

Ming Chuan University Department of Electronic Engineering  
Course Outline for all students entering in 2011

| Course  | Credits                                | Hours | 1 <sup>st</sup> year |     |        |     | 2 <sup>nd</sup> year |     |        |     | 3 <sup>rd</sup> year |     |        |     | 4 <sup>th</sup> year |     |        |     | Note |   |                 |                 |                 |
|---|--|-------|----------------------|-----|--------|-----|----------------------|-----|--------|-----|----------------------|-----|--------|-----|----------------------|-----|--------|-----|------|---|-----------------|-----------------|-----------------|
|   |  |       | Fall                 |     | Spring |     | Fall                 |     | Spring |     | Fall                 |     | Spring |     | Fall                 |     | Spring |     |      |   |                 |                 |                 |
|   |  |       | class                | lab | class  | lab | class                | lab | class  | lab | class                | lab | class  | lab | class                | lab | class  | lab |      |   |                 |                 |                 |
| Chinese Literature: Appreciation And Creative Writing | 4                                      | 4     | 2                    |     | 2      |     |                      |     |        |     |                      |     |        |     |                      |     |        |     |      |   |                 |                 |                 |
| Practical English 1                                   | 2                                      | 3     | 2                    | 1   |        |     |                      |     |        |     |                      |     |        |     |                      |     |        |     |      |   |                 |                 |                 |
| Practical English 2                                   | 2                                      | 3     |                      |     | 2      | 1   |                      |     |        |     |                      |     |        |     |                      |     |        |     |      |   |                 |                 |                 |
| Practical English 3                                   | 1                                      | 2     |                      |     |        |     | 1                    | 1   |        |     |                      |     |        |     |                      |     |        |     |      |   |                 |                 |                 |
| Practical English 4                                   | 1                                      | 2     |                      |     |        |     |                      |     | 1      | 1   |                      |     |        |     |                      |     |        |     |      |   |                 |                 |                 |
| English for Business Communication 1                  | 1                                      | 2     |                      |     |        |     |                      |     |        |     | 1                    | 1   |        |     |                      |     |        |     |      |   |                 |                 |                 |
| English for Business Communication 2                  | 1                                      | 2     |                      |     |        |     |                      |     |        |     |                      |     | 1      | 1   |                      |     |        |     |      |   |                 |                 |                 |
| Practical English of Professionals 1                  | 0                                      | 2     |                      |     |        |     |                      |     |        |     |                      |     |        |     | 1                    | 1   |        |     |      |   |                 |                 |                 |
| Practical English of Professionals 2                  | 0                                      | 2     |                      |     |        |     |                      |     |        |     |                      |     |        |     |                      |     | 1      | 1   |      |   |                 |                 |                 |
| General Ed  | 12                                     | 12    |                      |     |        |     |                      |     |        |     |                      |     |        |     |                      |     |        |     |      | 2 |                 |                 |                 |
| Physical Education (1)~(6)                            | 0                                      | 12    | 2                    |     | 2      |     | 2                    |     | 2      |     | 2                    |     | 2      |     |                      |     |        |     |      |   |                 |                 |                 |
| Implementing Service-Learning                         | 0                                      | 1     |                      |     |        |     |                      |     |        |     |                      |     |        |     |                      |     |        |     |      |   |                 |                 |                 |
| <b>Subtotal</b>                                       | 24                                     | 47    | 6                    |     | 6      |     | 3                    |     | 3      |     | 3                    |     | 3      |     |                      |     |        |     |      |   |                 |                 |                 |
| Professional Required Courses                         | Calculus                               | 6     | 8                    | 3   | 1      | 3   | 1                    |     |        |     |                      |     |        |     |                      |     |        |     |      |   |                 |                 |                 |
|   | Physics I                              | 3     | 3                    | 3   |        |     |                      |     |        |     |                      |     |        |     |                      |     |        |     |      |   |                 |                 |                 |
|   | Physics Laboratory I                   | 1     | 3                    | 1   | 2      |     |                      |     |        |     |                      |     |        |     |                      |     |        |     |      |   | Computer course |                 |                 |
|   | Concept of Computer Science            | 3     | 5                    | 3   | 2      |     |                      |     |        |     |                      |     |        |     |                      |     |        |     |      |   |                 | Computer course |                 |
|   | Introduction to Information Technology | 1     | 1                    | 1   |        |     |                      |     |        |     |                      |     |        |     |                      |     |        |     |      |   |                 |                 |                 |
|   | Linear Algebra                         | 3     | 3                    | 3   |        |     |                      |     |        |     |                      |     |        |     |                      |     |        |     |      |   |                 |                 |                 |
|   | Physics II                             | 3     | 3                    |     |        | 3   |                      |     |        |     |                      |     |        |     |                      |     |        |     |      |   |                 |                 |                 |
|   | Physics Laboratory II                  | 1     | 3                    |     |        | 1   | 2                    |     |        |     |                      |     |        |     |                      |     |        |     |      |   |                 |                 | Computer course |
|   | Programming Design I                   | 3     | 5                    |     |        | 3   | 2                    |     |        |     |                      |     |        |     |                      |     |        |     |      |   |                 |                 | Computer course |

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|---|---------------------------------------|-----------|----------------------|-----|--------|-----|----------------------|-----|--------|-----|----------------------|-----|--------|-----|----------------------|-----|--------|-----|------|-----------------|
|   |                                       |           | Fall                 |     | Spring |     | Fall                 |     | Spring |     | Fall                 |     | Spring |     | Fall                 |     | Spring |     |      |                 |
|   |                                       |           | class                | lab | class  | lab | class                | lab | class  | lab | class                | lab | class  | lab | class                | lab | class  | lab |      |                 |
| Professional<br>Required Courses  | Electronic Circuits I                 | 3         | 3                    |     |        | 3   |                      |     |        |     |                      |     |        |     |                      |     |        |     |      |                 |
|   | Digital Logic Design                  | 3         | 3                    |     |        | 3   |                      |     |        |     |                      |     |        |     |                      |     |        |     |      |                 |
|   | Electronic Circuits II                | 3         | 3                    |     |        |     |                      | 3   |        |     |                      |     |        |     |                      |     |        |     |      |                 |
|   | Electronic Circuits<br>Laboratory I   | 1         | 3                    |     |        |     |                      | 1   | 2      |     |                      |     |        |     |                      |     |        |     |      | Computer course |
|   | Engineering<br>Mathematics            | 6         | 6                    |     |        |     |                      | 3   |        | 3   |                      |     |        |     |                      |     |        |     |      |                 |
|   | Electronics                           | 6         | 6                    |     |        |     |                      | 3   |        | 3   |                      |     |        |     |                      |     |        |     |      |                 |
|   | Electromagnetics I                    | 3         | 3                    |     |        |     |                      | 3   |        |     |                      |     |        |     |                      |     |        |     |      |                 |
|   | Signals and Systems                   | 3         | 3                    |     |        |     |                      |     |        | 3   |                      |     |        |     |                      |     |        |     |      |                 |
|   | Electronic Circuits<br>Laboratory II  | 1         | 3                    |     |        |     |                      |     |        | 1   | 2                    |     |        |     |                      |     |        |     |      | Computer course |
|   | Microprocessor<br>Fundamentals        | 2         | 2                    |     |        |     |                      |     |        | 2   |                      |     |        |     |                      |     |        |     |      |                 |
|   | Microprocessor<br>Laboratory          | 1         | 3                    |     |        |     |                      |     |        | 1   | 2                    |     |        |     |                      |     |        |     |      | Computer course |
|   | Electronic Circuits<br>Laboratory III | 1         | 3                    |     |        |     |                      |     |        |     |                      | 1   | 2      |     |                      |     |        |     |      | Computer course |
|   | Project Research I                    | 3         | 3                    |     |        |     |                      |     |        |     |                      |     |        | 3   |                      |     |        |     |      |                 |
|   | Project Research II                   | 3         | 3                    |     |        |     |                      |     |        |     |                      |     |        |     |                      | 3   |        |     |      |                 |
|   | <b>Subtotal</b>                       | <b>63</b> |                      |     |        | 14  |                      | 16  |        |     | 13                   |     | 13     |     |                      | 1   |        | 3   |      | 3               |
| <b>Total Required Course Credits</b><br>(Electronic Engineering Department) | <b>87</b>                             |           |                      |     |        |     |                      |     |        |     |                      |     |        |     |                      |     |        |     |      |                 |

| Elective Courses              | Credits                                 | Hours | 1 <sup>st</sup> year |     |        |     | 2 <sup>nd</sup> year |     |        |     | 3 <sup>rd</sup> year |     |        |     | 4 <sup>th</sup> year |     |        |     | Note |   |
|-------------------------------|---|-------|----------------------|-----|--------|-----|----------------------|-----|--------|-----|----------------------|-----|--------|-----|----------------------|-----|--------|-----|------|---|
|                               |   |       | Fall                 |     | Spring |     | Fall                 |     | Spring |     | Fall                 |     | Spring |     | Fall                 |     | Spring |     |      |   |
|                               |   |       | class                | lab | class  | lab | class                | lab | class  | lab | class                | lab | class  | lab | class                | lab | class  | lab |      |   |
| IC Chip and<br>System Program | Digital System Design<br>and Laboratory | 3     | 3                    |     |        |     |                      | 3   |        |     |                      |     |        |     |                      |     |        |     |      | Computer course<br>(Program core<br>course) |

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|---|--------------------------------------|-------|----------------------|-----|--------|-----|----------------------|-----|--------|-----|----------------------|-----|--------|-----|----------------------|-----|--------|-----|--|
|   |                                      |       | Fall                 |     | Spring |     | Fall                 |     | Spring |     | Fall                 |     | Spring |     | Fall                 |     | Spring |     |  |
|   |                                      |       | class                | lab | class  | lab | class                | lab | class  | lab | class                | lab | class  | lab | class                | lab | class  | lab |  |
| MATLAB Programming                          | 3                                    | 3     |                      |     |        |     | 3                    |     |        |     |                      |     |        |     |                      |     |        |     | Computer course<br>(Program core course) |
| Probability and Statistics                  | 3                                    | 3     |                      |     |        |     | 3                    |     |        |     |                      |     |        |     |                      |     |        |     |  |
| Digital Signal Processing                   | 3                                    | 3     |                      |     |        |     |                      |     |        |     | 3                    |     |        |     |                      |     |        |     |  |
| Computer organization                       | 3                                    | 3     |                      |     |        |     |                      |     |        |     | 3                    |     |        |     |                      |     |        |     |  |
| Data Structure                              | 3                                    | 3     |                      |     |        |     |                      |     |        |     | 3                    |     |        |     |                      |     |        |     | Computer course                          |
| Introduction to VLSI Design                 | 3                                    | 3     |                      |     |        |     |                      |     |        |     | 3                    |     |        |     |                      |     |        |     | Computer course<br>(Program core course) |
| Electronic Circuit Design                   | 3                                    | 3     |                      |     |        |     |                      |     |        |     | 3                    |     |        |     |                      |     |        |     |  |
| Control System                              | 3                                    | 3     |                      |     |        |     |                      |     |        |     |                      | 3   |        |     |                      |     |        |     |  |
| Digital Image Processing                    | 3                                    | 3     |                      |     |        |     |                      |     |        |     |                      |     | 3      |     |                      |     |        |     | Computer course                          |
| Analog IC Design                            | 3                                    | 3     |                      |     |        |     |                      |     |        |     |                      |     | 3      |     |                      |     |        |     |  |
| Linear Circuit Design                       | 3                                    | 3     |                      |     |        |     |                      |     |        |     |                      |     | 3      |     |                      |     |        |     |  |
| FPGA/CPLD Design                            | 3                                    | 3     |                      |     |        |     |                      |     |        |     |                      |     |        | 3   |                      |     |        |     | Computer course                          |
| Robotic Control                             | 3                                    | 3     |                      |     |        |     |                      |     |        |     |                      |     |        |     | 3                    |     |        |     | Computer course                          |
| Electronic and semiconductor device program | Optics and Optical Design            | 3     | 3                    |     |        |     |                      |     |        | 3   |                      |     |        |     |                      |     |        |     | Computer course                          |
|   | Electromagnetics II                  | 3     | 3                    |     |        |     |                      |     |        | 3   |                      |     |        |     |                      |     |        |     | (Program core course)                    |
|   | Electromagnetic Wave                 | 3     | 3                    |     |        |     |                      |     |        | 3   |                      |     |        |     |                      |     |        |     |  |
|   | Introduction to Electronic Materials | 3     | 3                    |     |        |     |                      |     |        | 3   |                      |     |        |     |                      |     |        |     |  |
|   | Optoelectronic Devices               | 3     | 3                    |     |        |     |                      |     |        |     |                      | 3   |        |     |                      |     |        |     | (Program core course)                    |



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|---|----------------------------------|-------|----------------------|-----|--------|-----|----------------------|-----|--------|-----|----------------------|-----|--------|-----|----------------------|-----|--------|-----|--------------------|
|   |                                  |       | Fall                 |     | Spring |     | Fall                 |     | Spring |     | Fall                 |     | Spring |     | Fall                 |     | Spring |     |                    |
|   |                                  |       | class                | lab | class  | lab | class                | lab | class  | lab | class                | lab | class  | lab | class                | lab | class  | lab |                    |
| Communication Systems                                     | 3                                | 3     |                      |     |        |     |                      |     |        |     | 3                    |     |        |     |                      |     |        |     |                    |
| Green Energy Technology                                   | 3                                | 3     |                      |     |        |     |                      |     |        |     | 3                    |     |        |     |                      |     |        |     |                    |
| Introduction to Solar Cells                               | 3                                | 3     |                      |     |        |     |                      |     |        |     | 3                    |     |        |     |                      |     |        |     |                    |
| Introduction to Telecommunication Engineering             | 3                                | 3     |                      |     |        |     |                      |     |        |     |                      |     | 3      |     |                      |     |        |     |                    |
| Introduction to Random Processes                          | 3                                | 3     |                      |     |        |     |                      |     |        |     |                      |     | 3      |     |                      |     |        |     |                    |
| Numerical Analysis  | 3                                | 3     |                      |     |        |     |                      |     |        |     |                      |     | 3      |     |                      |     |        |     |                    |
| VLSI Design   | 3                                | 3     |                      |     |        |     |                      |     |        |     |                      |     | 3      |     |                      |     |        |     |                    |
| Discrete Mathematics                                      | 3                                | 3     |                      |     |        |     |                      |     |        |     |                      |     | 3      |     |                      |     |        |     |                    |
| Mixed Integrated Circuit Design                           | 3                                | 3     |                      |     |        |     |                      |     |        |     |                      |     | 3      |     |                      |     |        |     |                    |
| Solid State Electronics                                   | 3                                | 3     |                      |     |        |     |                      |     |        |     |                      |     |        | 3   |                      |     |        |     |                    |
| III-V compound semiconductor and photo-electronic devices | 3                                | 3     |                      |     |        |     |                      |     |        |     |                      |     |        | 3   |                      |     |        |     |                    |
| Applied Cryptography                                      | 3                                | 3     |                      |     |        |     |                      |     |        |     |                      |     |        | 3   |                      |     |        |     |                    |
| Introduction to Computer Networks                         | 3                                | 3     |                      |     |        |     |                      |     |        |     |                      |     |        | 3   |                      |     |        |     |                    |
| Computer Vision   | 3                                | 3     |                      |     |        |     |                      |     |        |     |                      |     |        | 3   |                      |     |        |     |                    |
| Artificial Intelligence                                   | 3                                | 3     |                      |     |        |     |                      |     |        |     |                      |     |        | 3   |                      |     |        |     |                    |
| Neural Networks   | 3                                | 3     |                      |     |        |     |                      |     |        |     |                      |     |        | 3   |                      |     |        |     |                    |
| Chip Design Practices                                     | 3                                | 3     |                      |     |        |     |                      |     |        |     |                      |     |        | 3   |                      |     |        |     | Computer course    |
| Introduction to Numerical Electromagnetics                | 3                                | 3     |                      |     |        |     |                      |     |        |     |                      |     |        | 3   |                      |     |        |     |                    |
| NANO Electronic Devices                                   | 3                                | 3     |                      |     |        |     |                      |     |        |     |                      |     |        |     |                      |     | 3      |     |                    |
| Embedded Systems  | 3                                | 3     |                      |     |        |     |                      |     |        |     |                      |     |        |     |                      |     | 3      |     | Computer course    |
| Digital Communication                                     | 3                                | 3     |                      |     |        |     |                      |     |        |     |                      |     |        |     |                      |     | 3      |     |                    |
| Physical Training (7)~(8)                                 | 4                                | 4     |                      |     |        |     |                      |     |        |     |                      |     |        |     | 2                    |     | 2      |     | 1-semester courses |
| <b>Grand Total</b>  | Subtotal Required Course Credits | 87    |                      |     |        |     |                      |     |        |     |                      |     |        |     |                      |     |        |     |                    |
|   | Subtotal Elective Course Credits | 41    |                      |     |        |     |                      |     |        |     |                      |     |        |     |                      |     |        |     |                    |

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|------------------|---------|-------|----------------------|-----|--------|-----|----------------------|-----|--------|-----|----------------------|-----|--------|-----|----------------------|-----|--------|-----|------|
|                  |         |       | Fall                 |     | Spring |     | Fall                 |     | Spring |     | Fall                 |     | Spring |     | Fall                 |     | Spring |     |      |
|                  |         |       | class                | lab | class  | lab | class                | lab | class  | lab | class                | lab | class  | lab | class                | lab | class  | lab |      |
| Total            | 128     |       |                      |     |        |     |                      |     |        |     |                      |     |        |     |                      |     |        |     |      |

Graduation Requirements:

1. In accordance with the General Provisions for Study, undergraduate students need to satisfactorily complete Service Learning, meet the university-wide basic competencies of English, Information Technology, Chinese, and Sports, and pass the core competencies of their department to be eligible for graduation.
2. Students who entered in and since the 2008-09 academic year need to complete at least 12 General Education course credits. General Education courses are divided into three areas: Humanities, Social Science, and Natural Science. Each area is divided into two subcategories: core and extended. Students need to take 1 two-credit course in both of the subcategories within each area to be eligible for graduation. Only 12 course credits will be counted toward graduation. Additional course credits earned in General Education courses are not counted toward graduation.
3. Courses from focused course programs set up by any individual IT department or cooperatively between IT and other Schools can be regarded as the EE professional elective courses under the approval of the department chair. Courses selected from other Schools can also be regarded as the EE professional elective courses under the approval of the department chair with a limitation of at most 20 course credits.
4. When retaking the required course, students can choose those which are with the same course name or the same course content as substitutions under the approval of the department chair. These courses can be regarded as their graduation credits.
5. Students who fulfill the requirement of each program can apply for the corresponding certificate. Each program has its own regulation as follows:
  - (1) The VLSI and System Engineering Program: In order to get the program certificate, students must make at least seven elective courses, the program required courses include: Digital System Design and Lab, MATLAB Programming, Introduction to VLSI Design.
  - (2) The Electronic Components Program: In order to get the program certificate, students must make at least seven elective courses, the program required courses include: Electromagnetics II, Optoelectronic Devices, Introduction to Semiconductor Devices.
6. Students can choose the courses from the EE master program, which can be counted as their graduation credits under the approval of the department chair.
7. Education credits cannot be counted as the graduation credits.
8. The elective courses on this Course Outline may be counted toward total graduation credits by students who entered the university prior to the 2011 academic year.