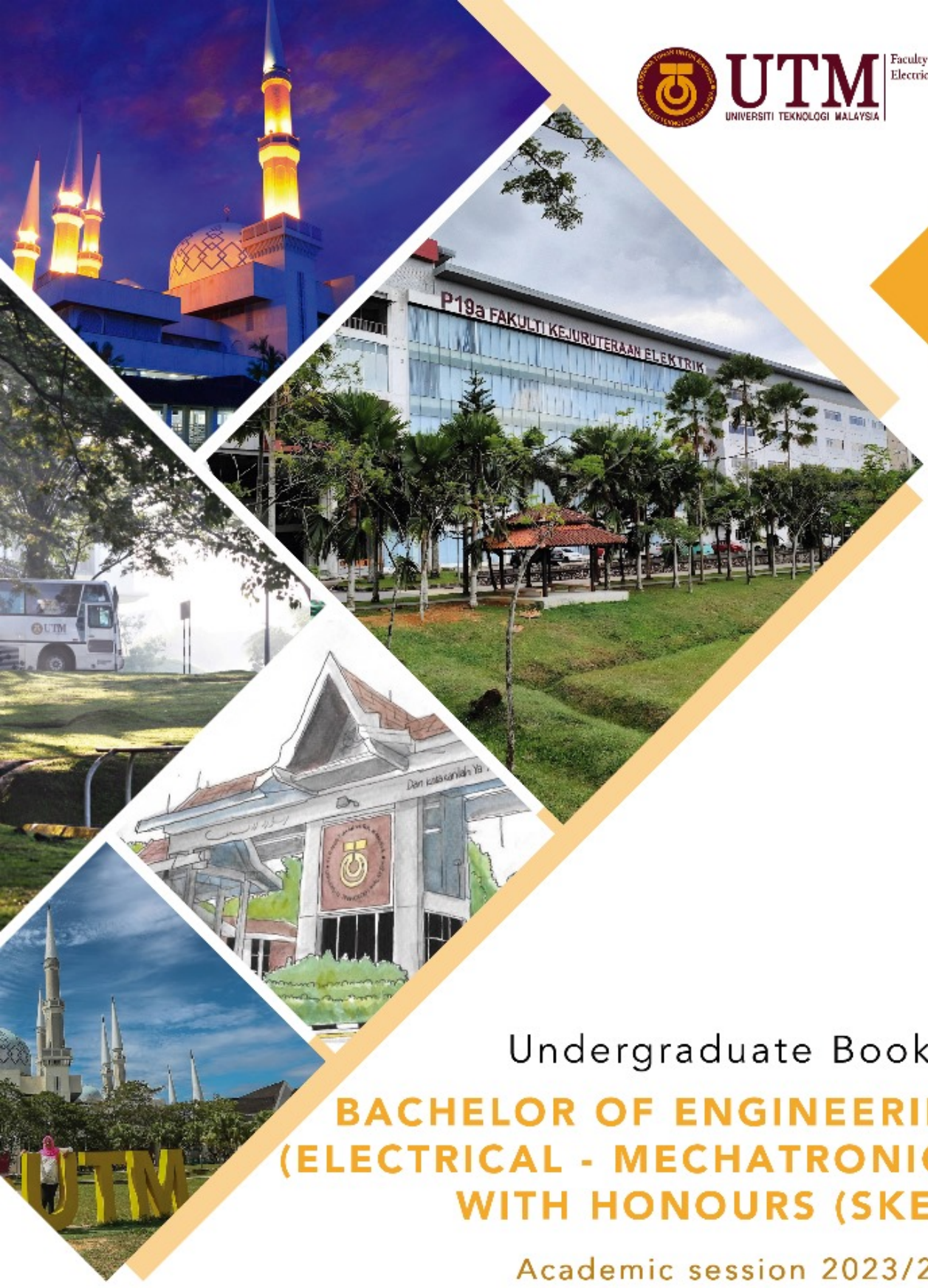
UTM
UNIVERSITI TEKNOLOGI MALAYSIA
Faculty of Electrical Engineering




Undergraduate Booklet

# BACHELOR OF ENGINEERING (ELECTRICAL - MECHATRONICS) WITH HONOURS (SKEM)

Academic session 2023/2024

www.fke.utm.my

**BACHELOR OF ENGINEERING (ELECTRICAL – MECHATRONICS) WITH HONOURS**

**(SKEM)**

# *STUDENT INFO*

| | |
|---|---|
| **NAME** | |
| **MATRIC NO.** | |
| **PHONE NO.** | |
| **EMAIL** | |
| **ACADEMIC ADVISOR** | |

# PROGRAMME GUIDELINES

The University adopts the semester system. The academic year is divided into two (2) normal semesters, namely Semester I and Semester II, and a short semester at the end of Semester II. Thus, intake of new undergraduate students is normally made during the semester I of an academic year. The minimum duration of the programmes is 4 years (8 semesters).

All the courses offered by the Faculty have credits except for certain courses, as approved by the University Senate. One (1) credit is equivalent to 14 hours of lectures or 30 hours of practical sessions (studio/project) in a semester. The total number of credits for the Bachelor of Engineering (Electrical-Mechatronics) with Honours (SKEM) programme is 136 credits.

All students' performance and achievements are assessed formally. Normally, every course is assessed based on the coursework, which constitutes not less than 50% of the overall marks, and a final exam paper, which constitutes another 50% of the overall marks. Coursework may be in the form of homework, quiz, test and presentation. Final examination is held at the end of each academic semester. Students' performance in a course is indicated by the letter grade. Generally, the passing grade for any course is a 'D+'. Students who fail a course (obtained a grade 'D' and below) are required to repeat the course the following semesters when it is offered. Students may improve the grade of any course with a 'B-' or lower grade. Subject to the Faculty and University's Academic Regulation, students may withdraw from a course. A student must pass all courses specified in his/her programme of study and fulfil all the requirements specified for his/her programme of study set by the Faculty and the University in order to be awarded with the Bachelor degree.

## *PROGRAMME LEARNING OUTCOMES (PLO)*

All undergraduate programme offered in FKE share a common Programme Learning Outcomes (PLO). After having completed the Bachelor degree programme, graduates should be able to demonstrate the following competencies:

| CODE | PROGRAMME LEARNING OUTCOMES |
|---|---|
| **PLO1** *Engineering Knowledge* | Ability to apply knowledge of mathematics, science, and electrical engineering to the solution of complex engineering problems. |
| **PLO2** *Problem Analysis* | Identify, formulate, and conduct research literature to analyse complex engineering problems using engineering knowledge. |
| **PLO3** *Design* | Design solutions for complex engineering problems and design systems and processes that meet specified needs with appropriate consideration for public health and safety, culture, society, and environment. |
| **PLO4** *Investigation* | Perform research-based analysis, conduct experiments, and interpret data for complex engineering problems. |
| **PLO5** *Modern Tool Usage* | Apply engineering practice and use modern engineering, and IT tools for complex engineering problems with an understanding of the limitations of the technology. |
| **PLO6** *Engineer & Society* | Comprehend the impact of global and contemporary issues, the role of engineers on society, including health, safety, legal and cultural issues, and the consequent responsibilities relevant to professional engineering practices and engineering problems. |
| **PLO7** *Environment & Sustainability* | Comprehend and evaluate the sustainability and impact of professional engineering work in the solutions of complex engineering problems in societal and environmental contexts. |
| **PLO8** *Ethics* | Grasp and execute responsibility professionally and ethically in professional engineering practices. |
| **PLO9** *Individual & Teamwork* | Function effectively as an individual, and as a member or leader in diverse teams. |
| **PO10** *Communcation* | Articulate ideas, communicate effectively, in writing and verbally, on complex engineering activities with the engineering community and with society at large. |
| **PO11** *Project Management* | Demonstrate knowledge and understanding of engineering and management principles, and economic decision-making to manage projects in multidisciplinary environments. |
| **PO12** *Life-Long Learning* | Recognise the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. |

## *PROFESSIONAL SKILLS CERTIFICATE (PSC)*

UTM has designed its own UTM Professional Skills Certificate (UTM PSC) programme managed by UTM Institute for Life Ready Graduate (UTM iLeague) to enhance the knowledge and skills of UTM students. It provides students with value-added courses so that they will have a competitive edge when they enter the employment market. Students will receive a Certificate of UTM Professional Skills Programme and the courses will appear in the student transcript. Students are required to undertake and must pass five (5) PSC courses as listed below:

| NO. | PSC COURSE | CODE |
|---|---|---|
| **Compulsory Courses (must take all THREE (3) courses)** | | |
| 1 | Design Thinking for Entrepreneur | GLRB 0010 |
| 2 | Talent and Competency Management | GLRM 0010 |
| 3 | English Communication Skills for Graduating Students | GLRL 0010 |
| **Elective Courses (must take any TWO (2) of these courses)** | | |
| 1 | Data Analytics For Organization | GLRT 0010 |
| 2 | Professional Ethics and Integrity | GLRM 0020 |
| 3 | Construction Measurement (Mechanical & Electrical) | GLRT 0020 |
| 4 | OSHE For Engineering Industry and Laboratory | GLRT 0030 |
| 5 | Quality Management For Built Environment and Engineering Professionals | GLRT 0050 |
| 6 | Safety and Health Officer Introductory Course | GLRT 0060 |
| 7 | Industrial Machinery and Lubrication | GLRT 0070 |

## *PRISMS (PROGRAM INTEGRASI SARJANA MUDA - SARJANA)*

PRISMS is a newly introduced programme that integrates undergraduate high-level elective SK** 5**3 courses with the core courses of the Master degree programme. Under PRISMS, students have an opportunity to complete and receive two degrees which are Bachelor degree and Master degree within 5 years (4+1).

### *Requirements*

Students who have completed third year second semester courses with a cumulative grade point average (CGPA) of 3.3 and above are eligible to apply for PRISMS. Students can apply using the PRISMS application form and must be recommended by the Academic Advisor, approved by the Program Director, and certified by the Dean of Faculty. Once the application to join PRISMS is approved, students can register for the SK** 5**3 courses during the course pre-registration or compulsory registration period.

### *PRISMS Credit Transfer*

Students must obtain grade B and above of the high-level elective SK** 5**3 courses for vertical credit transfer into the Master degree program that students plan to enrol. Maximum unit allowed for the credit transfer is twelve (12) credits.

# BACHELOR OF ENGINEERING (ELECTRICAL - MECHATRONICS) WITH HONOURS (SKEM)

## *INTRODUCTION*

Mechatronic Engineering is a branch of engineering that combines elements of mechanical engineering, electronic engineering, computer science, and control engineering. The curriculum for SKEM programme is designed with a strong emphasis on preparing students for successful engineering careers in this fast-paced and ever-changing field. In view of this, the programme will equip the students with the knowledge of embedded systems, robotics, automation, control engineering, and artificial intelligence.

Mechatronic engineering focuses on the design, development, and maintenance of intelligent and automated systems, blending mechanical components with electronic and software solutions to create innovative products and processes. Mechatronic engineers work on a wide range of applications, including robotics, automotive systems, industrial automation, consumer electronics, and more. They integrate sensors, actuators, microcontrollers, and software algorithms to enable machines to perform tasks autonomously, respond to environmental changes, and communicate with humans and other systems. This multidisciplinary field aims to create efficient, reliable, and versatile systems that enhance automation, improve efficiency, and advance technology across various industries. Those whose expertise revolves around these areas are extremely needed by the existing industries and have an immense advantage in employment.

## *PROGRAMME SPECIFICATIONS*

The Bachelor of Engineering (Electrical-Mechatronics) with Honours is a program has been offered for more than two decades by UTM. The program is a four-year program completed with a final year project. The programme is offered only at the UTM Main Campus in Johor Bahru. The duration of study is subject to the student's entry qualifications and can be completed within four (4) years to a maximum of six (6) years.

The programme is offered on a full-time basis and is based on a 2-Semester per academic session. Generally, students are expected to undertake courses equivalent to fifteen (15) to eighteen (18) credits per semester. Assessments are based on coursework given throughout the semester and final examinations.

## *GENERAL INFORMATION*

| | |
|---|---|
| **Awarding Institution** | Universiti Teknologi Malaysia |
| **Teaching Institution** | Universiti Teknologi Malaysia |
| **Programme Name** | Bachelor of Engineering (Electrical - Mechatronics) with Honours |
| **Final Award** | Bachelor of Engineering (Electrical - Mechatronics) with Honours |
| **Programme Code** | SKEM |
| **Professional or Statutory Body of Accreditation** | Board of Engineers Malaysia (BEM) |
| **Language(s) of Instruction** | English and Bahasa Melayu |
| **Mode of Study** | Conventional |
| **Mode of operation** | Self-governing |
| **Study Scheme** | Full Time |
| **Study Duration** | Minimum: 4 years (8 semesters)<br>Maximum: 6 years (12 semesters) |

## *PROGRAMME EDUCATIONAL OBJECTIVES* (*PEO*)

After having exposed to 3 to 5 years of working experience, our graduates should become professionals who demonstrate the following competencies:

| CODE | PROGRAMME EDUCATIONAL OBJECTIVES (PEO) |
|---|---|
| **PEO1** | Become mechatronic engineers who are competent, innovative, and productive in addressing stakeholders' needs. |
| **PEO2** | Grow professionally with proficient soft skills. |
| **PEO3** | Demonstrate high standards of ethical conduct, positive attitude, and societal responsibilities. |

## *AWARD REQUIREMENTS*

To graduate, students must:

- Attain a total of 136 credit hours with a minimum CGPA of 2.0
- Complete Professional Skills Certificates (PSC).

## *COURSE CLASSIFICATION*

| NO. | CLASSIFICATION | CREDIT | % |
|---|---|---|---|
| 1. | University General Courses | 16 | 12 % |
| 2. | Mathematics | 15 | 11 % |
| 3. | Programme Core | 96 | 71 % |
| 4. | Programme Electives | 6 | 4 % |
| 5. | Free Electives | 3 | 2 % |
| | **Total** | **136** | **100 %** |
| | | | |
| **A** | Engineering Courses<br>a) Lecture/Project/Laboratory<br>b) Workshop/Field/Design Studio<br>c) Industrial Training<br>d) Final Year Project | <br>91<br>-<br>5<br>6 | 75 % |
| **Total Credits for Part A** | | **102** | |
| **B** | Related Courses<br>a) Applied Science/Mathematic/Computer<br>b) Management/Law/Humanities/Ethics/Economy<br>c) Language<br>d) Co-Curriculum<br>e) Free Electives | <br>15<br>8<br>6<br>2<br>3 | 25% |
| **Total Credits for Part B** | | **34** | |
| **Total Credits for Part A and B** | | **136** | **100%** |
| **Total Credits to Graduate** | | **136** | |

# STUDY PLAN FOR SKEM

## YEAR 1

| CODE | COURSE | CREDIT | PRE-REQUISITE | TOTAL CREDIT |
|---|---|---|---|---|
| **SEMESTER 1** | | | | |
| ULRS 1032 | Integrity and Anti-corruption Course | 2 | | **16** |
| SSCE 1693 | Engineering Mathematics I | 3 | | |
| SKEE 1012 | Introduction to Electrical Engineering | 2 | | |
| SKEE 1013 | Electrical Circuit Analysis | 3 | | |
| SKEE 1033 | Scientific Programming | 3 | | |
| SKEE 1233 | Digital Electronic Systems | 3 | | |
| **SEMESTER 2** | | | | |
| ULRS 1182 | Appreciation of Ethics and Civilizations (Local Students) | 2 | | **17** |
| UHLM 1012 | Malay Language for Communication 2 (International Students) | | | |
| SSCE 1793 | Differential Equations | 3 | | |
| SKEM 1113 | Engineering Mechanics | 3 | | |
| SKEE 1103 | C Programming for Engineers | 3 | | |
| SKEE 1073 | Electronic Devices and Circuits | 3 | SKEE 1013 | |
| SKEM 1503 | Computer Aided Engineering Design | 3 | | |

# YEAR 2

| CODE | COURSE | CREDIT | PRE-REQUISITE | TOTAL CREDIT |
|---|---|---|---|---|
| **SEMESTER 1** | | | | |
| SSCE 1993 | Engineering Mathematics II | 3 | SSCE 1693 | **17** |
| SKEE 2073 | Signals and Systems | 3 | | |
| SKEE 2133 | Electronic Instrumentation and Measurement | 3 | | |
| SKEE 2433 | Principles of Electrical Power Systems | 3 | SEEE1013 | |
| SKEE 2752 | Electronic Design Laboratory | 2 | | |
| SKEE 3223 | Microprocessor | 3 | SKEE 1233 | |
| **SEMESTER 2** | | | | |
| ULRS 1022 | Philosophy and Current Issues (Local Students) | 2 | | **18** |
| ULRS 1182 | Appreciation of Ethics and Civilizations (International Students) | | | |
| ULRF 2**2 | Elective of Service Learning and Community Engagement | 2 | | |
| UHLB 2122 | Professional Communication Skills 1 | 2 | | |
| SSCE 2193 | Engineering Statistics | 3 | | |
| SKEE 2523 | Electromagnetic Field Theory | 3 | SSCE 1993 | |
| SSCE 2393 | Numerical Methods | 3 | | |
| SKEM 2013 | Mechanics of Materials | 3 | | |

# YEAR 3

| CODE | COURSE | CREDIT | PRE-REQUISITE | TOTAL CREDIT |
|---|---|---|---|---|
| **SEMESTER 1** | | | | |
| UHL* 1112 | Elective of Foreign Language for Communication | 2 | | **18** |
| UHLB 3132 | Professional Communication Skills 2 | 2 | | |
| SKEM 3143 | Mechanical System Design | 3 | | |
| SKEE 3133 | System Modeling & Analysis | 3 | SKEE 2073 | |
| SKEE 3533 | Communication Principles | 3 | SKEE 2073 | |
| SKEE 3732 | Common 3rd Year Laboratory | 2 | SKEE 2752 | |
| SKEE 3263 | Electronic Systems | 3 | SKEE 1073 | |
| **SEMESTER 2** | | | | |
| ULRS 3032 | Entrepreneurship & Innovation | 2 | | **17** |
| SKEE 3143 | Control System Design | 3 | SKEE 3133 | |
| SKEM 3133 | Electrical Motors and Drives | 3 | | |
| SKEE 3733 | Integrated Design Project | 3 | SKEE 3732 | |
| SKEL 3233 | Digital Signal Processing | 3 | SKEE 2073 | |
| S*** ***3 | Free Elective | 3 | | |
| **SEMESTER 3** | | | | |
| SKEE 3925 | Industrial Training | 5 | | **5** |

# YEAR 4

| CODE | COURSE | CREDIT | PRE-REQUISITE | TOTAL CREDIT |
|---|---|---|---|---|
| **SEMESTER 1** | | | | |
| SKEE 4542 | Engineering Management Principles | 2 | | **17** |
| SKEM 4143 | Robotics | 3 | SSCE 1993 | |
| SKEE 4813 | Methodology of Research and Development | 3 | | |
| SKEM 3123 | Hydraulic and Pneumatic Systems | 3 | SKEM 1113 | |
| SKEM 4333 | Mechatronics System Design | 3 | | |
| SKE* 4**3 / 5**3 | Field Elective 1 / PRISMS Elective 1 / Faculty Free Elective[1] | 3 | | |
| **SEMESTER 2** | | | | |
| SKEE 4826 | Final Year Project | 6 | SKEE 4813 | **11** |
| SKEE 4012 | Professional Engineering Practice | 2 | | |
| SKE* 4**3 / 5**3 | Field Elective 2 / PRISMS Elective 2 / Faculty Free Elective[1] | 3 | | |
| | | | **CUMULATIVE CREDITS** | **136** |

[1] For Free Faculty Elective, students can only take one course only – either in Semester 1 of Year 4 OR Semester 2 of Year 4.

### *ELECTIVE COURSES*

| CODE | COURSE | CREDIT | PRE-REQUISITE |
|---|---|---|---|
| SKEM 4133 | Machine Vision Systems | 3 | |
| SKEM 4153 | Robot Technology for Automation | 3 | SKEM 4143 |
| SKEM 4173 | Artificial Intelligence | 3 | |
| SKEM 4223 | Embedded Systems | 3 | SKEE 3223 |
| SKEE 4173 | Industrial Process Control | 3 | |
| SKEM 4313 | PLC and SCADA System Design | 3 | SKEE 3143 |
| SKEM 4113 | Modern Control Theory | 3 | SKEE 3143 |
| SKEE 4153 | Digital Control Systems | 3 | SKEE 3143 |
| SKEE 3433 | Power Electronic and Drives | 3 | SKEE 2433 |
| SKEM 4183 | Industrial Instrumentations and Applications | 3 | SKEE 2133 |
| SKEM 4193 | Advanced Transducers and Sensors | 3 | SKEE 2133 |
| SKEM 4243 | BioMEMS and Microanalytical Systems | 3 | SKEE 2133 |
| SKEM 4233 | Nanotechnology and Application | 3 | |
| SKEM 4323 | Advanced Control Theory | 3 | SKEE 3143 |
| SKEM 4343 | System Identification and Estimation | 3 | SKEE 3143 |
| SKEM 4163 | Autonomous Robot | 3 | SKEM 4143 |
| SKEM 4123 | Industrial Engineering | 3 | |
| SKEL 4213 | Software Engineering | 3 | SKEE 1103 |

| SEEM ELECTIVE COURSES FOR PRISM | | | |
|---|---|---|---|
| **Code** | **Course** | **Credit** | **Pre-requisite** |
| SKEM 5753 | Advanced Instrumentation and Measurement | 3 | |
| SKEM 5713 | Artificial Intelligence and Applications | 3 | |
| SKEM 5703 | Control Systems Engineering | 3 | |

# GRADUATION CHECKLIST

To graduate, students must pass all the stated courses in this checklist. It is the responsibility of the students to ensure that all courses are taken and passed. Students who do not complete any of the courses are not allowed to graduate.

**Bachelor of Engineering (Electrical - Mechatronics) with Honours - SKEM**

| NO. | CODE | COURSE | CREDITS EARNED | CREDITS COUNTED | TICK (√) IF PASSED |
|---|---|---|---|---|---|
| 1. | SKEE 1012 | Introduction to Electrical Engineering | 2 | 2 | |
| 2. | SKEE 1013 | Electrical Circuit Analysis | 3 | 3 | |
| 3. | SKEE 1033 | Scientific Programming | 3 | 3 | |
| 4. | SKEE 1233 | Digital Electronic Systems | 3 | 3 | |
| 5. | SKEM 1113 | Engineering Mechanics | 3 | 3 | |
| 6. | SKEE 1103 | C Programming for Engineers | 3 | 3 | |
| 7. | SKEE 1073 | Electronic Devices and Circuits | 3 | 3 | |
| 8. | SKEM 1503 | Computer Aided Engineering Design | 3 | 3 | |
| 9. | SKEE 2073 | Signals and Systems | 3 | 3 | |
| 10. | SKEE 2133 | Electronic Instrumentation and Measurement | 3 | 3 | |
| 11. | SKEE 2433 | Principles of Electrical Power Systems | 3 | 3 | |
| 12. | SKEE 2752 | Electronic Design Laboratory | 2 | 2 | |
| 13. | SKEE 3223 | Microprocessor | 3 | 3 | |
| 14. | SKEE 2523 | Electromagnetic Field Theory | 3 | 3 | |
| 15. | SKEM 2013 | Mechanics of Materials | 3 | 3 | |
| 16. | SKEM 3143 | Mechanical System Design | 3 | 3 | |
| 17. | SKEE 3133 | System Modeling & Analysis | 3 | 3 | |
| 18. | SKEE 3533 | Communication Principles | 3 | 3 | |

| | | | | | |
|---|---|---|---|---|---|
| 19. | SKEE 3732 | Common 3rd Year Laboratory | 2 | 2 | |
| 20. | SKEE 3263 | Electronic Systems | 3 | 3 | |
| 21. | SKEE 3143 | Control System Design | 3 | 3 | |
| 22. | SKEM 3133 | Electrical Motors and Drives | 3 | 3 | |
| 23. | SKEE 3733 | Integrated Design Project | 3 | 3 | |
| 24. | SKEL 3233 | Digital Signal Processing | 3 | 3 | |
| 25. | SKEE 3925 | Industrial Training | 5 | HL | |
| 26. | SKEE 4542 | Engineering Management Principles | 2 | 2 | |
| 27. | SKEM 4143 | Robotics | 3 | 3 | |
| 28. | SKEE 4813 | Methodology of Research and Development | 3 | 3 | |
| 29. | SKEM 3123 | Hydraulic and Pneumatic Systems | 3 | 3 | |
| 30. | SKEM 4333 | Mechatronics System Design | 3 | 3 | |
| 31. | SKE* 4**3 / 5**3 | Field Elective 1 / PRISMS Elective 1 / Faculty Free Elective | 3 | 3 | |
| 32. | SKEE 4826 | Final Year Project | 6 | 6 | |
| 33. | SKEE 4012 | Professional Engineering Practice | 2 | 2 | |
| 34. | SKE* 4**3 / 5**3 | Field Elective 2 / PRISMS Elective 2 / Faculty Free Elective | 3 | 3 | |
| | | **TOTAL CREDITS OF ENGINEERING COURSES (A)** | **102** | **97** | |
| **MATHEMATICS COURSES (Faculty of Science)** | | | | | |
| 1. | SSCE 1693 | Engineering Mathematics I | 3 | 3 | |
| 2. | SSCE 1793 | Differential Equations | 3 | 3 | |
| 3. | SSCE 1993 | Engineering Mathematics II | 3 | 3 | |
| 4. | SSCE 2193 | Engineering Statistics | 3 | 3 | |
| 5. | SSCE 2393 | Numerical Methods | 3 | 3 | |
| | | **TOTAL CREDITS OF MATHEMATICS COURSES (B)** | **15** | **15** | |

| UNIVERSITY GENERAL COURSES | | | | | |
|---|---|---|---|---|---|
| **Cluster 1: Malaysia Core Value** | | | | | |
| 1. | ULRS 1182 | Appreciation of Ethics and Civilizations (Local Students) | 2 | 2 | |
| | UHLM 1012 | Malay Language for Communication 2<br>(International Students) | | | |
| 2. | ULRS 1022 | Philosophy and Current Issues (Local Students) | 2 | 2 | |
| | ULRS 1182 | Appreciation of Ethics and Civilizations (International Students) | | | |
| **Cluster 2: Value and Identity** | | | | | |
| 1. | ULRS 1012 | Value and Identity | 2 | 2 | |
| **Cluster 3: Global Citizen** | | | | | |
| 1. | ULRF 2**2 | Elective of Service Learning and Community Engagement | 2 | 2 | |
| **Cluster 4: Communication Skills** | | | | | |
| 1. | UHLB 2122 | Professional Communication Skills 1 | 2 | 2 | |
| 2. | UHLB 3132 | Professional Communication Skills 2 | 2 | 2 | |
| 3. | UHL* 1112 | Elective of Foreign Language for Communication | 2 | 2 | |
| **Cluster 5: Enterprising Skills** | | | | | |
| 1. | ULRS 3032 | Entrepreneurship & Innovation | 2 | 2 | |
| **Free Elective Courses** | | | | | |
| 1. | S*** ***3 | Free Elective | 3 | 3 | |
| | | **TOTAL CREDITS of UNIVERSITY GENERAL COURSES (C)** | **19** | **19** | |
| | | **TOTAL CREDITS TO GRADUATE (A + B + C)** | **136** | **131** | |

| **OTHER COMPULSORY COURSES - PROFESSIONAL SKILLS CERTIFICATE (PSC).**<br>Students are required to enroll and pass FIVE (5) PSC courses to graduate. | | | |
|---|---|---|---|
| **COMPULSORY PSC COURSES (must take all THREE (3) courses)** | | | |
| 1. | GLRB 0010 | Design Thinking for Entrepreneur | |
| 2. | GLRM 0010 | Talent and Competency Management | |
| 3. | GLRL 0010 | English Communication Skills for Graduating Students | |
| **ELECTIVE PSC COURSE (must take any TWO (2) of these courses)** | | | |
| 1. | GLRT 0010 | Data Analytics for Organisation | |
| 2. | GLRM 0020 | Professional Ethics and Integrity | |
| 3. | GLRT 0020 | Construction Measurement (Mechanical & Electrical) | |
| 4. | GLRT 0030 | OSHE for Engineering Industry and Laboratory | |
| 5. | GLRT 0050 | Quality Management for Built Environment and Engineering Professionals | |
| 6. | GLRT 0060 | Safety and Health Officer Introductory Course | |
| 7. | GLRT 0070 | Industrial Machinery and Lubrication | |

# ACADEMIC STAFFS

## *DIRECTOR*

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