides.com/plagiarism/ready-steady-write

The remainder of the report should contain the following sections:

Aims: The specific intentions and objectives of the laboratory.

Experimental Set-up: Details of the equipment used and the experimental set-up. If the laboratory is a simulation type the name and function of the software packages used should be given.

Procedure: An account of the steps involved in carrying out the experiment. A summarised version of the more detailed instructions given in the laboratory handout will suffice.

Results: A clear and accurate record of the results obtained. This should include tables of experimental data, numerical parameters, printouts of simulation waveforms or other appropriate forms of results. It should be possible from the results for a reader to get a complete understanding of the outcome of the laboratory.

Discussion: A detailed analysis and criticism of the results obtained. You should discuss the accuracy of the results, any limitations and their significance. You should relate them to the material covered in the lectures where possible. You should indicate what you have learned from the laboratory that is important in your discipline.

Conclusion: You should consider the importance and implications of the experiment you have carried out in the wider context of Electronic Engineering. You should give your opinions on what is good or bad practice concerning the topic covered by the laboratory and any professional ethical issues you feel are important.

References: References should appear in the text in one of two forms, depending on whether the author's name crops up naturally, e.g,

“According to Smith (1955) the cart comes before the horse” or

“It is well known that the horse comes before the cart (Saddler and Wright, 1923)”.

If the publication has more than two authors then the form (Baldwin et al, 1993) should be used.

In the ***Reference*** section these would appear in alphabetical order as:

Baldwin, M, Turpin, E and Wilton, D, 1993, Long-Term Stability of Soap Films, Wetherfield Publishers Ltd.

Saddler A, and Wright B, 1923, "Design rules for cartwrights", J Horse-drawn Vehicles, 26, pp104-190.

Smith, 1955, "Philosophical misconceptions", Phil Tran, 106, pp 23-24.

Submission: The deadline for handing up your report is 1 week after completion of the lab unless otherwise stated by the relevant lecturer. Reports are submitted by placing them in the marked box in the PC Lab on the first floor of the printing house. The box will be emptied once a week and you will receive an email acknowledgement of your submission.

Note: Please keep a copy of your report for your records