UPM

UNIVERSITI PUTRA MALAYSIA

BERILMU BERBAKTI

GUIDEBOOK

INDUSTRIAL TRAINING

BACHELOR OF ENGINEERING

FACULTY OF ENGINEERING

UNIVERSITI PUTRA MALAYSIA

CONTENTS

Page

SECTION I - INTRODUCTION

Industrial training is an essential component of a well-rounded engineering education. It provides students with invaluable practical experience that complements theoretical knowledge gained in the classroom. A well-designed and organised industrial training program offers significant added value by exposing students to real-world work environments and on-the-job scenarios.

Industrial training is a mandatory course for all students pursuing a Bachelor of Engineering degree. The course credit is 5 hours, and the minimum duration of the training program is 10 weeks (minimum).

To ensure a productive training experience, the industrial training program is planned and evaluated based on the established course outcomes outlined by the faculty. Communicating these course outcomes and the overall objectives of the industrial training program to students, visiting lecturers, and the training supervisors at the placement site is therefore crucial.

1. Objective

The main objective of the industrial training is to provide students with an exposure to professional engineering practices and ethics:

a. Understanding the Engineer's Role: Students gain practical insight into the responsibilities and contributions of engineers within an organisation

b. Developing Professional Skills: The training hones critical skills needed for success, including problem-solving, communication (written and oral), and management capabilities.

c. Teamwork and Communication: Students experience the importance of teamwork and collaboration. This includes fostering communication skills essential for interacting with both technical and non-technical professionals in a work environment.

d. Industry Exposure: The training provides opportunities to learn about current technologies and gain firsthand experience of real-world working culture.

Students are expected to improve in the following important aspects:

a. Analytical skills

b. Logical reasoning

c. Communication skills

d. Professional interaction

e. Professionalism

f. Social awareness

g. Contemporary issues awareness

While technical proficiency is essential, industrial training should extend beyond simply focusing on design and analysis within a specific engineering discipline. To nurture well-rounded engineers, the focus should be on the development of both competency and interpersonal skills as a professional engineer.

2. Course and Programme Outcomes

At the end of the training, students are expected to:

1. Complete given engineering tasks in the workplace.

2. Understand the impact of professional engineering solutions on the society and environment.

3. Demonstrate commitment, ethics, professionalism and leadership while performing the task.

4. Communicate effectively on complex engineering activities with various stakeholders.

These course outcomes are aligned with ten out of 12 Engineering Accreditation Council (EAC) Programme Outcomes:

EAC1: Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems

EAC4: Investigate complex problems using research-based knowledge and research methods including design and conduct of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions

EAC5: Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modeling, to complex engineering activities, with an understanding of the limitations

EAC6: Apply reasoning informed by contextual knowledge to access societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice

EAC7: Understand the impact of professional engineering solutions in societal and environmental context and demonstrate knowledge of and need for sustainable development

EAC8: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice

EAC9: Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary setting

EAC10: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective report and design documentation, make effective presentations, and give and receive clear instructions

EAC11: Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, to manage projects and in multidisciplinary environments

EAC12: 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

3. Placement Search

Students are required to complete industrial training at a company vetted by the faculty and under the supervision of a qualified personnel. The industrial training coordinator will assist students in the following areas:

a. Training schedule: The coordinator will inform students on the start and end dates for the industrial training program.

b. Departmental support letters: The coordinator will facilitate the issuance of a letter of support from the department for each student for their applications.

c. Placement suitability review: The coordinator will review internship offer letters and advise students on the suitability of the placement based on program requirements.

d. Placement approval: The coordinator, acting on behalf of the department, can approve internship placements that meet the programme's criteria.

4. Placement Considerations

When selecting an industrial training placement, students are encouraged to prioritise placements that align with their academic area of specialisation or personal interests. Additionally, students should ensure financial viability during the training period, by considering:

a. the stipend or allowance offered by the company.

b. the availability and affordability of housing options near the training location.

c. additional sources of financial support.

5. Placement Confirmation

An offer of industrial training placement must be accompanied by the ***LATIN01- Tawaran Penempatan Latihan Industri*** form. The industrial training coordinator may issue a letter to confirm placement if required by the company.

6. Training Duration

The industrial training program requires all students to complete 10 weeks of continuous practical training. Students are not allowed to split this training into multiple shorter durations.

The training period officially begins on the first day the student reports for duty at the company. Students must complete and return ***PU/PS/BR01/LI - Borang Pengesahan Lapor Diri*** to the Coordinator within the first week.

7. Allowances

Students completing placements in government offices may receive an allowance based on the current minimum stipulated rate. The amount of allowance provided by companies during industrial training placements is at their discretion.

Students with scholarships may be eligible for additional financial support from their sponsoring organisations. Claim forms may be obtained from the Students' Affairs Division at UPM.

8. Insurance

All UPM students who are Malaysian nationals are covered by student insurance upon registration. This insurance will provide basic coverage during the industrial training. International students at UPM must have their own insurance when they register as students. They must ensure that this insurance also covers the industrial training period.

9. Leave of Absence

Students are expected to adhere to the training plan established at the placement. In the case of an essential absence for reasons other than sickness, students must submit a formal leave request to the Industrial Training Supervisor in advance. The student must also inform the Industrial Training Coordinator about the leave request and its approval status. The leave must be documented in ***LOGLATIN - Log Laporan Latihan Industri*** form.

10. Change of Placement

Students are generally not permitted to change their assigned placements once ***PU/PS/BR01/LI - Borang Pengesahan Lapor Diri*** (refer to item 6) has been completed. This signifies a commitment between the student, the university, and the company.

However, exceptional circumstances may necessitate a change in placement. In such cases, students must discuss the issue with the Industrial Training Coordinator. The coordinator will provide written approval, if a new placement is warranted.

11. Student Briefings

An initial briefing should be conducted by the Industrial Training Coordinator to advise students on the industrial training placement procedures. The briefing should also cover:

a. Objectives of the industrial training

b. Course and programme outcomes

c. Evaluation methods

A final briefing shall be conducted before the training starts. The purpose is to remind students about their responsibilities during the training, potential problems that may arise, and strategies for dealing with them effectively. The venue and time for the briefings will be arranged by the coordinator.

12. Industrial Training Visit

The head of the department appoints visiting lecturers to observe student progress during the training. The visit by lecturers is to:

a. To interact with students undertaking industrial training and their managers/supervisors. There will be two separate discussions - one between the lecturer and the student, and the other between the visiting lecturer and the industrial training supervisor. Students are expected to be prepared for the discussion.

b. To monitor and assess student's progress during their training and advise on their preparation of the industrial training report.

c. To visit former students who are employed at the placement and obtain their feedback on the relevance of faculty courses.

d. To introduce programmes and training courses offered by the faculty to staff at the placement.

e. To discuss the possibility of future student placements and employment.

f. To establish networking.

A briefing for visiting lecturers shall cover the following:

a. Objectives of the industrial training and the industrial training visit

b. Course and programme outcomes

c. Evaluation methods

d. Responsibilities of the visiting lecturers

13. Reporting

Students are required to submit two types of reports during their industrial training:

- Weekly training log: This report will be completed in the ***LOGLATIN - Log Laporan Latihan Industri***. Students must submit a copy of this report to their respective industrial training coordinator and visiting lecturer regularly. This serves as a record of their training progress for the faculty.

- Final report: Upon completion of the training, students are responsible for submitting a final report. Students are required to submit three copies of the final report: one for themselves, one for the placement coordinator, and one for the department.

Students are strongly encouraged to focus on writing high-quality reports, following the industrial training report guidelines and template specified by the faculty. The training report should be a well-structured, professional document that effectively communicates learnings and achievements. It should not be a collection of loose forms or pictures. Students may be required to revise reports that do not meet the minimum standard.

In addition to the student reports, the Industrial Training Coordinator will also submit a brief report to the Head of Department and the Head of the Industrial Training Programme at the faculty. This coordinator report shall document the students' performance and the overall effectiveness of the industrial training programme, on the basis of the ***LATIN03 - Penilaian Penyelia Latihan Industri*** and ***LATIN04 - Penilaian Pensyarah Pelawat dan Penyelaras Latihan Industri***.

14. Assessment

Placement Assessment

An assessment of the placement shall take place within the five weeks of the training. The visiting lecturers and students would present the following reports:

- ***LATIN02A - Laporan Pensyarah Pelawat Latihan Industri***: This visiting lecturer's report evaluates the quality and effectiveness of the training experience provided by the company.
- ***LATIN02B - Laporan Pelajar Latihan Industri***: This student's report assesses whether the placement aligns with the student's academic program and learning objectives.

Industrial Training Supervisor' Assessment

Throughout the training period, the industrial training supervisor observes students' progress and monitors their achievement of learning objectives. They submit a final evaluation report using ***LATIN03 - Penilaian Penyelia Latihan Industri.***

Overall Industrial Training Assessment

After the training is completed, students are required to submit the final report within three weeks of completing the placement. Additionally, a dedicated presentation session organised by the industrial training coordinator shall occur within seven weeks of completing the training.

The visiting lecturer will provide an assessment of the students' outputs, while the coordinator will summarise the student's overall attainment of expected outcomes in ***LATIN04 - Penilaian Pensyarah Pelawat dan Penyelaras Latihan Industri.***

A summary of the industrial training documentation is provided in Table 1.

Evaluation Outcomes

Based on the combined evaluation from reports, observations, and presentations, students receive a final grade for their industrial training:

- Satisfactory (60% and above): This indicates successful completion of the program's learning objectives.
- Unsatisfactory (below 60%): This indicates a need for improvement. Students may be required to revise their reports or retake the training program.

Successful completion of the industrial training program is a mandatory requirement for a Bachelor of Engineering degree. Students should take this program seriously and actively participate in all its components.

Table 1: Related assessment forms and reports for Industrial Training.

No.	Form/Report	Completed by	Submitted to	Due
1	LATIN01 - Tawaran Penempatan Latihan Industri	Company HR	Coordinator	Before the internship
2	PU/PS/BR01/LI- Borang Pengesahan Lapor Diri	Company HR	Coordinator	Week 1 of internship period
3	LOGLATIN - Log Laporan Latihan Industri	Student	Coordinator/ Visiting lecturer	Biweekly during internship period
4	LATIN02A - Laporan Pensyarah Pelawat Latihan Industri	Visiting lecturer	Coordinator	After the visit
5	LATIN02B - Laporan Pelajar Latihan Industri	Student	Visiting lecturer	During the visit
6	LATIN03 - Penilaian Penyelia Latihan Industri	Industrial Training Supervisor	Coordinator	Week 10/end of internship period
7	Final Report & Presentation	Student	Visiting lecturer	Week 4 & 7 of semester registered
8	LATIN 04 - Penilaian Pensyarah Pelawat dan Penyelaras Latihan Industri	Visiting lecturer	Coordinator	Week 7 of semester registered

SECTION II - EXEMPTION FROM PERFORMING INDUSTRIAL TRAINING

Students who have worked in related engineering fields for at least 12 months within the past 5 years and wish to get exemption from industrial training can submit an application during the first year of study. The approval must be obtained before the second year of study, following procedures below:

1. Write a letter to head of department with following information:

    a) Number of weeks worked

    b) Beginning and end date

    c) Type and period of work (in weeks)

    d) Brief information of company of internship(s)

    e) Name and qualification of supervisor(s)

    f) Projects involved (if any)

    g) Company's verification

    h) Other information (if any)

2. Based on the information given, the Head of Department or Industrial Training Coordinator will decide whether the applicant should submit a complete report for the exemption.

3. When the Head of Department or Industrial Training Coordinator has given an approval, the student needs to complete ***LATIN05 Permohonan Pengecualian Latihan Industri*** and submit a report of job experience based on guidelines published on the faculty website.

4. The Industrial Training Coordinator will review and remark on the quality of the training and forward it to the Head of Department for support and approval. The ***LATIN04 Penilaian Laporan dan Pembentangan Latihan Industri*** form needs to be completed.

5. The Deputy Dean of Undergraduate Studies Division will evaluate and (in normal conditions) issue a final decision in either of two forms:

    - Approve Exemption Application
    - Reject Exemption Application

6. An exemption to complete industrial training does not constitute a concurrent exemption to the course credits, which must be replaced by taking additional technical courses.

SECTION III - GUIDELINES FOR INDUSTRIAL TRAINING COORDINATOR

Responsibilities:

Placement Management:

1. Site Application & Approval:
    a. Assist students with applications for industrial training placements at suitable companies (refer to Attachment A for appropriate fields per program).
    b. Collect and review the ***LATIN01 - Tawaran Penempatan Latihan Industri*** forms from potential companies.
    c. Approve training sites for students, prioritising:
        - Suitability: Ensure alignment between training nature and student's program/learning objectives.
        - Academic Performance: Consider a student's academic record (some placements may require stronger standing).
        - Financial & Logistical Needs: While not primary, consider student needs when possible.
    d. Maintain a list of companies deemed unsuitable for student placements.
2. Student Communication:
    a. Conduct pre-placement briefings covering:
        - Course and programme outcomes
        - Registration at the training organisation
        - Completing the Industrial Training Log Book
        - Weekly report submission frequency
        - Final report requirements
        - Final presentation requirements
        - Insurance information
3. Placement Support:

a. Collect ***PU/PS/BR01/LI- Borang Pengesahan Lapor Diri*** during Week 1 from industrial training supervisor/company HR (send reminders if needed).

b. Provide students with a list of Visiting Lecturers for reference.

c. Accept student suggestions and feedback through the Visiting Lecturer (if necessary).

4. Onsite Visit Coordination:

    a. Organize and coordinate onsite visits by lecturers to observe students at their placements.

5. Assessment Coordination:

    a. Manage and oversee:

        - Student presentations on industrial training experiences.
        - Evaluation of industrial training reports by visiting lecturers.

6. Grade Processing & Submission:

    a. Compile final grades by considering input from:

        - Industry Supervisor Evaluations (50%)
        - Industrial Training Report Assessment (25%)
        - Presentation of Report Evaluation (25%)

    b. Submit final assessment results to the respective Head of Department within designated time frames.

7. Departmental Reporting:

    a. Prepare a comprehensive report on the learning objectives and programme outcomes achievements using the Cumulative Assessment Marks (CAM) and Course Assessment Summary (CAS) forms.

    b. Discuss the report with the Head of Department and the Head of Industrial Training Programme at the Faculty level.

SECTION IV - GUIDELINES FOR A VISITING LECTURER

Responsibilities:

1. Monitor student progress by reviewing their weekly training log (***LOGLATIN - Log Laporan Latihan Industri)***

2. Assess the student placement through an onsite visit. A manual for the industrial training visiting lecturer is published on the website.

3. Evaluate the student's training and report the results to the Coordinator.

SECTION V - GUIDELINES FOR INDUSTRIAL TRAINING PLACEMENT (COMPANY AND SUPERVISOR)

Responsibilities:

1. Accept the UPM Engineering Faculty student's duty report and return the ***PU/PS/BR01/LI- Borang Pengesahan Lapor Diri*** to the Coordinator.

2. Develop a structured training program tailored to the student's learning objectives and aligned with the program's requirements. By the end of the industrial training program, the student should have gained experience in the following aspects:

    - communicate effectively with engineers, other professionals and community at large
    - analyse and interpret data
    - design and conduct experiment
    - use the skills, techniques and modern engineering tools for engineering practice
    - discuss the relevant contemporary issues
    - function effectively as an individual in a group

3. Review and approve the student's work documented in the ***- LOGLATIN - Log Laporan Latihan Industri*** form on a weekly basis.

4. Complete the student's performance evaluation using the ***LATIN03 - Penilaian Penyelia Latihan Industri*** upon program completion.

SECTION VI - GUIDELINE FOR INDUSTRIAL TRAINING REPORT WRITING

A template for the industrial training report is provided on the website.

ATTACHMENT A: INDUSTRIAL TRAINING REQUIREMENT ACCORDING TO UNDERGRADUATE PROGRAMMES

BACHELOR OF AEROSPACE ENGINEERING WITH HONOURS

Industrial training for aerospace engineering is divided into two, which are:

1. Aeronautics

a. Flight Mechanics
   Related to flight testing activities for safe departure and landing

b. Aircraft Structure and Materials
   Involves aircrafts' structure assembly and usage of materials. Parts of the materials are aluminium alloy, titanium alloy and composites.

c. Aerodynamics
   Essential training in testing aircraft models or aircraft's parts using wind tunnels. To study properties like lift, drag and coefficient of drag.

d. Aircraft Design
   Involves aircraft and aircraft's parts designing.

e. Air Transportation
   Related with aircraft's repairing and maintenance including certification, air regulations, airport maintenance and scheduling.

2. Aerospace System

a. Automatics Control
   This involves equipment handling systems and aircraft's instrumentation. It also involves aircraft's control activities in the cockpit.

b. Avionics
   Related activities in this area include Flight Deck Layout and Display, Electronics, Communication, Navigation, FCS, Indicating and Recording, Electrical Power.

c. Propulsion
   Activities include topics such as Engines, Fuel System, and Auxiliary Power.

d. Fluid Mechanics
   Activities associated with hydraulic system, landing gear, pneumatics and air conditioning, oxygen and water/waste, fire protection.

BACHELOR OF CIVIL ENGINEERING WITH HONOURS

The civil engineering internship aims to provide opportunities for students to apply theoretical knowledge in real-world scenarios, develop practical skills, and gain exposure into the broader aspects of civil engineering within their chosen field of interest. The following provides the scope and a detailed breakdown of the skills, activities, and learning opportunities associated with a civil engineering internship:

1. Structural and Construction Engineering

a. Use of software for structural design and analysis, and construction planning and scheduling.
b. Assist in the preparation of detailed structural drawings, calculations, and construction specifications.
c. Assist in designing building structures, bridges, and other infrastructure projects.
d. Gain familiarity with design codes, standards, and local authority approval through practical application in structural design
e. Participate in structural inspections and assessments projects.
f. Visit construction sites to observe and learn construction techniques and methods.
g. Monitor construction progress and quality control.
h. Manage construction operations, including resource allocation, equipment deployment, and site logistics.
i. Perform construction scheduling and cost planning,
j. Gain knowledge of and adhere to safety regulations and quality standards on construction sites.

2. Geotechnical Engineering

a. Assist in site investigations, soil sampling, and groundwater monitoring.
b. Learn in-situ soil testing techniques and geotechnical instrumentation.
c. Gain hands-on experience in installing and monitoring geotechnical instrumentation.
d. Participate in field assessments of ground conditions, geological hazards, and earthworks.
e. Contribute to foundation design calculations and geotechnical reports.
f. Use of software for geotechnical design and analysis (i.e.: slope stability analysis, foundation design).

3. Water and Environmental Engineering

a. Gain exposure to water treatment processes, wastewater management, and environmental regulations.
b. Assist in hydraulic and hydrologic modelling for stormwater management, flood risk assessment, and river basin analysis.
c. Contribute to the design of water reticulation, pipe network, sewerage, drainage systems and stormwater collection and conveyance, following design manuals and industry standards
d. Learn about sustainable water resource management and green infrastructure practices.
e. Participate in environmental impact assessments, water quality monitoring, and pollution control measures.
f. Explore hydraulic and coastal structures and shoreline protection projects.

4. Highway and Transportation Engineering

a. Learn geometric design principles for highways, intersections, and transportation networks.
b. Use of software tools for highway design, traffic analysis, and modeling.
c. Gain exposure on pavement design methods, materials selection, and maintenance strategies.
d. Participate in road inspections, assessments, and retrofitting projects to evaluate and improve existing infrastructure.
e. Assist in highway planning studies, cost estimation, and project scheduling.
f. Contribute to road safety assessments, traffic flow analysis, and transportation system optimization.
g. Participate in traffic surveys, data collection, and field assessments.

5. Geomatic Engineering

a. Develop skills in surveying techniques using advanced equipment such as total stations and GPS.
b. Learn Geographic Information Systems for spatial data analysis, mapping, and visualisation.
c. Assist in topographic surveys, boundary surveys, and construction layout.
d. Participate in field surveys to collect elevation data, establish control points, and create digital terrain models
e. Apply surveying techniques to infrastructure projects, including road alignments, utility mapping, and site grading.

6. Project Management

a. Gain exposure to project planning, scheduling, and budgeting for civil engineering projects.
b. Learn project management methodologies and tools used in engineering project execution.
c. Assist in preparing project documentation, including scope of work, project charters, drawings, and specifications.
d. Participate in project meetings, coordination activities, and progress reporting.
e. Gain insights into procurement processes, including preparation of bill of quantities (BOQ) and tender documents.
f. Develop leadership and communication skills through team collaboration and stakeholder engagement.
g. Receive mentorship from experienced engineers and professionals in the field.
h. Learn about ethical considerations and professional responsibilities in civil engineering practice.

BACHELOR OF AGRICULTURAL AND BIOSYSTEMS ENGINEERING WITH HONOURS

1. Works related to agricultural informatics, machinery and equipment such as design, assembly, construction, operation, repairing, handling, information technology and computing.

2. Activities related to water and soil engineering; comprising water irrigation system, water control structure, hydrology, surveying for alignment of waterways and construction of country roads for development of agricultural area, checking tender specification, preparing contract's paperwork, offering tender and works supervision.

3. Works related to agricultural products processing such as in factory and processing centre including operation observation and coordination of process, repairing, handling and equipment testing, design and compatibility test for processing, administration and

4. Consultancy work related to mechanical/civil/electrical engineering for agricultural-based projects including designing infrastructure/facilities such as buildings, country roads and management of projects for agricultural development.

BACHELOR OF ELECTRICAL AND ELECTRONIC ENGINEERING WITH HONOURS

Industrial training structure for this program is divided according to major fields of electrical and electronics and subsectors in industry which are:

1. Manufacturing of Electronics Components and Appliances
2. Consumer and Industrial Services
3. Research, Development and Consultancy
4. Electrical

The training structure for these fields is distinctive yet requires similar basic knowledge.

1. Manufacturing of Electronics Components and Appliances.

This includes manufacturing of electronic components such as semiconductors, passive components, printed circuit boards and precision plastic parts. This encompasses a variety of products such as transistors, integrated circuits and electronic appliances such as radio, TVs, telephones and computers. Suitable training includes:

a. Learning mass production system in terms of works, equipment and management
b. Maintenance of manufacturing equipment
c. Learning testing method at each manufacturing step.
d. Learning IC design/system flow, engineering services, and solutions to bolster wafer fabrication/ front end activities.
e. Learning IC Packaging / back end activities & engineering services solution
f. Conducting short term projects related to the field. For example:
    - Manufacturing process survey
    - Automation process design
    - Product testing method design

2. Consumer and Industrial Services

This field includes the usage of computers, and computer peripherals, telecommunications equipment and office equipment in coordinating services such as process control, telecommunication, energy generation and distribution and traffic control. Additionally, electronic consumer goods like television receivers, portable multimedia players (PMPs), speakers, cameras, and electronic games are encompassed in this scope. Suitable training includes:

a. Survey on the usage of computer in a service
b. Selection of suitable equipment for a specific process.
c. Supervising equipment assembly and testing
d. System maintenance method
e. Conducting short term projects related to the field. For example:
    - Appliance/package design using computer
    - Conduct testing on appliance
    - Preparation of specification for upgrading system
    - Conducting system research

3. Research, Development and Consultancy

This field includes research, design, electrical appliances testing, electronics and computers.

a. Learning appliance design method, circuit or IC with computer aid.
b. Conducting short term projects in designing or searching data and analyzing research as part of a big consultancy project.

4. Electrical

This field includes manufacturing and usage of boards, panels and consoles, switching apparatus, lamps, air conditioners, vacuum cleaners, ovens, transformers, cables & wires, primary cells & batteries, solar cells and modules. Suitable training includes:

a. Troubleshooting, repairing, and maintaining electrical systems in various industrial settings.
b. Operating, and maintaining solar panels, wind turbines, and other renewable energy systems.
c. Design, installation, and maintenance of electrical distribution and transmission systems.
d. Implementing energy-efficient technologies and practices to optimize energy usage and reduce costs.
e. Implementing various instruments and devices for electrical measurement and instrumentation in industrial applications.
f. Utilise CAD software for designing electrical systems and components.
g. Implementing latest advancements and trends in the electrical industry, such as smart grids, Internet of Things (IoT) applications, and electric vehicle charging infrastructure.

BACHELOR OF CHEMICAL ENGINEERING WITH HONOURS

Industrial training in Chemical Engineering field covers following subdivision:

1. Chemical Process Engineering
2. Biochemical Engineering
3. Environmental Engineering
4. Material Science Engineering
5. Safety Engineering and Reliability

Training in this field is to give some exposure to chemical engineering application in production industry such as gas processing, oil, petrochemical, toxic chemical, cement production and paint, solvent distillation, polymer industry, pharmaceutical, vitamin, and mineral, food and beverages industry, alcohol production and acid bioorganic, or industry that use chemical engineering application in environmental field such as air pollution control, water, and waste toxic, etc. Chemical engineering internship program focus on:

a. Design chemical substance processing plant with process utility such as steam, boiler, furnace, high pressure, control device and other tank / processing plant for organic matter by using biochemistry process such as reactor fermentation / system or waste and waste treatment plant through use of chemical process and biochemistry.

b. Design crop yield in industry by using bioprocess fermentation, or polymer reaction, pharmaceutical and food use chemical reaction and enzyme.

c. Run process equipment such as generator, boiler, reactor, heat transfer and system tool condensation.

d. Understand chemical substance processing operations such as solid, gas, and liquid/ biochemistry processing operations like microbe species usage in gas reaction and liquid.

e. Control operation in production such as temperature, pressure, material mixing and reaction time in order to minimise waste and optimise the process.

f. Handle materials which have fine particle and crystal shape. Mixture technology material, particle and transfer analysis material and process of applying high transmission of heat.

g. Monitoring processes and designing systems in order to ensure that the waste production is minimised and recycling industrial waste.

h. Using process equipment such as grease oil traps, coagulation process, sedimentation process, biofilter, colour treatment and others.

i. Understanding the biochemical process operation in the waste treatment technology such as the use of microbe species and toxic materials degradation using biology.

j. Utilise analytical techniques/ simulation tools/ optimization methods/ safety and hazard analysis/ design techniques and applications related to chemical engineering fields

BACHELOR OF MECHANICAL ENGINEERING WITH HONOURS

1. Research and Development

In this field students will be able to do research works related to Mechanical and Manufacturing engineering. The training involved using new materials, inventory, control process, computer software in design and manufacturing. They will also do designing works that involve all important aspects related to sustainability, cost and manufacturing system.

2. Mechanical Engineering

This field includes three main divisions which are services, manufacturing and contractor. Services include transportation, energy, telecommunication and investment. Manufacturing division includes manufacturing, production and processing of a factory. Contractor includes producing works. Developing component and mechanical system.

3. Production Engineering

Two main components in Production Engineering are Production Process and Production System.

In Production Process, students have the opportunity to expose themselves in:

a. Control of material
b. Turning, milling, grinding
c. Casting, forging, extrusion, drawing, stamping, smelting, fabrication rolling and others.

In Production System, students have the opportunity to expose themselves in:

a. Mass Production
b. CNC/NC Machine Tools
c. Automation and Robotics and others

4. Industrial Engineering

In this field students have the opportunity to expose themselves in:

a. Design of plant layout
b. Material handling
c. Industrial management
d. Production/Operations management
e. Production planning and control
f. Industrial system analysis

5. Quality Control/ Quality Assurance

Quality control involves controlling goods and services, controls of goods in, control work in process, final inspection and testing of goods and ready services. Students will have the

opportunity to use control charts, acceptance sampling, data analysis and others in real situations.

6. Design, Development and Testing

Students will be exposed and engaged at the early stages of the process and design. Design works of the components such as mould and jig machines, production systems are considered suitable for this purpose.

7. Computer in Engineering

Students undertaking training in this industry have the opportunity to gain further experience in using existing software packages in the analysis work and design engineering. Students can also create computer programs to solve specific problems.

BACHELOR OF PROCESS AND FOOD ENGINEERING WITH HONOURS

The Bachelor of Process and Food Engineering curriculum offers comprehensive knowledge and skills in transforming biological and agricultural raw materials into consumer food, pharmaceuticals, and industrial products. To meet industry demands, the curriculum includes four focus areas:

1. Food Engineering: Focuses on converting biological and agricultural raw materials into consumer food, covering process design, equipment, and systems with advanced control methods and efficient energy management.
2. Bio-material Processing Engineering: Applies process engineering principles to industries using biological and agricultural materials like palm oil, rubber, and cocoa. It includes designing processes, equipment, and systems with parallel control and efficient energy management.
3. Packaging Engineering: This focuses on packaging machinery and automation, evaluating and testing packaging materials, and understanding package permeability and the shelf life of food products.
4. Process Machinery Design Engineering: This covers the dynamics of processing machinery, the design of machinery elements, and the automation of processing machinery systems.

All of these emphasise developing new processes and products from biological and agricultural raw materials for food, pharmaceutical, and industrial use.

Industrial training in this program covers the following fields, among others:

1. Food Process Engineering
2. Food Engineering
3. Bioprocess Engineering
4. Food Packaging Engineering
5. Food Manufacturing

The objective of the industrial training is to provide hands-on experience in applying process and food engineering within manufacturing and processing plant operations. This includes engineering design (process, equipment, and system design), product development, and research.

BACHELOR OF COMPUTER AND COMMUNICATION SYSTEMS ENGINEERING WITH HONOURS

Industrial training in Computer and Communication Systems Engineering can span over several fields as follows:

1. Internship in Computer Engineering fields include:

a. design, test and troubleshoot hardware components which include PCB design, System on Chip (SoC) and circuit layouts.
b. develop, test and debug software applications either at front-end, back-end or both.
c. install and maintain different components of a computer system.
d. apply the available package in industry in analysis work and engineering design.
e. perform data analytics tasks such as data cleaning, preprocessing, analysis, visualisation and build predictive modelling using machine learning or other computerised approaches.
f. perform system integration that combines various computer components in a seamless and secure manner.

2. Internship in Communication Engineering fields include:

a. design, install, maintain, test and troubleshoot communication hardware.
b. develop network protocols, configure routers and switches, or implement communication protocols such as TCP/IP, Bluetooth, or Wi-Fi.
c. analyse network traffic, perform network planning and optimization or predict network failures.
d. Setting up ground stations for satellite or radio communication, configure communication links and analyse data transmission.
e. handle fibre optics cables and perform fusion or mechanical splicing.
f. Perform routine maintenance to ensure optimum performance on communication systems.

3. Research, Development and Consultancy in relevant computer and communication system engineering fields which include:

a. learn appliance design method such as equipment, circuit or telecommunication system using the existing software packages in the industry
b. conduct short term project in designing or searching data and analysing research as part of big consultancy project
c. study relevant standards and guidelines for best practices in computer and communication engineering projects.