EE4001 Final Year Project Briefing

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B.Eng. (EE) Curriculum Structure

University Level Requirements (ULR)	Faculty Requirements	ECE Major Requirements	Unrestricted Elective Modules (UEM)
2 General Education Modules (GEMs) 1 Singapore Studies (SS) Module = 4 MCs 2 Breadth Electives from outside faculty (including 1 physics module)	2 Math & 1 Physics G1413 Critical Thinking & Writing HR2002 Human Capital in Organizations EG1108 Electrical Engg MLE1101 Introductory Material Sci &Engg EG2401 Engineering Professionalism CS1101C Programming Methodology	EE Core Modules (MCs = 37) EE Core – Project and Independent Study Modules (22 MCs) EE Technical Electives to satisfy breadth and depth requirements (28 MCs)	Any faculty (for Breadth/Depth) Can be used to fulfill minor or double major requirements n be used for enhancement programmes
MCs = 20	MCs = 33	MCs = 87	MCs = 20

FYP (12 MCs)

Total = 160 MCs

FYP Workload

- 12 MCs over 2 semesters; 6 MCs per semester

  Workload Expectation: 6 x 2.5 = 15 hours/week

  – Plan your module workload carefully

  – **Allocate at least 15 hours/week to your FYP**

FYP Allocation

- Allocation of FYP projects was based on balancing several factors such as students' interests as indicated on Choice Form, student's CAP, academic staff workload, project availability, etc.
- Total number of students: ~200 (AY2016/17)
- Students allocated one of their first 3 choices: >85%

FYP Objectives

- Students to learn how to apply knowledge and skills acquired in the classroom and also to think of innovative ways of solving complex problems with awareness of health/safety issues where appropriate.
- Supervisors to guide students to learn skills, such as questioning, forming hypotheses, gathering evidence, project planning and management.
- Supervisors to mentor students to develop skills for independent and lifelong learning.
- Process or how the project is executed is as important as the final outcome.

FYP Methodology

- Projects have a varied mix of research, design and development components.
- Academic staff advise students and continually monitor their progress.
- Students are encouraged to keep a log book of activities during their project, recording the following:
  - Regular meetings with supervisor(s)
  - Short term and long term goals and plans
  - Results obtained during the project

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FYP Evaluation Criteria

i. Carry out preparatory work, such as literature search, review of past work, etc.

ii. Evaluate materials of direct relevance to the investigation.

iii. Focus on main issues, formulate the problem and identify areas of major contribution in the project.

iv. Validate the problem statement through analytical studies, software design and simulation, designing and building instrumentation and/or experimentation.

v. Write a dissertation and a technical paper.

vi. Present and defend the work reported in the dissertation.

FYP Evaluation Criteria

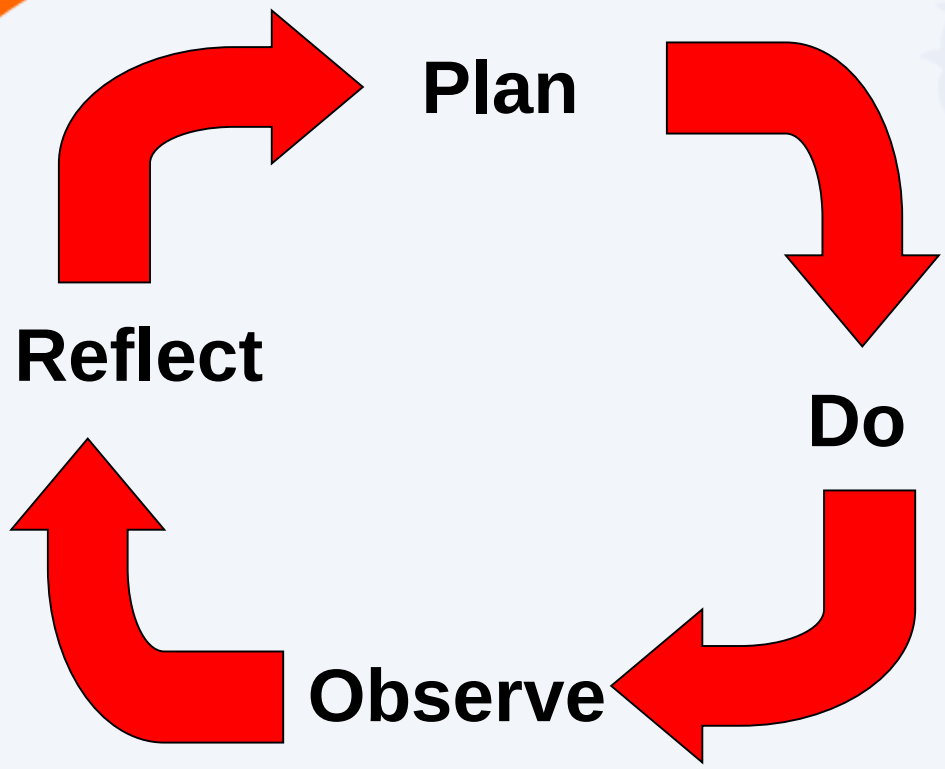
Assessment will be made on the following:

- **Planning & Project Management:** Time-scheduling, setting milestones, usage of resources, contingency planning, etc.
- **Execution:** Execution in parts as directed by the milestones and integration of all the parts to provide the solution to the formulated problem
- **Outcome(s)**

Assessment is summative (adds to the final grade).

Supervisor(s) and examiner to provide feedback to the student.

FYP Research



- **Plan – Process**
- **Do – Effort and Initiative**
- **Observe – Effort and Initiative + Outcome**
- **Reflect – Assessment of outcome**

And the entire learning cycle continues…

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Timeline of Continual Assessments (CAs):

Weeks 6-7, Sem I

CA1: 13 Sep – 30 Sep 2016, Sem I

→ **Pass Online Safety Quiz – by 30 Sep 2016 latest**

Week 13 Sem I to 2 weeks after Sem 1 Exam

CA2: 7 Nov - 16 Dec 2016, Sem I

Weeks 11-13, Sem II

CA3: 27 Mar - 14 Apr 2017, Sem II

→ **Submit hard copy of thesis & tech paper for examination – 31 March 2017**

Weeks 13, Sem II

CA4: 10 - 14 April 2017, Sem II

→ **Upload final version of thesis and tech paper – 12 May 2017**

CA1

- When? – Completed by 7th week of Semester I.
- Weightage? – 10 %
- Who is involved? – Supervisor(s)
- What is assessed? – Student's effort, understanding, planning, achievement for criteria i, ii and iii, and Report [5 to 10 page report to be submitted to Supervisor(s)].

i. To carry out preparatory (background) work, such as literature search, review of past work, etc.
ii. To evaluate materials of direct relevance to the investigation.
iii. To focus on main issues, formulate the problem and identify areas of major contribution in the project.

CA2

- When? – Week 13 of Semester I to 2 weeks after the end of Semester I examination.
- Weightage? – 30 %
- Who are involved? – Supervisor(s) (20%) & Examiner (10%)
- What is assessed? – Student's effort, initiative, understanding, execution & achievement for criteria iii and iv, & Oral Presentation (Supervisor and/or examiner may also request for report)

iii. To focus on main issues, formulate the problem and identify areas of major contribution in the project.

iv. To validate the problem statement and solution through analytical studies, software design and simulation, designing and building instrumentation, and/or experimentation.

CA3

- When? – Weeks 11 - 13 of Semester II **(overlaps with CA4)**
- Weightage? – 30 %
- Who is involved? – Supervisor(s)
- What is assessed? – Student's effort, initiative, execution & achievement for criterion iv.

iv. To validate the problem statement and solution through analytical studies, software design and simulation, designing and building instrumentation and/or experimentation.

CA4

- When? – Week 13 of Semester II
- Weightage? – 30 %
- Who is involved? – Examiner ONLY! (Supervisor may sit through presentation)
- What is assessed? – Thesis, oral presentation, technical paper, execution & achievement for criteria iv, v and vi.

iv. To validate the problem statement and solution through analytical studies, software design and simulation, designing and building instrumentation and/or experimentation.
v. To write a dissertation (thesis) and a technical paper.
vi. To present and defend the work in the thesis.

Summary of expectations in FYP

(1) Analyze and understand the given problem through critical evaluation of literature.
(2) Formulate and validate the problem.
(3) Plan the execution, solve sub-problems, etc., with consideration of health/safety issues where appropriate
(4) Project planning (e.g. timelines, milestones) and project management (e.g. regular monitoring, updating of progress, risk identification/assessment, contingency planning, etc.).
(5) Write a clear and concise final dissertation and technical paper.
(6) Present, substantiate and defend the analysis and conclusions reported in the dissertation (i.e. Oral presentation).

Deliverables: Interim reports and presentations at each CA followed by final dissertation, technical report and oral presentation.

At each CA, there will be different levels of achievements that students will be graded on and these will be in the form of rubrics.

Importance of consistent work (Do not neglect earlier CAs!).

Students should note that the process of problem formulation and solving is as important as the final outcome (Process/Execution equally important as Outcome!).

Rubrics as an Assessment Tool for FYP CAs

- Rubrics differ from traditional methods of assessment in that they assess students in the actual process of learning, clearly showing them how their work is evaluated.
- Provide clearer guidelines on criteria for assessment.
- Inject some objectivity into the assessment.
- Achieve some uniformity in the assessment as the guidelines are made clearer.
- Provide clear goals to students to set their own targets of achievement
- Please refer to FYP student portal for the CA1 to CA4 rubrics under “CAs”.

  http://online.ece.nus.edu.sg/fypportal/cas.asp

Rubrics Assessment Criteria

CA1 – Supervisor ONLY (10%)

- Understanding of Problem
- Evaluation of Materials
- Planning (e.g., timelines, milestones)
- Background Work

Important: Have to pass online safety quiz latest by Week 7! (Latest by 30 Sep 2016)

http://online.ece.nus.edu.sg/safety/quiz/

Rubrics Assessment Criteria

CA2 – Supervisor (20%)

- Effort
- Initiative
- Understanding
- Planning (e.g., timelines, milestones, plans for regular monitoring and update)
- Execution and Overall Achievement

CA2 – Examiner (10%)

- Understanding
- Execution and Overall Achievement

Rubrics Assessment Criteria

CA3 – Supervisor ONLY (30%)

- Effort
- Initiative
- Project Management (e.g., risk identification/assessment, contingency planning, regular monitoring and updating of progress)
- Outcome and Overall Achievement

Rubrics Assessment Criteria

CA4 – Examiner ONLY (30%)

- **Thesis**
  - Statement of Problem
  - Critical Evaluation of Literature
  - Organization
  - Discussion, Recommendations and Conclusion
- **Technical Paper**
- **Oral Presentation (i.e., Present, substantiate and defend the analysis and conclusions reported in the dissertation)**
- **Outcome and Overall Achievement**

FYP Prizes and Awards

- **ECE FYP Poster Competition**
- **FOE Innovation and Research Award (IRA)**
  http://www.eng.nus.edu.sg/ugrad/awards.html#fyp
- **Outstanding Undergraduate Researcher (OUR) Prize**
  http://www.eng.nus.edu.sg/ugrad/our_prize.html
- **IEEE Control Systems Chapter Prize**
  http://www.nus.edu.sg/registrar/edu/awards/rulesofaward-i.html
- **IEEE Region 10 Undergraduate Student Paper Contest and IEEE Singapore Section Undergraduate Student Paper Contest**
  http://www.r10sac.org/activities/competitions/paper.html
- **Alcatel-Lucent Technologies Prize**

Prizes and awards can enrich your CV. Please discuss with your supervisor and keep track of the application deadline.

ECE FYP Poster Competition

- FYP supervisors to recommend their students based on good progress and achievements to date in their FYP.
- Poster competition to be held on Friday of Week 13 in Semester 2 (Tentatively 14 April 2017; TBC later).
- Nominated students to prepare an A1-size poster (594 x 841 mm (or) 23.4 x 33.1 inches) on their FYP and present their work to a judging panel.
- Three prizes worth $200, $150 and $100 plus certificate.

FOE Innovation and Research Award (IRA)

- This award was set up to recognize and appreciate innovative talents for their FYP achievement.
- All final year project students within the Faculty can participate.
- The following criteria may be used to determine good entries:

  1. The project work **improves** a known method, analysis, procedure; or
  2. The project work **adds value** to the existing engineering domain; or
  3. The project **changes the conventional** for the better.

- IRA winners may be in one of the following categories, with no predetermined quota on number of awardees for each category.
  - High Achievement Award (Prize $400 and Certificate)
  - Merit Award (Prize $200 and Certificate)

Outstanding Undergraduate Researcher (OUR) Prize

- OUR Prize is launched in AY 2006-2007 (university-wide competition for the best undergraduate researcher(s)).
- A maximum of **15 prizes** is awarded each year by the University.

	Winner Category	Prizes
	Individual	S$2000* per prize and certificate
	Group (no more than 5 members per group)	S$5000* per prize and certificate

IEEE Region 10 Undergraduate Student Paper Contest & IEEE Singapore Section Undergraduate Student Paper Contest

- The Institution of Electrical and Electronics Engineers (IEEE) organizes a Region 10 Student Paper Contest.
- Open to all IEEE Student members undergoing an undergraduate course in electrical and computer engineering in Region 10 (Asia, Australia and NZ).
- There are no specific criteria, except that the student needs to submit a research paper based on his / her work (should be student's own work) and there should be some research and innovation in the work.
- There are three prizes worth US$ 300, $200 and $150 plus certificate.

http://www.r10sac.org/activities/competitions/paper.html

IEEE Control Systems Chapter Prize

- Donated in year 2000 by the IEEE Control Systems Chapter of Singapore.
- A prize of $600 is awarded annually.
- The prize is governed by the following conditions:

  1. Subject to rule 3 below, the prize will be awarded to FYP students in ECE Department with the **best Control Engineering project**.
  2. The prize will be awarded by the Board of Undergraduate Studies on the recommendation of the Selection Committee.
  3. No award will be made unless there is a candidate of sufficient merit.
  4. If no award is made in any year, the funds available will be carried forward to provide for awards in subsequent years.

Alcatel-Lucent Technologies Prize

- The book prize will be awarded to the final year student with the best Communications Engineering final year project in the Bachelor of Engineering (Electrical) Examinations.
- The book prize, valued at $500, will be in the form of book vouchers.

Managing your FYP: 10 Things NOT to do

1. **Do not plagiarise** other students' FYP results in your CA reports. Students who are found guilty of committing plagiarism will be given a straight **'F'** for EE4001 (12 MCs).
2. **Do not be late** for any appointment with your supervisor & examiner. Your supervisor & examiner place great emphasis on time management (time is precious to them). If you know you are going to be late or are unable to make it for the appointment, it is **basic courtesy** and your **responsibility** to contact them at the soonest to cancel or to re-arrange the appointment. Your supervisor & examiner may be annoyed if you are late or miss the appointment without prior notice.

Managing your FYP: 10 Things NOT to do

3. **Do not run away or 'hide'** when you encounter problems with your FYP.
   - If you do not know how to proceed with your FYP, quickly seek advice from your FYP supervisor.
   - If you have communication problems with your supervisor, seek help from Ms. Susan A. Silva at ECE Dept General Office or the ECE FYP Coordinator.
   - If you have personal problems (depression, BGR problem, etc) that is affecting your studies and FYP, and you cannot resolve the problems by yourself, do not lock yourself in the room. You must try to seek help **early** from different sources, e.g., talk to your family members, friends, UHC counsellor, your Academic Advisor, ECE Year 4 Coordinator, ECE FYP Coordinator, or officers at ECE Dept General Office. Do not wait till CA1, CA2, CA3, CA4 deadlines are due, or when you realize you are going to FAIL your FYP, then you start to panic and start to seek help, and then you will have to face the consequences of failing your FYP yourself.

Managing your FYP: 10 Things NOT to do

4. **Do not procrastinate** in your FYP till CA1, CA2, CA3, CA4 deadlines are near. It is your responsibility to set up regular weekly appointments with your supervisor at the start of the semester and to update him/her on your FYP progress. Plan early. Be consistent and put in effort. Exercise self discipline and proper time management.
5. **Do not be complacent** or wait for the supervisor to prompt you on your weekly meetings, or updates on your FYP work. Be reminded that this is your project, your degree and your future. Work done for your FYP thesis is important as it may reflect on your future career and employment.
6. **Do not hesitate** to consult your FYP supervisor(s). If there is a problem encountered in your work that impedes progress, quickly seek help from your supervisor(s). They are most willing to share their knowledge and guide you to solve the problem.

Managing your FYP: 10 Things NOT to do

7. **Do not be disappointed** by the feedback given at each CA as they are meant to help you to improve. Work done and assessed at every CA is important as it carries weightage (%) towards the overall assessment.
8. **Do not wait** till the last minute to start writing your thesis. Progressive work on the thesis should be carried out early (e.g., CA1 and CA2). The format and guidelines for thesis and technical paper writing can be found at the FYP portal. Please read through them carefully.

   http://online.ece.nus.edu.sg/fypportal/memos/

Managing your FYP: 10 Things NOT to do

9. **Do not be afraid** to seek advice from the examiner, wherever appropriate, as the examiner will be the one evaluating your work during CA2 and CA4.
10. **Do not be ignorant**. Do remember to seek feedback on a continual basis in order to gauge your progress and identify areas of further improvement.

Summary: Take ownership of your FYP! It is your project.

Managing your FYP

1. To contact your supervisor immediately when the semester starts.
2. To follow lab/research institute (RI) safety regulations, e.g. do not access the cleanroom or carry out chemical work without proper training; do not bring visitors into labs/RIs without prior permission; do not transfer chemicals between labs without prior permission; do not use lasers without a laser license; to use equipment after proper qualification and training.
3. To build a strong bond with your supervisor: to respect your supervisor; to be actively involved in your project discussion; to establish a strong team spirit with your supervisor, graduate students, lab TOs and your peers.

“7 Habits of Highly Successful FYP”

(Due apologies to Stephen Covey if quoted inappropriately)

- Habit 1 - Be Proactive
- Habit 2 - Begin with the End in Mind, but remember that Process/Execution is as important as Outcome
- Habit 3 - Put First Things First
- Habit 4 - Think Win/Win
- Habit 5 - Seek First to Understand
- Habit 6 - Synergize “Sum is greater than its parts”
- Habit 7 - Sharpen the Senses (i.e., Observation). [Be open to serendipitous findings]

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