PhD / MPhil in Electrical Engineering

2022 – 2023

THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

Doctor of Philosophy (PhD) / Master of Philosophy (MPhil) in Electrical Engineering

Programme Code : 41601

PROGRAMME DOCUMENT

Department of Electrical Engineering
電機工程學系


Department of
Electrical Engineering
電機工程學系

DOCTOR OF PHILOSOPHY (PHD) / MASTER OF PHILOSOPHY (MPHIL) (FULL-TIME: 41601-FD/41601-FTD/41601-FTM / PART-TIME: 41601-PD/41601-PTD/41601-PTM)

CONTENTS PAGE

This Programme Document is subject to review and changes which the programme offering Department can decide to make from time to time. Just in case any updated information is necessary after the publication of this document, students will be informed of the changes as and when appropriate.

This Document should be read together with the "Regulations and Administrative Procedures for the Degrees of MPhil and PhD" and the "Research Student Handbook". Should any discrepancy between the contents of this booklet and University regulations arise, University regulations always prevail.

1. GENERAL INORMATION

1.1 Offering Department

Department of Electrical Engineering

1.2 Final Awards

Doctor of Philosophy (PhD)
Master of Philosophy (MPhil)

1.3 Period of Study and Mode of Attendance

Mode of Study	MPhil	PhD	
		For students with Master's degree containing a significant research component	For students with a Bachelor's degree
Full-time	2-Year normal study period 3-Year maximum study period	3-Year normal study period 5-Year maximum study period	4-Year normal study period 6-Year maximum study period
Part-time	4-Year normal study period 5-Year maximum study period	6-Year normal study period 7-Year maximum study period	8-Year normal study period 9-Year maximum study period

1.4 Entrance Requirements

University General Minimum Entrance Requirements

To register for the degree of MPhil, a student shall hold:

- a Bachelor's degree with first or second class honours of The Hong Kong Polytechnic University or a recognised university; or
- other academic qualifications which are deemed to be equivalent.

To register for the degree of PhD, a student shall hold a postgraduate degree containing a significant research component, such as a dissertation, conferred by The Hong Kong Polytechnic University or a recognised university.

In exceptional circumstances applicants other than those stipulated in the above paragraph may be admitted directly to the PhD programme. For example, applicants with a Bachelor's degree with First Class Honours, or the equivalent. Admission can be made based on other equivalent qualifications on an individual basis.

English Language Requirement Requirements

For students who do not have a degree of which the language of instruction was English from a recognised university are:

- An overall score of at least 6.5 in the International English Language Testing System (IELTS); or
- A Test of English as a Foreign Language (TOEFL) score of 80 or above for the Internet-based test or 550 or above for the paper-based test.

All English language test scores are considered valid for two years after the date of the test.

2. RATIONALE, AIMS AND INTENDED LEARNING OUTCOMES OF THE PROGRAMME

2.1 Programme Aims and Rationale

The research degree programmes are designed to enable the students to acquire competence in research methods and scholarship in the discipline of electrical engineering or other related disciplines; and display sustained independent effort and original thought, to become capable professionals, researchers or scholars.

2.2 Institutional Learning Outcomes

* Research and Scholarship Excellence
* Originality
* Lifelong Learning Capacity

2.3 Intended Learning Outcomes of the Programme

The programme of research is designed in such a way to enable students to:

a. act with integrity, and in an ethical manner in conducting research and in publications;

b. demonstrate the ability to read and evaluate the literatures in engineering;

c. acquire a solid theoretical background in his/ her research area;

d. appreciate current research and developments in various areas of his/ her discipline and their challenges;

e. publish in international Journals and present research outcomes in conferences;

f. formulate and solve advanced engineering problems;

g. for MPhil students: design and conduct research projects;

for PhD students: design and conduct research projects independently;

h. for PhD students: deal with multi-disciplinary approaches and translate knowledge, models, algorithms, processes, solutions from areas to his/her own;

i. for MPhil students, be competent teacher/ researcher, or pursue PhD studies in his/ her discipline; and

for PhD students, be competent teacher/ researcher, or industrial R&D professional in his/ her discipline.

3. PROGRAMME STRUCTURE

3.1 University Coursework Requirements

Programme	Credit Requirements	Details
MPhil (full-time and part-time)	9 credits + English Enhancement Subjects*	1-credit HTI6081 0/3/5-credit English Enhancement subjects 0-credit e-learning module on "Understanding China and the Hong Kong Special Administrative Region, P.R.C."** 2-credit Seminars 6-credit other subjects (no more than 3 credits from guided-study subjects)
PhD 3-year full-time / 6-year part-time	15 credits + English Enhancement Subjects*	1-credit HTI6081 0/3/5-credit English Enhancement subjects 0-credit e-learning module on "Understanding China and the Hong Kong Special Administrative Region, P.R.C."** 3-credit Seminars 2-credit Practicum 9-credit other subjects (no more than 6 credits from guided-study subjects)
PhD 4-year full-time / 8-year part-time	22 credits + English Enhancement Subjects*	1-credit HTI6081 0/3/5-credit English Enhancement subjects 0-credit e-learning module on "Understanding China and the Hong Kong Special Administrative Region, P.R.C."** 4-credit Seminars 2-credit Practicum 15-credit other subjects (no more than 9 credits from guided-study subjects)

* English Enhancement Subjects

All RPg Students admitted from the 2021/22 Intake Cohort onwards are required to take the RLSA in their first semester of study at PolyU to be arranged by ELC. Based on their performance of the RLSA, students will need to take relevant subjects according to the following arrangement:

RLSA Performance[#]	English enhancement subjects
Band 1 in both Writing, and Speaking tasks	Exempted
Band 2 or above in both Writing, and Speaking tasks	ENGL6016: Advanced Academic English for Research Students: Publishing and Presenting
Band 3 or below in either Writing, or Speaking tasks	ELC6011 **and** ELC6012 ELC6011: Presentation Skills for Research Students ELC6012: Thesis Writing for Research Students

Band 1 is the highest grade and Band 5 the lowest.

** E-Learning module on "Understanding China and the Hong Kong Special Administrative Region, P.R.C."

Starting from the 2022/23 intake cohort, all research students are required to complete the e-Learning module on "Understanding China and the Hong Kong Special Administrative Region, P.R.C." before thesis submission as a graduation requirement. Students are encouraged to complete the requirement as early as possible. Details on the requirement:

https://www.polyu.edu.hk/ous/nationaleducation/understanding-china-and-hongkong/

3.2 Subjects Support to Programme Outcomes

The following subjects support the programme outcomes through teaching activities, practice and examination:

3.2.1 Subject base training

Ethics Subject:

HTI6081 Ethics: Research, Professional and Personal Perspectives

Guided-study Subjects:

EE6811-EE6813 Special Topics in Advanced Power System I/II/III
EE6821-EE6823 Special Topics in Advanced Utilisation I/II/III
EE6831-EE6833 Special Topics in Advanced Control System I/II/III
EE6841-EE6843 Special Topics in Advanced Fiber Optic I/II/III
EE6851-EE6853 Special Topics in Advanced Smart Materials and Structures I/II/III

Guided-study subjects are those in which normally no lecturing is done and in which the RPg student is required by the subject supervisor to read specified monographs and journal publications; the RPg student has to meet the subject supervisor frequently discuss his/her progress in the subject. Coursework normally consists of assignments and presentations. Examination is compulsory and normally includes both written and oral.

If the RPg student plans to register this subject, he/she needs to identify an appropriate subject supervisor who is also required to submit a meeting plan with topic, by the end of Week 3 of each semester, for DRC Chair's approval. At the end of the semester, the RPg student is examined by the subject supervisor and another staff member who is knowledgeable about the topic. A grade will be given in the same way as for regular taught subjects in **Form EE/27** (use this form instead of GS/27). All Guided-study subjects will be at level 6 and their code numbers will be between 6800 and 6999. The grades obtained by the RPg students on Guided-study subjects will be considered and endorsed by the relevant D/SRC based on the assessment reports.

Others:

Research postgraduates courses offered by PolyU / other universities

3.2.2 Non-subject base training

EE6001J - EE6001M Research Seminars

All FT RPg students are required to attend at least 10 research seminars per year, in addition to workshops/conferences, and to submit a report, to the Chief Supervisor, of no less than 1,500 words (excluding references) on one of the attended seminars every year.

All PT RPg students are required to attend at least 10 research seminars per two years, in addition to workshops/conferences, and to submit a report, to the Chief Supervisor, of no less than 1,500 words (excluding references) on one of the attended seminars once every two years.

RPg students are recommended to complete one credit per year (for FT students) or per two years (for PT students) to fulfil the above-mentioned requirement, with an overall assessment grade of Pass and Fail. However, as deemed appropriate by the Chief Supervisor, they are allowed to complete at most two credits per year (for FT students) or per two years (for PT students) to fulfil the research seminar credit requirement.

Research seminars may or may not be organised by the host department and are expected to last not less than an hour each. RPg students **should** discuss with their Chief Supervisors the relevance and suitability of the seminars before attending the seminars. The scope of a seminar attended by an RPg student should have significant research value to his/her study, enabling him/her to keep abreast of the latest discovery and enhancing his/her knowledge in the field(s).

Chief Supervisors are required to assess the seminars and the report (with a pass or failure grade). RPg students failing to submit a report to the satisfaction of their Chief Supervisor are required to make a re-submission until a pass grade is obtained. The Chief Supervisor has to pass the record of the seminars attended by the RPg students and the report with a pass grade D/SGO (for those admitted from the 2018/19 cohort onwards) or to GS (for those admitted in or before the 2017/18 cohort) for custody at the end of each academic year.

EE6002 Practicum

To earn one credit, PhD/Joint PhD students will be required to engage in teaching activities/professional service assigned by the HoU/DoS or his/her delegate for 6 hours/week in any 13-week semester. Students are allowed to complete these two credits any time before thesis submission. They can choose to complete these two credits in two different semesters or within the same semester, subject to the approval of the Chief Supervisor.

Stipend recipients are not allowed to fulfil part of their departmental training requirement through the completion of the Practicum credits as Practicum is credit-bearing and part of the coursework requirements.

PhD/Joint PhD students who are required to undertake teaching supporting activities are required to complete the training programmes organised by the Educational Development Centre, English Language Centre/Chinese Language Centre (as required) before the commencement of any teaching supporting activities.

The HoU/DoS or his/her delegate are required to:

- ensure that the activities are structured and can be assessed properly;
- submit to the Subject Assessment Review Panel, at the end of the session, an assessment report on the performance of the relevant student(s), with details of activities undertaken and an overall assessment grade of Pass or Fail.

Training Received by Stipend Recipients

Stipend recipients will receive certain training as assigned by the HoD/DoS in consultation with the Supervisor(s) in his/her department for **not less than 100 hours per year** for teaching and professional service, *excluding from the 156 hours for EE6002 Practicum*.

Stipend recipients are required to report the teaching and service training in annual progress reports. **Fulfilling the training requirement for not less than 100 hours per year is a condition of receiving stipend. The stipend may be stopped if the training requirement is not fulfilled.** The Department has to (base on suggestion of Chief Supervisors to) make the decision and propose the recommendation. GS will then review all the student reports and assessment of Departments and confirm the reports.

Others:

- Attendance and presentation in international conferences or workshops;
- Journal paper publications;
- Thesis write-up and oral defense

3.3 Relationship between the Intended Learning Outcomes of the Programme with Subjects

Doctor of Philosophy (PhD)

Programme Outcomes	Ethics: Research, Professional & Personal Perspectives HTI6081	Special Topic Subjects EE6811-3 EE6821-3 EE6831-3 EE6841-3 EE6851-3	Research seminars EE6001J-M	Practicum EE6002	International conference / workshop attendance and presentation	Journal Paper publications	Thesis write-up and oral defense
a/ Act with integrity, and in an ethical manner in conducting research and in publications	√				√	√	
b/ Demonstrate the ability to read and evaluate the literatures in engineering					√	√	√
c/ Acquire a solid theoretical background in the his/her research area		√				√	√
d/ Appreciate current research and developments in various areas of his/her discipline and their challenges		√	√			√	√
e/ Publish in international journals and present research outcomes in conferences					√	√	
f/ Formulate and solve advanced engineering problems						√	√
g/ Design and conduct research projects independently						√	√
h/ Deal with multi-disciplinary approaches and translate knowledge, models, algorithms, processes, solutions from areas to his/her own					√	√	√
i/ Be a competent teacher, researcher, or industrial R&D professional in his/her discipline				√	√	√	√

Master of Philosophy (MPhil)

Programme Outcomes	Ethics: Research, Professional & Personal Perspectives HTI6081	Special Topic Subjects EE6811-3 EE6821-3 EE6831-3 EE6841-3 EE6851-3	Research seminars EE6001J-M	International conference / workshop attendance and presentation	Journal paper publications	Thesis write-up and oral defense
a/ Act with integrity, and in an ethical manner in conducting research and in publications	√			√	√	
b/ Demonstrate the ability to read and evaluate the literatures in engineering				√	√	√
c/ Acquire a solid theoretical background in the his/her research area		√			√	√
d/ Appreciate current research and developments in various areas of his/her discipline and their challenges		√	√		√	√
e/ publish in international journals and present research outcomes in conferences				√	√	
f/ Formulate and solve advanced engineering problems					√	√
g/ Design and conduct research projects					√	√
h/ Be a competent teacher, researcher, or industrial R&D professional in his/her discipline				√	√	√

3.4 Programme Specified Subjects and Credits

	Subjects	**C**ompulsory / **E**lective	Credit
MPhil 2-year Full-time 4-year Part-time	HTI6081 Ethics: Research, Professional & Personal Perspectives	C	1
	EE6001J Research Seminar	C	1
	EE6001K Research Seminar	C	1
	Electives from: EE6811-EE6813 Special Topics in Advanced Power System EE6821-EE6823 Special Topics in Advanced Utilisation EE6831-EE6833 Special Topics in Advanced Control System EE6841-EE6843 Special Topics in Advanced Fiber Optic EE6851-EE6853 Special Topics in Advanced Smart Materials & Structures Research postgraduates courses offered by PolyU / other universities	E	6 [No more than 3 credits from guided-study subjects]
	Thesis	C	--
		Plus English Enhancement Subjects (please read 3.1 for details)	**9**

Subjects	**C**ompulsory / **E**lective	PhD	
		3-yr FT 6-yr PT	4-yr FT 8-yr PT
		Credits	
HTI6081 Ethics: Research, Professional & Personal Perspectives	C	1	1
EE6001J Research Seminar	C	1	1
EE6001K Research Seminar	C	1	1
EE6001L Research Seminar	C	1	1
EE6001M Research Seminar	C	--	1
EE6002 Practicum	C	2	2
Electives from: EE6811-EE6813 Special Topics in Advanced Power System EE6821-EE6823 Special Topics in Advanced Utilisation EE6831-EE6833 Special Topics in Advanced Control System EE6841-EE6843 Special Topics in Advanced Fiber Optic EE6851-EE6853 Special Topics in Advanced Smart Materials & Structures Research postgraduates courses offered by PolyU / other universities	E	9 [No more than 6 credits from guided-study subjects]	15 [No more than 9 credits from guided-study subjects]
Thesis	C	--	--
Plus English Enhancement Subjects (please read 3.1 for details)		**15**	**22**

3.5 Credit transfer

3.5.1 Credits which have already been used to contribute to a previous award should not be transferred to contribute to the MPhil/PhD award with the following exceptions:

(a) All returning students will be allowed to transfer the grade obtained in the subject "HTI6081 Ethics: Research, Professional & Personal Perspectives" to the new RPg programme regardless of its level, provided that the grade was attained within five years of re-admission;
(b) All 3-year full-time/6-year part-time PhD students will be allowed to transfer one credit from his/her previous attendance in seminars.

3.5.2 Transfer of credits of subjects at postgraduate level earned from recognized previous studies

Applications for the transfer of credits from recognized previous studies will be endorsed by the DRC with justifications and approved by the HoU. Only credits gained from subjects at postgraduate level that have not been used to contribute to an award will be acceptable for transfer. The validity period for such credit transfer for research degree programmes is defined to be eight years from the year of attainment at the time of admission. The maximum number of credits transferrable for different categories of students is: No more than 50% of the credit requirement of the programme disregarding whether the credits were earned within or outside PolyU.

3.5.3 Credits transferred from previous study outside the University will not be included in the calculation of the qualifying GPA.

3.5.4 Transfer of credits taken at postgraduate level outside PolyU after admission

Taking subjects outside PolyU during the student's research postgraduate studies in PolyU with prior approval is regarded as an acceptable way to gain credits. The student should submit an application (Form RC/48), via his/her Chief Supervisor, to the Department to initiate the transfer. The application will be endorsed by the DRC Chair and approved by the HoU.

The transfer of grades will be in accordance with the conversion table below and the grade gained will be included in the calculation of the qualifying GPA:

Grade	Grade Point	Short Description
A+	4.3	Excellent
A	4.0	
A-	3.7	
B+	3.3	Good
B	3.0	
B-	2.7	
C+	2.3	Satisfactory
C	2.0	
C-	1.7	
D+	1.3	Pass
D	1.0	
F	0.0	Fail

3.5.5 Minimum number of credits with a letter grade

An MPhil student must complete a least three credits with a letter grade and a PhD student at least six to allow for a meaningful calculation of the qualifying GPA.

4. SYLLABI

Subject Description Form

Subject Code	HTI6081
Subject Title	Ethics: Research, Professional & Personal Perspectives
Credit Value	1
Level	6
Pre-requisite / Co-requisite/ Exclusion	None
Objective	• To equip students with a deep appreciation of ethical guidelines and codes of conduct that they can apply in their research studies at PolyU and in their future professional and personal lives.
Intended Learning Outcomes *(Note 1)*	On successful completion of this subject, students will be able to: 1. Demonstrate knowledge and understanding of the need for ethical behavior and guiding codes of ethics in research and the professions. 2. Understand, discuss and apply ethical principles and codes across a range of disciplines and scenarios 3. Demonstrate awareness of current ethical issues and problems in relation to their own discipline and research area 4. Critically analyze and discuss scenarios cases of possible or actual ethical misconduct 5. Discuss how the guiding principles of ethics in research extend and apply to business, professional and personal codes of conduct and why this important to integrity and the well being of business, the professions and our community. 6. Show a fundamental understanding of the issues of copyright, plagiarism and proper citation, and be able to apply this in their own work.
Subject Synopsis/ Indicative Syllabus *(Note 2)*	• The need for ethics training and the meaning of ethical behavior in research: case studies, disasters and learning by the mistakes of others • Philosophy and codes of ethics and their origins • Culture, religion and the law – how these relate to ethical codes of conduct • Obtaining ethical approval for a research project: procedures and processes • Ethics in life science, humanities, education, business and industry: common issues, guiding principles, discipline specific scenarios • Ethics and human behavior: individual, professional and societal responsibilities • Recent ethical issues affecting Hong Kong and the society in general • Ethical use of information in thesis writing: understanding copyright, plagiarism and proper citation
Teaching/Learning Methodology *(Note 3)*	Lecture/seminar/workshop

Assessment Methods in Alignment with Intended Learning Outcomes

(Note 4)

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		1	2	3	4	5	6
1. Group assignment on discipline specific scenario/case study analysis	100%	✓	✓	✓	✓	✓	✓
Total	100 %						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

1. Discipline specific scenario/case study analysis will assess ability to identify and analyze ethical issues in the student's own discipline and to present a coherent and detailed critique and plan on how these could be avoided or resolved (giving sources and written work accompanied by a Turn-it-in Report). The group assignment will assess the student's ability to identify, discuss and analyze ethical principles and issues from a wide perspective, and evaluate how individual, professions and societies benefit from following ethically acceptable behavior and practices.

Student Study Effort Required

Class contact:	
• Lecture/seminar/workshop/oral presentation	16 Hrs.
Other student study effort:	
• Self study and group work	27.5 Hrs.
• Assignment preparation	15 Hrs.
Total student study effort	58.5 Hrs.

Reading List and References

Materials from the Hong Kong Ethics development website
(http://www.icac.org.hk/hkedc/eng/library2.asp)

Materials from EthicsWeb.ca
(http://www.ethicsweb.ca/resources/professional/issues.html)

Selected readings and videos

Declaration of Helsinki (revised 2008)

Note 1: Intended Learning Outcomes
Intended learning outcomes should state what students should be able to do or attain upon completion of the subject. Subject outcomes are expected to contribute to the attainment of the overall programme outcomes.

Note 2: Subject Synopsis/ Indicative Syllabus
The syllabus should adequately address the intended learning outcomes. At the same time over-crowding of the syllabus should be avoided.

Note 3: Teaching/Leaning Methodology
This section should include a brief description of the teaching and learning methods to be employed to facilitate learning, and a justification of how the methods are aligned with the intended learning outcomes of the subject.

Note 4: Assessment Method
This section should include the assessment method(s) to be used and its relative weighting, and indicate which of the subject intended learning outcomes that each method purports to assess. It should also provide a brief explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes.

Subject Description From

<table>
<tr><td>Subject Code</td><td>EE6001J, EE6001K, EE6001L, EE6001M</td></tr>
<tr><td>Subject Title</td><td>Research Seminar I/II/III/IV</td></tr>
<tr><td>Credit Value</td><td>1</td></tr>
<tr><td>Level</td><td>6</td></tr>
<tr><td>Pre-requisite/co-requisite/Exclusion</td><td>EE6001J Pre-requisite: Nil
EE6001K Pre-requisite: Nil
EE6001L Pre-requisite: EE6001J or EE6001K
EE6001M Pre-requisite: EE6001J and EE6001K</td></tr>
<tr><td>Objectives</td><td>To encourage students to appreciate the latest research and development in various areas of his/her discipline.</td></tr>
<tr><td>Subject Intended Learning Outcomes</td><td>Upon completion of the subject students will be able:
1. To appreciate the latest research and development in various research areas and disciplines.
2. To meet and discuss with experts and leaders in person in various research areas and disciplines.
3. To disseminate and promote research outputs in various research areas and disciplines through discussions and report.</td></tr>
<tr><td>Subject Synopsis / Indicative Syllabus</td><td>To attend research seminars in various research areas and disciplines.</td></tr>
<tr><td>Teaching / Learning Methodology</td><td>Students are required to attend at least 10 research seminars which may or may not be organized by the Department. The duration of each seminar should not be less than an hour. Students are required to submit a report with no less than 1500 words (excluding references) on one of the attended seminars to their Chief Supervisors. The topic of the seminar reported on should not be related directly to the thesis title of the student. Assessment of the report will be given with a pass or failure grade. Students who failed to submit a report to the satisfaction of their Chief Supervisors are required to make a re-submission until a pass grade is obtained.

<table>
<tr><td>Teaching/Learning Methodology</td><td colspan="3">Intended subject learning outcomes</td></tr>
<tr><td></td><td>1</td><td>2</td><td>3</td></tr>
<tr><td>Seminars</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Report</td><td>✓</td><td></td><td>✓</td></tr>
</table>
</td></tr>
<tr><td>Assessment Methods, its alignment of Intended Subject Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods</td><td rowspan="2">% weighting</td><td colspan="3">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>1</td><td>2</td><td>3</td></tr>
<tr><td>Attendance</td><td>50</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Report</td><td>50</td><td>✓</td><td></td><td>✓</td></tr>
<tr><td>Total</td><td>100</td><td colspan="3"></td></tr>
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</td></tr>
<tr><td>Measurements of the Intended Subject Learning Outcomes</td><td>
<table>
<tr><td>Intended Subject Learning Outcomes</td><td>Related Programme Learning Outcome</td><td>Assessment Methods</td><td>Measurement Level</td><td>Assessment Standard</td></tr>
<tr><td>1</td><td rowspan="3">e</td><td rowspan="3">Attendance and report</td><td rowspan="3">Pass</td><td rowspan="3">Not less than 70% of students in the class achieving the Measurement Level</td></tr>
<tr><td>2</td></tr>
<tr><td>3</td></tr>
</table>
</td></tr>
</table>

Student Study Effort Expected	- Seminars	20 Hrs
	- Self-study and Preparation of report	15 Hrs
	Total student study effort	35 Hrs
Reading List and References	NA	

Subject Description From

<table>
<tr><td>Subject Code</td><td>EE6002</td></tr>
<tr><td>Subject Title</td><td>Practicum</td></tr>
<tr><td>Credit Value</td><td>2 training credits</td></tr>
<tr><td>Level</td><td>6</td></tr>
<tr><td>Pre-requisite/co-requisite/Exclusion</td><td>Nil</td></tr>
<tr><td>Objectives</td><td>To train student as a competent teacher, researcher, or industrial R& D professional in his/ her discipline.</td></tr>
<tr><td>Subject Intended Learning Outcomes</td><td>Upon completion of the subject students will be able:
1. To engage in teaching support activities.
2. To engage in departmental research support activities.</td></tr>
<tr><td>Subject Synopsis / Indicative Syllabus</td><td>To engage in teaching/research supporting activities.</td></tr>
<tr><td>Teaching / Learning Methodology</td><td>For 1 credit, students are required to engage in teaching / research supporting activities assigned by the Head of Department or his/her delegate for up to 6 hours per week in any 13-week semester. Before the commencement of any teaching supporting activities, students are required to complete the training programmes organized by the Education Development Centre. Students who are required to interact directly with students in English as a part of their duties in supporting teaching and learning must demonstrate their language competence to fulfill the intended duties to the satisfaction of the host department. All eligible students except those who are native English speakers will also be required to successfully complete a language training programme offered by the English Learning Centre before taking up any teaching supporting activities.
<table>
<tr><td rowspan="2">Teaching/Learning Methodology</td><td colspan="2">Intended subject learning outcomes</td></tr>
<tr><td>1</td><td>2</td></tr>
<tr><td>Teaching support duties</td><td>✓</td><td></td></tr>
<tr><td>Research support duties</td><td></td><td>✓</td></tr>
</table></td></tr>
<tr><td>Assessment Methods, its alignment of Intended Subject Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods</td><td rowspan="2">% weighting</td><td colspan="2">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>1</td><td>2</td></tr>
<tr><td>Student feedback</td><td>50</td><td>✓</td><td>✓</td></tr>
<tr><td>Lecturer evaluation</td><td>50</td><td>✓</td><td>✓</td></tr>
<tr><td>Total</td><td>100</td><td></td><td></td></tr>
</table></td></tr>
<tr><td>Measurements of the Intended Subject Learning Outcomes</td><td>
<table>
<tr><td>Intended Subject Learning Outcomes</td><td>Related Programme Learning Outcome</td><td>Assessment Methods</td><td>Measurement Level</td><td>Assessment Standard</td></tr>
<tr><td>1</td><td rowspan="2">h</td><td rowspan="2">Student feedback and lecturer evaluation</td><td rowspan="2">Pass</td><td rowspan="2">Not less than 70% of students in the class achieving the Measurement Level</td></tr>
<tr><td>2</td></tr>
</table></td></tr>
<tr><td>Student Study Effort Expected</td><td>
<table>
<tr><td>- Teaching/research support activities</td><td>156 Hrs</td></tr>
<tr><td>Total student study effort</td><td>156 Hrs</td></tr>
</table></td></tr>
<tr><td>Reading List and References</td><td>NA</td></tr>
</table>

Subject Description Form

Subject Code	EE6521
Subject Title	Industrial Power Electronics
Credit Value	3
Level	6
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	1. To provide power electronics engineers with in depth knowledge of the industrial power electronics. 2. To provide latest development in power supplies, industrial power electronics system and their applications in renewable energy systems. 3. To develop a skill in power electronics design including passive components, packaging and standards 4. To enable students to understand the power quality issues and the active and reactive power flow 5. To encourage students to advance in-depth research on new converter technologies to meet new requirements in the context of smart city and smart grid with high penetration of renewable energies and electric vehicles.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Acquire an in-depth understanding of power supply concept and design and be able to analyse the industrial needs for static power conversion. b. Apply the international standards to power electronics design. c. Have a global view on recent development on power electronics and facilitate applications of power electronics in various industries d. Work in teams and independently when conducting power electronics design and testing.
Subject Synopsis/ Indicative Syllabus	1. ***Industrial power systems:*** Static power systems, battery systems, AC systems, DC systems and AC-DC power conversion. 2. ***Power conversion:*** Soft-switching, power factor correction, inverter configurations and static converters. 3. ***Special environment power electronics:*** Power electronics distribution system, industrial guidelines, variable speed and constant frequency systems, actuation systems, brushless drives and other applications of power electronics in industry 4. ***Industrial power supplies:*** Converter topologies, decentralized power, power modules, electro-magnetic compatibility, international standards and reliability. 5. ***Power quality improvement:*** Fourier analysis of voltage current waveforms, total harmonic distortion, passive/active filters, rectifier, power quality issues, reactive power compensation. 6. ***Magnetics and capacitors:*** High frequency inductors and transformers, winding techniques, core loss analysis, optimization of magnetics and power capacitors.

Laboratory Experiments:

Selected topics in computer simulation, Motor drive, DC-DC and AC-DC power converters

Teaching/Learning Methodology

Lectures and tutorials are the primary means of conveying the basic concepts and theories. Experiences on design and practical applications are given through experiments and mini-projects, in which the students are expected to solve design problems with real-life constraints and to attain pragmatic solutions with critical and analytical thinking. Interactive laboratory sessions are introduced to encourage better preparation and hence understanding of the experiments. Experiments are designed to supplement the lecturing materials so that the students are encouraged to take extra readings and to look for relevant information.

Teaching/Learning Methodology	Outcomes			
	a	b	c	d
Lectures	✓	✓	✓	
Tutorials	✓	✓		
Experiments				✓

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed			
		a	b	c	d
1. Examination	60%	✓	✓	✓	
2. Test	20%	✓	✓	✓	
3. Laboratory performance / report	20%				✓
Total	100%				

One end-of-semester written examination; one mid-semester-test; one end-of-semester test; laboratory performance evaluation (including punctuality, initiative, and technical reasoning); and laboratory report on a particular experiment.

Student Study Effort Expected

Class contact:	
▪ Lecture/tutorial	30 Hrs.
▪ Tutorial/Student presentation	3 Hrs.
▪ Laboratory	6 Hrs.
Other student study effort:	
▪ Laboratory and presentation preparation/report	15 Hrs.
▪ Self-study	66 Hrs.
Total student study effort	120 Hrs.

Reading List and References

Reference books:

1. A. M. Trzynadlowski, Introduction to Modern Power Electronics, Third Edition, Wiley, 2015.
2. M.Cirrincione, M. Pucci, G. Vitale, Power Converters and AC Electrical Drives with Linear Neural Networks, CRC Press, 2012.
3. N. Mohan, Power Electronics: A First Course, John Wiley & Sons, 2012.
4. F.P. McCluskey, High temperature Electronics, CRC Press, 1997
5. K.W.E. Cheng, Classical Switched Mode and Resonant Power Converters, The Hong Kong Polytechnic University, 2002

Subject Description Form

Subject Code	EE6530
Subject Title	Electrical Energy-Saving Systems
Credit Value	3
Level	6
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	1. To enable students to establish a research skill on energy saving using techniques of electrical engineering. 2. To provide an in-depth knowledge on selected topics of energy-saving systems in electrical engineering. 3. To enable students to understand typical energy storage systems, its associated issues of grid connection and related technical considerations. 4. To enable students to understand the potential of solar energy and characteristics & performance of various kinds solar energy systems. 5. To enable students to understand various techniques and systems for control and monitoring of energy saving, as well as the related communication protocol and interfacing requirements. 6. To enable students to understand control gears for lighting systems and variable speed drives for HVAC systems & elevators.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. Examine the operation principle & control strategy of various energy storage systems, compensation techniques, topologies of these systems and identify their benefits & impacts. b. Examine the principle and characteristics of various solar energy devices, and identify the potentials of solar energy. Calculate available solar irradiation for a given location. c. Understand the theory of energy saving and describe the operation principle and characteristics of typical control and monitoring systems for energy saving, including the communication protocols. d. Identify different energy saving control for industrial plants and multi-storey buildings, including giving examples. e. Examine the operation principle and characteristics of typical control gear for lighting and variables speed drives. f. Given a technical topic, carry out literature search and report the findings in a presentation and be able to work and communicate effectively in a team setting.
Subject Synopsis/ Indicative Syllabus	1. ***Energy storage systems*:** Local compensation, utility Load Factor, peak lopping and valley filling, energy storage systems, battery energy storage, super capacitor, power electronics topologies, control strategy, grid connection, voltage support, power quality improvement, environmental impact, improvement of utility energy efficiencies.

2. ***Solar energy utilization*:** Solar irradiation on earth, potentials of solar energy, solar thermal system systems, photovoltaic systems, characteristics and performance of typical BIPV systems and estimation of its energy output, passive solar devices on buildings and mobility for energy saving, and case study.
3. ***Energy saving control and monitoring systems*:** Theory of energy saving, concept of building energy efficiency, control and monitoring systems and some of its related communication protocols. Application examples.
4. ***Lighting, ballast, and variable speed drives*:** Magnetic ballast, electronic ballast, lighting design, fluorescent, LED and HID lamps, variable speed drives for HVAC systems and elevators, energy storage and regeneration for elevators, harmonics implications.

Laboratory Experiments, Seminars, Site Visits:
Demonstration on operating principles of some selected energy-saving systems.

Case study:
Selections of practical real life energy-saving systems in Hong Kong.

Teaching/Learning Methodology

Lectures and tutorials are the primary means of conveying the basic concepts and theories. Practical experiences on power electronics design, energy saving and applications are given through mini-projects. Mini-projects are given in the beginning of the study. Students are encouraged to form group to jointly investigate an industrial problem and they have to present the projects in front of the class.

Teaching/Learning Methodology	Outcomes					
	a	b	c	d	e	f
Lectures	√	√	√	√	√	
Tutorials	√	√	√	√	√	
Mini-project						√

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed					
		a	b	c	d	e	f
1. Examination	60%	√	√	√	√	√	
2. Class Test and/or Assignment	30%	√	√	√	√	√	
3. Mini-project & Report	10%	√	√	√	√	√	√
Total	100%						

It is a fundamental energy saving subject. The outcomes on concepts, design and applications are assessed by the usual means of examination and test whilst those on analytical skills, problem-solving techniques and practical considerations of circuit design, as well as technical reporting and teamwork, are evaluated by experiments, mini-project and the reports.

Student Study Effort Expected	Class contact:	
	▪ Lecture/Tutorial	30 Hrs.
	▪ Seminar/Case study	9 Hrs.
	Other student study effort:	
	▪ Mini-project/report	15 Hrs.
	▪ Self-study	66 Hrs.
	Total student study effort	120 Hrs.

Reading List and References

Reference books:

Battery Storage Systems

1. D. Andrea, Battery Management Systems for Large Lithium Ion Battery Packs, Artech House, 2010.
2. P.W. Parfomak, Energy storage for Power Grids and Electric Transportation: A Technology Assessment, Congressional Research Service, 2012.
3. Y. Brunet, Energy storage, Wiley, 2010
4. F. S. Barnes, J.G. Levine, Large Energy Storage Systems Handbook, CRC Press, 2011

Solar Energy Utilisation

5. S. Yannas, Solar Energy and Housing Design, Architectural Association, 2005/2006
6. R. Messenger, Photovoltaic Systems Engineering, CRC Press, 2000.
7. C. Prapanavarat, Investigation of the Performance of a Photovoltaic AC Module, Generation, Transmission and Distribution, IEE Proceedings, Vol: 149, Issue 4, Jul 2002
8. Web site of Energy Efficiency and Renewable Energy from the Dept. of Energy of USA, http://www.eere.energy.gov/
9. Web site of the Key Centre of Photovoltaic Engineering in University of New South Wales, http://www.pv.unsw.edu.au/

Energy Saving Control and Monitoring Systems

10. EMSD of HKSAR Govt, Code of Practice for Energy Efficiency of Building Services Installation, 2012
11. EMSD of HKSAR Govt, Code of Practice for Building Energy Audit, 2012
12. M. Wiebe, A Guide to Utility Automation: AMR, SCADA, and IT Systems for Electric Power, c1999.
13. Bela Liptak, Instrument Engineers' Handbook, 4th Edition, Volume Two: Process Control and Optimization, CRC 2005.

Lighting, Ballast, and Variable Speed Drives

14. J.R. Benya, D.J. Leban, Lighting Retrofit and Relighting: A Guide to Energy Efficient Lighting, John Wiley & Son, 2011
15. M.H. Rashid, Power Electronics Handbook: Devices, Circuits and Applications, Academic Press, 2010
16. Guidelines on Energy Efficiency of Lift and Escalator Installations, 2000 Edition, Electrical and Mechanical Services Department (EMSD), the Government of the HKSAR, Hong Kong
17. K.W.E.Cheng, Design and Fabrication of Electronics and Optical Systems for Advanced Automotive Lighting Systems, The Hong Kong Polytechnic University, 2007

Subject Description Form

Subject Code	EE6811 – EE6813
Subject Title	Special Topics in Advanced Power System I/II/III
Credit Value	3
Level	6
Pre-requisite / Co-requisite/ Exclusion	Recommended background knowledge: Knowledge of Power Systems equivalent to the final year of an Honours Degree in Electrical Engineering course. Preference will be given to those who has had research or working experience in the topic chosen.
Objectives	To provide practising electrical engineers with an opportunity to study in depth a topic in advanced power system engineering and management which are important to engineers and researchers.
Intended Learning Outcomes	Upon completion of the subject students will be able: 1. To acquire an understanding of a selected topic in this area, up to the expertise knowledge level, through self study and guidance by the supervisor. 2. To possess the ability of developing latest innovations and cutting edge technologies, through literature studies, simulation studies, and/or experimental studies. 3. To be able to report and explain the above selected area of knowledge, through written and oral means.
Subject Synopsis/ Indicative Syllabus	To conduct an in-depth study in a particular topic in Advanced Power System. The topic content will be fixed after mutual discussion with the prospective supervisor prior to the start of the module.
Teaching/Learning Methodology	The subject can be conducted via guided study in two modes for individual students. Mode I requires a student to take an MSc subject related to the topics of the guided study subject or a relevant short course as the basis of the guided study subject. The student will be required to participate fully in the MSc subject/relevant short course (i.e. attend all the lectures, complete both the coursework and examination requirements). To bring the subject up to the doctoral level, a student is required to submit further write-ups and presentations. An overall grade for the guided study subject is then derived from the result of the MSc subject as well as the extra writes-up and presentations. Mode II is operated for guided study subjects with no relevant MSc subject/short course available. A student is required, under the supervision of the subject supervisor, to read specified monographs, journal publications and/or a book. The student and the subject supervisor must meet once per week to discuss the progress made by the student in the subject. Courseworks in terms of literature survey reports and presentations should normally be included. At the end of the semester the student will be examined, normally both orally and in written form.

<table>
<tr><td></td><td>
<table>
<tr><td rowspan="2">Teaching/Learning Methodology</td><td colspan="3">Intended subject learning outcomes</td></tr>
<tr><td>1</td><td>2</td><td>3</td></tr>
<tr><td>Lecture & Tutorial (for mode I study only)</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>One-to-one guided tutorial</td><td>✓</td><td></td><td>✓</td></tr>
<tr><td>Self study</td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>Software/hardware experimentation</td><td></td><td>✓</td><td>✓</td></tr>
</table>
</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods</td><td rowspan="2">% weighting</td><td colspan="3">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>1</td><td>2</td><td>3</td></tr>
<tr><td>Coursework</td><td>49</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Examination</td><td>51</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Total</td><td>100</td><td colspan="3"></td></tr>
</table>
NB:
Examination (normally both written and oral, conducted by the responsible staff and a staff member who is knowledgeable in the topic)
Coursework (normally assignment and presentations)
</td></tr>
<tr><td rowspan="6">Student Study Effort Expected

(Mode I)</td><td>Class contact (time-tabled):</td><td></td></tr>
<tr><td>▪ Lecture</td><td>24 Hrs.</td></tr>
<tr><td>▪ Tutorial/Laboratory/Practical Classes</td><td>15 Hrs.</td></tr>
<tr><td>Guided activities:</td><td></td></tr>
<tr><td>▪ Meeting with the supervisor / Presentations/ Viva examination</td><td>10 Hrs.</td></tr>
<tr><td>▪ Self-study / Preparation of reports and presentation materials</td><td>56 Hrs.</td></tr>
<tr><td></td><td>Total student study effort</td><td>105 Hrs.</td></tr>
<tr><td>(Mode II)</td><td>Guided activities:</td><td></td></tr>
<tr><td></td><td>▪ Meeting with the supervisor / Presentations/ Viva examination</td><td>20 Hrs.</td></tr>
<tr><td></td><td>▪ Self-study / Preparation of reports and presentation materials</td><td>85 Hrs.</td></tr>
<tr><td></td><td>Total student study effort</td><td>105 Hrs.</td></tr>
<tr><td>Reading List and References</td><td colspan="2">To be assigned by the subject lecturer.</td></tr>
</table>

Subject Description Form

Subject Code	EE6821 – EE6823
Subject Title	Special Topics in Advanced Utilisation I/II/III
Credit Value	3
Level	6
Pre-requisite / Co-requisite/ Exclusion	Recommended background knowledge: Knowledge of Power Electronics and Drives equivalent to the final year of an Honours Degree in Electrical Engineering course. Preference will be given to those who has had research or working experience in the topic chosen.
Objectives	To provide practising electrical engineers with an opportunity to study in depth a topic in advanced utilisation engineering and management which are important to engineers and researchers.
Intended Learning Outcomes	Upon completion of the subject students will be able: 1. To acquire an understanding of a selected topic in this area, up to the expertise knowledge level, through self study and guidance by the supervisor. 2. To possess the ability of developing latest innovations and cutting edge technologies, through literature studies, simulation studies, and/or experimental studies. 3. To be able to report and explain the above selected area of knowledge, through written and oral means.
Subject Synopsis/ Indicative Syllabus	To conduct an in-depth study in a particular topic in Advanced Utilisation. The topic content will be fixed after mutual discussion with the prospective supervisor prior to the start of the module.
Teaching/Learning Methodology	The subject can be conducted via guided study in two modes for individual students. Mode I requires a student to take an MSc subject related to the topics of the guided study subject or a relevant short course as the basis of the guided study subject. The student will be required to participate fully in the MSc subject/relevant short course (i.e. attend all the lectures, complete both the coursework and examination requirements). To bring the subject up to the doctoral level, a student is required to submit further write-ups and presentations. An overall grade for the guided study subject is then derived from the result of the MSc subject as well as the extra writes-up and presentations. Mode II is operated for guided study subjects with no relevant MSc subject/short course available. A student is required, under the supervision of the subject supervisor, to read specified monographs, journal publications and/or a book. The student and the subject supervisor must meet once per week to discuss the progress made by the student in the subject. Courseworks in terms of literature survey reports and presentations should normally be included. At the end of the semester the student will be examined, normally both orally and in written form.

	<table><tr><td rowspan="2">Teaching/Learning Methodology</td><td colspan="3">Intended subject learning outcomes</td></tr><tr><td>1</td><td>2</td><td>3</td></tr><tr><td>Lecture & Tutorial (for mode I study only)</td><td>✓</td><td>✓</td><td>✓</td></tr><tr><td>One-to-one guided tutorial</td><td>✓</td><td></td><td>✓</td></tr><tr><td>Self study</td><td>✓</td><td>✓</td><td></td></tr><tr><td>Software/hardware experimentation</td><td></td><td>✓</td><td>✓</td></tr></table>
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Student Study Effort Expected **(Mode I)**	<table><tr><td>Class contact (time-tabled):</td><td></td></tr><tr><td>▪ Lecture</td><td>24 Hrs.</td></tr><tr><td>▪ Tutorial/Laboratory/Practical Classes</td><td>15 Hrs.</td></tr><tr><td>Guided activities:</td><td></td></tr><tr><td>▪ Meeting with the supervisor / Presentations/ Viva examination</td><td>10 Hrs.</td></tr><tr><td>▪ Self-study / Preparation of reports and presentation materials</td><td>56 Hrs.</td></tr><tr><td>Total student study effort</td><td>105 Hrs.</td></tr></table>
(Mode II)	<table><tr><td>Guided activities:</td><td></td></tr><tr><td>▪ Meeting with the supervisor / Presentations/ Viva examination</td><td>20 Hrs.</td></tr><tr><td>▪ Self-study / Preparation of reports and presentation materials</td><td>85 Hrs.</td></tr><tr><td>Total student study effort</td><td>105 Hrs.</td></tr></table>
Reading List and References	To be assigned by the subject lecturer.

Subject Description Form

Subject Code	EE6831 – EE6833
Subject Title	Special Topics in Advanced Control System I/II/III
Credit Value	3
Level	6
Pre-requisite / Co-requisite/ Exclusion	Recommended background knowledge: Knowledge of Control Systems equivalent to the final year of an Honours Degree in Electrical Engineering course. Preference will be given to those who has had research or working experience in the topic chosen.
Objectives	To provide practising electrical engineers with an opportunity to study in depth a topic in advanced control system engineering and management which are important to engineers and researchers.
Intended Learning Outcomes	Upon completion of the subject students will be able: 1. To acquire an understanding of a selected topic in this area, up to the expertise knowledge level, through self study and guidance by the supervisor. 2. To possess the ability of developing latest innovations and cutting edge technologies, through literature studies, simulation studies, and/or experimental studies. 3. To be able to report and explain the above selected area of knowledge, through written and oral means.
Subject Synopsis/ Indicative Syllabus	To conduct an in-depth study in a particular topic in Advanced Control System. The topic content will be fixed after mutual discussion with the prospective supervisor prior to the start of the module.
Teaching/Learning Methodology	The subject can be conducted via guided study in two modes for individual students. Mode I requires a student to take an MSc subject related to the topics of the guided study subject or a relevant short course as the basis of the guided study subject. The student will be required to participate fully in the MSc subject/relevant short course (i.e. attend all the lectures, complete both the coursework and examination requirements). To bring the subject up to the doctoral level, a student is required to submit further write-ups and presentations. An overall grade for the guided study subject is then derived from the result of the MSc subject as well as the extra writes-up and presentations. Mode II is operated for guided study subjects with no relevant MSc subject/short course available. A student is required, under the supervision of the subject supervisor, to read specified monographs, journal publications and/or a book. The student and the subject supervisor must meet once per week to discuss the progress made by the student in the subject. Courseworks in terms of literature survey reports and presentations should normally be included. At the end of the semester the student will be examined, normally both orally and in written form.

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(Mode II)	<table><tr><td>Guided activities:</td><td></td></tr><tr><td>▪ Meeting with the supervisor / Presentations/ Viva examination</td><td>20 Hrs.</td></tr><tr><td>▪ Self-study / Preparation of reports and presentation materials</td><td>85 Hrs.</td></tr><tr><td>Total student study effort</td><td>105 Hrs.</td></tr></table>
Reading List and References	To be assigned by the subject lecturer.

Subject Description Form

Subject Code	EE6841 – EE6843
Subject Title	Special Topics in Advanced Fiber Optic I/II/III
Credit Value	3
Level	6
Pre-requisite / Co-requisite/ Exclusion	Recommended background knowledge: Knowledge of Fiber Optic equivalent to the final year of an Honours Degree in Electrical Engineering course. Preference will be given to those who has had research or working experience in the topic chosen.
Objectives	To provide practising electrical engineers with an opportunity to study in depth a topic in advanced fiber optic engineering and management which are important to engineers and managers.
Intended Learning Outcomes	Upon completion of the subject students will be able: 1. To acquire an understanding of a selected topic in this area, up to the expertise knowledge level, through self study and guidance by the supervisor. 2. To possess the ability of developing latest innovations and cutting edge technologies, through literature studies, simulation studies, and/or experimental studies. 3. To be able to report and explain the above selected area of knowledge, through written and oral means.
Subject Synopsis/ Indicative Syllabus	To conduct an in-depth study in a particular topic in Advanced Fiber Optic. The topic content will be fixed after mutual discussion with the prospective supervisor prior to the start of the module.
Teaching/Learning Methodology	The subject can be conducted via guided study in two modes for individual students. Mode I requires a student to take an MSc subject related to the topics of the guided study subject or a relevant short course as the basis of the guided study subject. The student will be required to participate fully in the MSc subject/relevant short course (i.e. attend all the lectures, complete both the coursework and examination requirements). To bring the subject up to the doctoral level, a student is required to submit further write-ups and presentations. An overall grade for the guided study subject is then derived from the result of the MSc subject as well as the extra writes-up and presentations. Mode II is operated for guided study subjects with no relevant MSc subject/short course available. A student is required, under the supervision of the subject supervisor, to read specified monographs, journal publications and/or a book. The student and the subject supervisor must meet once per week to discuss the progress made by the student in the subject. Courseworks in terms of literature survey reports and presentations should normally be included. At the end of the semester the student will be examined, normally both orally and in written form.

	<table><tr><td rowspan="2">Teaching/Learning Methodology</td><td colspan="3">Intended subject learning outcomes</td></tr><tr><td>1</td><td>2</td><td>3</td></tr><tr><td>Lecture & Tutorial (for mode I study only)</td><td>✓</td><td>✓</td><td>✓</td></tr><tr><td>One-to-one guided tutorial</td><td>✓</td><td></td><td>✓</td></tr><tr><td>Self study</td><td>✓</td><td>✓</td><td></td></tr><tr><td>Software/hardware experimentation</td><td></td><td>✓</td><td>✓</td></tr></table>
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Student Study Effort Expected **(Mode I)**	Class contact (time-tabled):
	▪ Lecture — 24 Hrs.
	▪ Tutorial/Laboratory/Practical Classes — 15 Hrs.
	Guided activities:
	▪ Meeting with the supervisor / Presentations/ Viva examination — 10 Hrs.
	▪ Self-study / Preparation of reports and presentation materials — 56 Hrs.
	Total student study effort — 105 Hrs.
(Mode II)	Guided activities:
	▪ Meeting with the supervisor / Presentations/ Viva examination — 20 Hrs.
	▪ Self-study / Preparation of reports and presentation materials — 85 Hrs.
	Total student study effort — 105 Hrs.
Reading List and References	To be assigned by the subject lecturer.

Subject Description Form

Subject Code	EE6851 – EE6853
Subject Title	Special Topics in Smart Materials and Structures I/II/III
Credit Value	3
Level	6
Pre-requisite / Co-requisite/ Exclusion	Recommended background knowledge: Knowledge of Electrical Engineering equivalent to the final year of an Honours Degree in Electrical Engineering course. Preference will be given to those who have had research or working experience in the topic chosen.
Objectives	To provide practising engineers with an opportunity to study in depth a topic in smart materials and structures which are becoming increasingly important to engineers and researchers.
Intended Learning Outcomes	Upon completion of the subject students will be able: 4. To acquire an understanding of a selected topic in this area, up to the expertise knowledge level, through self study and guidance by the supervisor. 5. To possess the ability of developing latest innovations and cutting edge technologies, through literature studies, simulation studies, and/or experimental studies. 6. To be able to report and explain the above selected area of knowledge, through written and oral means.
Subject Synopsis/ Indicative Syllabus	To conduct an in-depth study in a particular topic in Smart Materials and Structures. The topic content will be fixed after mutual discussion with the prospective supervisor prior to the start of the module.
Teaching/Learning Methodology	The subject can be conducted via guided study in two modes for individual students. Mode I requires a student to take an MSc subject related to the topics of the guided study subject or a relevant short course as the basis of the guided study subject. The student will be required to participate fully in the MSc subject/relevant short course (i.e. attend all the lectures, complete both the coursework and examination requirements). To bring the subject up to the doctoral level, a student is required to submit further write-ups and presentations. An overall grade for the guided study subject is then derived from the result of the MSc subject as well as the extra writes-up and presentations. Mode II is operated for guided study subjects with no relevant MSc subject/short course available. A student is required, under the supervision of the subject supervisor, to read specified monographs, journal publications and/or a book. The student and the subject supervisor must meet once per week to discuss the progress made by the student in the subject. Courseworks in terms of literature survey reports and presentations should normally be included. At the end of the semester the student will be examined, normally both orally and in written form.

	<table><tr><td rowspan="2">Teaching/Learning Methodology</td><td colspan="3">Intended subject learning outcomes</td></tr><tr><td>1</td><td>2</td><td>3</td></tr><tr><td>Lecture & Tutorial (for mode I study only)</td><td>✓</td><td>✓</td><td>✓</td></tr><tr><td>One-to-one guided tutorial</td><td>✓</td><td></td><td>✓</td></tr><tr><td>Self study</td><td>✓</td><td>✓</td><td></td></tr><tr><td>Software/hardware experimentation</td><td></td><td>✓</td><td>✓</td></tr></table>
Assessment Methods in Alignment with Intended Learning Outcomes	<table><tr><td rowspan="2">Specific assessment methods</td><td rowspan="2">% weighting</td><td colspan="3">Intended subject learning outcomes to be assessed</td></tr><tr><td>1</td><td>2</td><td>3</td></tr><tr><td>Coursework</td><td>49</td><td>✓</td><td>✓</td><td>✓</td></tr><tr><td>Examination</td><td>51</td><td>✓</td><td>✓</td><td>✓</td></tr><tr><td>Total</td><td>100</td><td colspan="3"></td></tr></table> NB: Examination (normally both written and oral, conducted by the responsible staff and a staff member who is knowledgeable in the topic) Coursework (normally assignment and presentations)
Student Study Effort Expected **(Mode I)**	Class contact (time-tabled):
	▪ Lecture — 24 Hrs.
	▪ Tutorial/Laboratory/Practical Classes — 15 Hrs.
	Guided activities:
	▪ Meeting with the supervisor / Presentations/ Viva examination — 10 Hrs.
	▪ Self-study / Preparation of reports and presentation materials — 56 Hrs.
	Total student study effort — 105 Hrs.
(Mode II)	Guided activities:
	▪ Meeting with the supervisor / Presentations/ Viva examination — 20 Hrs.
	▪ Self-study / Preparation of reports and presentation materials — 85 Hrs.
	Total student study effort — 105 Hrs.
Reading List and References	To be assigned by the subject lecturer.