

University of Macau  
Faculty of Science and Technology  
Department of Electrical and Computer Engineering

**Part A: Course Outline**

Course Title:	Design Project II		
Course Code:	ECEB420	Year of Study:	4
Course Mode:	Special		
Compulsory/Elective:	Compulsory		
Course Prerequisites:	Design Project I		
Prerequisite Knowledge			
Class/Laboratory Schedule:	Practice: 6 hours per week		
Duration	One semester	Credit Units	3
Text Books and References:			
Course Description:	<p>This course aims to give the students experience in solving real engineering problems and the opportunity to apply the knowledge they have gained during their study. Through the project the students will gain experience in project planning, in teamwork and in communication with management and support staff. The project will also develop their design and research skills.</p>		
Topics Covered	<p>There are four main disciplines under the program</p> <ul style="list-style-type: none"> <li>i. Biomedical Engineering</li> <li>ii. Microelectronics</li> <li>iii. Electric Power Engineering and its Automation</li> <li>iv. Wireless</li> </ul> <p>Student could choose the direction of his design project in one of the discipline or any other direction related to the Electrical and Computer Engineering.</p>		
Course Objectives:	<ol style="list-style-type: none"> <li>1. To develop the ability to search for technical information resources on software and hardware, such as the library, research and technical literature, electronic database and the World Wide Web. [d, f, h, i, j, k]</li> <li>2. To train students to design, synthesis, analysis and implement small systems to meet desired needs. [a, b, c, d, e, k]</li> <li>3. To train students to work in a team environment to complete a system, to do experiment. [c, e, k, g]</li> <li>4. To train the student the ability to write scientific report and present their research work. [a, f, g, i, j]</li> </ol>		

Course Assessment:	Project Work and Report : 70% Oral Presentation: 25% Poster: 5%															
Relationship to Program Objectives and Outcomes	<p>This course primarily contributes to ECE program outcomes that develop students abilities to:</p> <ol style="list-style-type: none"> <li>a. Ability to apply knowledge of mathematics, science and engineering.</li> <li>b. Ability to design and conduct experiments.</li> <li>c. Ability to design a system, component or process to meet desired needs.</li> <li>d. Ability to function on multidisciplinary teams.</li> <li>e. Ability to identify, formulate and solve engineering problems.</li> <li>g. Ability to communicate effectively</li> <li>k. Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.</li> </ol> <p>This course secondarily contributes to ECE program outcomes that develop students abilities to:</p> <ol style="list-style-type: none"> <li>f. Understanding of professional and ethical responsibility.</li> <li>h. Broad education necessary to understand the impact of engineering solutions in global and societal context.</li> <li>i. Recognition of the need for and an ability to engage in life-long learning.</li> <li>l. Ability to use the computer/IT tools relevant to the discipline along with an understanding of their processes and limitations</li> </ol>															
Course Contents and Relationship to Program Criteria:	<table border="1" data-bbox="469 1290 1487 1532"> <thead> <tr> <th data-bbox="469 1290 564 1361">Week no.</th> <th data-bbox="564 1290 1326 1361"></th> <th data-bbox="1326 1290 1487 1361">Program Criteria</th> </tr> </thead> <tbody> <tr> <td data-bbox="469 1361 564 1406">6</td> <td data-bbox="564 1361 1326 1406"><b>Project Progress and Analysis</b></td> <td data-bbox="1326 1361 1487 1406">*</td> </tr> <tr> <td data-bbox="469 1406 564 1451">5</td> <td data-bbox="564 1406 1326 1451"><b>Project Progress and System Implementation</b></td> <td data-bbox="1326 1406 1487 1451">*</td> </tr> <tr> <td data-bbox="469 1451 564 1496">3</td> <td data-bbox="564 1451 1326 1496"><b>Final Report Preparation</b></td> <td data-bbox="1326 1451 1487 1496">*</td> </tr> <tr> <td data-bbox="469 1496 564 1532">1</td> <td data-bbox="564 1496 1326 1532"><b>Oral Presentation</b></td> <td data-bbox="1326 1496 1487 1532">*</td> </tr> </tbody> </table>	Week no.		Program Criteria	6	<b>Project Progress and Analysis</b>	*	5	<b>Project Progress and System Implementation</b>	*	3	<b>Final Report Preparation</b>	*	1	<b>Oral Presentation</b>	*
Week no.		Program Criteria														
6	<b>Project Progress and Analysis</b>	*														
5	<b>Project Progress and System Implementation</b>	*														
3	<b>Final Report Preparation</b>	*														
1	<b>Oral Presentation</b>	*														
Contribution of Course to meet the professional component:	<p>This course contributes to provide students the personal experience of the approach, practice and evaluation of research in engineering topics. It trains the student ability to define and solve an engineering problem. It also trains the student to write scientific report and to present their research work.</p>															
Course Instructor(s):																
Prepared by:	Dr. Dai Ning Yi , Prof. Wong Man Chung, Prof. Mak Pui In															

## Part B: General Course Information and Policies

Instructor:

Office:

Office Hour:          Phone:

e-mail:

### Programme Educational Objectives

1. **Problem Solving:** Graduates have the ability to think in a critical and evaluative manner and to consider a broad perspective, in order to solve technical and nontechnical problems.
2. **Leadership and Communication:** Graduates will provide effective leadership, act in an ethical manner and skills will include the ability to communicate well and to work successfully within diverse groups.
3. **Market Acceptance:** Graduates will have successful careers in the academic environment, industrial and government organizations.
4. **Technical Competence:** Graduates will be technically competent and have a thorough grounding in the fundamentals of math and science in electrical and computer engineering and experience in engineering design. They will be able to use modern engineering techniques, skills, and tools to fulfill societal needs.

Scale: 1 (Highest) to 4 (Lowest)

	<b>Problem Solving</b>	<b>Leadership and Communication</b>	<b>Market Acceptance</b>	<b>Technical Competence</b>
Design Project II	1	2	2	1

Remark:

- Objective for “Problem Solving” can be achieved by data analysis, simulations, laboratories and report.
- Objective for “Leadership and Communication” can be achieved by report writing and presentation. However, Leadership training can be achieved by the project group work.
- Objective for “Market Acceptance” can be achieved by the project(s) that is/are required in industries.
- Objective for “Technical Competence” can be achieved by using fundamentals of math and science in electrical and computer engineering and experience in engineering project design and computer simulation.

### **Program Criteria Policy:**

#### Course VS Program Criteria

Scale: 1 (Highest) to 4 (Lowest)

Course	PS	DIC	BS	CS	ES	DE	LA	CV	DM
Design Project II	*	*	*	*	*	*	*	*	*

Terms:

Probability and Statistics (PS), Differential and Integral Calculus (DIC), Basic Science (BS), Computer Science (CS), Engineering Science (ES), Differential Equation (DE), Linear Algebra (LA), Complex Variables (CV), Discrete Mathematics (DM)

\* The program criteria varies according to different topics the students select.

### **Relationship of Course to Programme Outcomes:**

#### Course VS Course Outcomes

	Program Outcomes											
	a	b	c	d	e	f	g	h	i	j	k	l
ECEB420 Design Project II	P	PM (b1-3)	P	PM (d.1)	PM (e.1-3)	P	PM (g.1-3)	P	PM (i.2)	PM (j.1)	PM (k.1-2)	PM (l.2)

Outcomes

**\*T – TEACH; P – PRACTICE; M – MEASURED**

The electrical and computer engineering program outcomes are:

- an ability to apply knowledge of mathematics, science, and engineering appropriate to the degree discipline
- an ability to design and conduct experiments, as well as to analyse and interpret data
- an ability to design a system, component or process to meet desired needs within realistic constraints, such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability
- an ability to function on multi-disciplinary teams
- an ability to identify, formulate and solve engineering problems
- an ability to understand professional and ethical responsibility
- an ability to communicate effectively

- (h) an ability to understand the impact of engineering solutions in a global and societal context, especially the importance of health, safety and environmental considerations to both workers and the general public
- (i) an ability to stay abreast of contemporary issues
- (j) an ability to recognise the need for, and to engage in life-long learning
- (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice appropriate to the degree discipline
- (l) an ability to use the computer/IT tools relevant to the discipline along with an understanding of their processes and limitations

### Curriculum Detail

#### **ELEC 420 Design Project II**

Timetabled work in hours per week			No of teaching weeks	Total hours	No /Duration of exam papers	Max marks available from:	
Lecturer	Tutor	Practice				Exams	Course
*	*	*	<b>15</b>	<b>90</b>	<b>0</b>	*	*

\*: not available

**Term:** 8<sup>th</sup>

Hours			Percentage content of					
Lecturer	Lab/tut	Other	Maths	Basic Science	Engineering Science	Engineering Design and Synthesis	Complementary Studies	Computer Studies
0	0	<b>90</b>	20**	0**	40**	35**	0**	5**

\*\* : can be varied and is mainly determined by the project itself.

### **Design Elements**

% of Design Content	Design Content in Course Work	Design Project	Design Content in Laboratories
20% ~ 90% **	X	X	X

### Course Assessment Policy:

- In case of a team project, significant contribution is required from each member and students are assessed individually.
- The following policies are adopted in assessment of final project grading.

	Project Work and Report		Oral Presentation	Poster
	Course Work	Report		
By supervisor(s)	100%	50%	25%	25%
By Examiners	0	50%	75%	75%
Marks	40	30	25	5
Total	70		25	5

### **STUDENT DISABILITIES SUPPORT SERVICE**

The University of Macau is committed to providing an equal opportunity in education to persons with disabilities. If you are a student with a physical, visual, hearing, speech, learning or psychological impairment(s) which substantially limit your learning and/or activities of daily living, you are encouraged to communicate with your instructors about your impairment(s) and the accommodations you need in your studies. You are also encouraged to contact the Student Disability Support Service of the Student Counselling and Development Section (SCD) in Student Affairs Office, which provides appropriate resources and accommodations to allow each student with a disability to have an equal opportunity in education, university life activities and services at the University of Macau. To learn more about the service, please contact SCD at [scd.disability@umac.mo](mailto:scd.disability@umac.mo), or 8822 4901 or visit the following website: [http://www.umac.mo/sao/scd/sds/aboutus/en/scd\\_mission.php](http://www.umac.mo/sao/scd/sds/aboutus/en/scd_mission.php).