UNIVERSITI TEKNIKAL MALAYSIA MELAKA

ACADEMIC HANDBOOK 2022/2023

FOR BACHELOR DEGREE AND DIPLOMA PROGRAMMES

FACULTY OF MANUFACTURING ENGINEERING
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

FIRST PUBLISHED 2022

Member of the Malaysian Scholarly Publishing Council (MAPIM)
Member of the Malaysian Book Publishers Association. (MABOPA)

Published and Printed in Malaysia by:
Penerbit UTeM Press
Universiti Teknikal Malaysia Melaka
Hang Tuah Jaya, 76100 Durian Tunggal, Melaka, Malaysia.
Tel: +606 270 1241 Faks: +606 270 1038

CONTENTS

ABOUT

Universiti Teknikal Malaysia Melaka (UTeM) was established under Section 20 University and University College Act 1971 (Act 30) through "Perintah Universiti Teknikal Malaysia Melaka (Pemerbadanan 2007)" gazetted as P.U. (A) 43 on the 1st of February 2007. UTeM was initially known as Kolej Universiti Teknikal Kebangsaan Malaysia (KUTKM), established on the 1st of December 2001.

Vision

To be one of the world's leading innovative and creative technical universities.

Mission

UTeM is determined to lead and contribute to the wellbeing of the country and the world by:

- ☑ Promoting knowledge through innovative teaching and learning, research and technical scholarship.
- ☑ Developing professional leaders with impeccable moral values.
- ☑ Generating sustainable development through smart partnership with the community and industry.

Objectives

- To conduct **academic & professional programs** based on relevant needs of the industries.
- To produce graduates with **relevant knowledge, technical competency, soft skills, social responsibility & accountability.**
- To cultivate **scientific method, critical thinking, creative & innovation problem solving & autonomy** in decision making amongst graduates.
- To foster development & innovation activities in **collaboration with industries** for the prosperity of the Nation.
- To equip graduates with **leadership & teamwork** skills as well as develop **communication & life-long learning** skills.
- To develop **techno-preneurship & managerial skills** amongst graduates.
- To instil an appreciation of the **arts & cultural values** and awareness of **healthy life** styles amongst graduates.

TOP MANAGEMENT

PROF. TS. DR. MASSILA
BINTI KAMALRUDIN
Vice Chancellor

PROF. DR. ZULKIFILIE
BIN IBRAHIM
Deputy Vice Chancellor,
Academic & International

PROF. IR. DR. GHAZALI
BIN OMAR
Deputy Vice Chancellor,
Research & Innovation

ASSOC. PROF. DATUK DR. SABRI
BIN MOHAMAD SHARIF
Deputy Vice Chancellor,
Student Affairs

ENCIK MASDZARIF
BIN MAHAT
Chief Operating Officer

ENCIK KHAIRUL
BIN TAIB
Bursar

ENCIK AZMAN
BIN HJ. AYUB
Chief Librarian

DATUK AZHAR
BIN MOHAMED
Legal Advisor

PROF. DR. MOHD KHANAPI
BIN ABD GHANI
Chief Information Office

FOREWORD BY THE DEAN

Professor Ir. Dr. Hambali bin Arep @ Ariff

Dean,
Fakulti Kejuruteraan Pembuatan

بسم الله الرحمن الرحيم

Assalamualaikum Warahmatullahi Wabarakatuh & Salam Sejahtera.

First and foremost, I would like to congratulate all students of cohort 2022/2023 for being a part of Faculty of Manufacturing Engineering –The first and only Faculty of Manufacturing Engineering (FKP) in Malaysia. As students of Bachelor in Manufacturing Engineering, Bachelor of Industrial Engineering and Diploma in Manufacturing Engineering, your life towards building a great career in Engineering starts here at the beautiful campus of UTeM in Durian Tunggal, Melaka.

To study here is to join the teams consist of knowledgeable academic teams, great support system and of the access to wide variety of the clubs and societies. While the pandemic continues to impact our daily lives, our aim remains unchanged, to provide you with the best possible learning experience and be part of an active and inspiring community – one determined to help you develop your skillset, broaden your horizons and push knowledge forward for the benefit of all.

In this handbook you will find a wealth of information pertaining curriculum syllabus, regulations and important information's that will enable you to plan for study effectively.

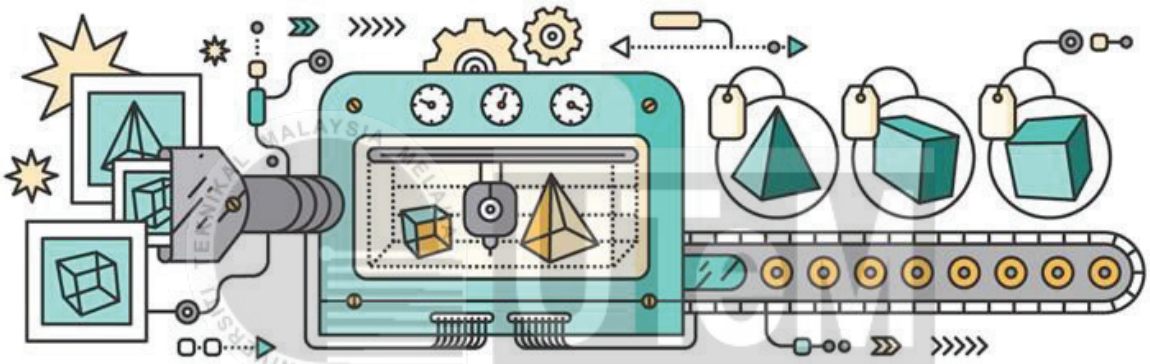
As the Dean of the faculty, I would like to extend my gratitude and appreciation to the working committee who have contributed to the establishment of this Academic Handbook which is an official and essential reference document for both the students and the academic members of the faculty.

Finally, I wish a sincere good luck and success to all new intakes of 2022/2023 academic year. May the experience to be gain at UTeM and FKP serve as good starting point for the development of holistic characters that benefits the country and mankind.

Keep safe and healthy.

Thank you.

INTRODUCTION TO MANUFACTURING ENGINEERING & INDUSTRIAL ENGINEERING



Manufacturing engineering is a branch of engineering that focuses on designing and operating the manufacturing systems for a product. It concerns with understanding, analysing, and improving complex industrial, manufacturing and infrastructure systems.

This branch of engineering specifically focuses on finding and using the equipment needed to turn raw materials such as metal, plastic, or wood into a complete product in the most efficient way possible. It starts off with the process of designing a product, and later moves to the development of a working product. The scope of work also involves selecting the best technologies and processes to produce the said product.

As Malaysia is a trading nation, Malaysia needs to continuously look for new, fresh, and innovative ways of growing its market aside from striving to deliver improved products. Over the years, the country has

enhanced its manufacturing sector, enabling it to become the leading player in the global market.

The industrial revolution 4.0 which introduces the ongoing trends of process automation and data exchange using advanced manufacturing technologies has changed the way we live, work, and communicate. These include the integration of Internet of Things (IoT), Industrial IoT, cyber-physical systems (CPS), cloud computing, artificial intelligence (AI), cognitive computing, 3D printing, predictive maintenance, smart sensors, and many more. This has greatly changed the landscape of the manufacturing industry in Malaysia. These technologies aim to completely transform a manufacturing firm to one with minimal dependence on human force, as machine to machine communication would be enhanced.

These provide remarkable opportunity for manufacturers to gain higher productivity, better efficiency, and improved quality. Replacing manual inspection with AI-powered visual insights also reduces manufacturing errors and saves money and time. Any errors could also be detected right away, rather than at later stages when repair work is more expensive. Hence, industrial revolution 4.0 is the key to revolutionising the manufacturing industry in Malaysia.

MANUFACTURING ENGINEERING CAREER

Process Engineer
Design Engineer
Automation Engineer
Material Engineer
Quality Control Engineer
Production Engineer
Researcher
Operation Manager
Quality Control Engineer

Aerospace
Automotive
Manufacturing
Oil and gas
Biotechnology
Pharmaceutical
Plant and machinery
manufacture

FAKULTI KEJURUTERAAN PEMBUATAN

Faculty's Vision

To be a Faculty of Manufacturing Engineering which is **comprehensive, excellent and recognised.**

Faculty's Mission

To carry out quality manufacturing engineering **teaching and learning, research and consultancy** activities that meet the current needs.

Programmes Offered

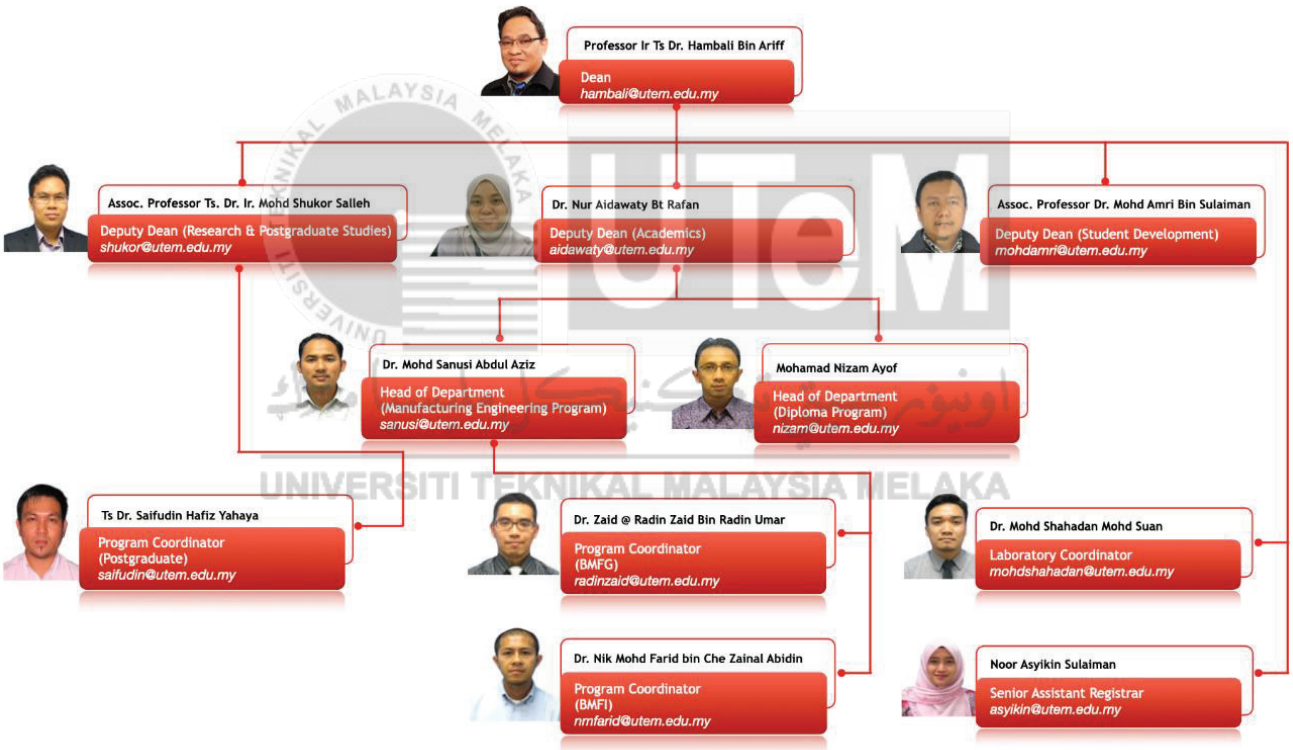
Undergraduate Programmes

- Bachelor of Manufacturing Engineering (BMFG)
- Bachelor of Industrial Engineering (BMFI)
- Diploma of Manufacturing Engineering (DMF)

Postgraduate Programmes

- Doctor of Philosophy (PhD)
- Doctor of Engineering (D.Eng.)
- Master of Engineering in Manufacturing Engineering (by Research)
- Master of Engineering in Manufacturing Engineering (by Taught Course):
  - Manufacturing Systems (MMFS)
  - Industrial Engineering (MMFD)
  - Quality Systems (MMFQ)
  - Advanced Materials and Processing (MMFB)

ORGANISATION OF THE FACULTY



ACCREDITATION

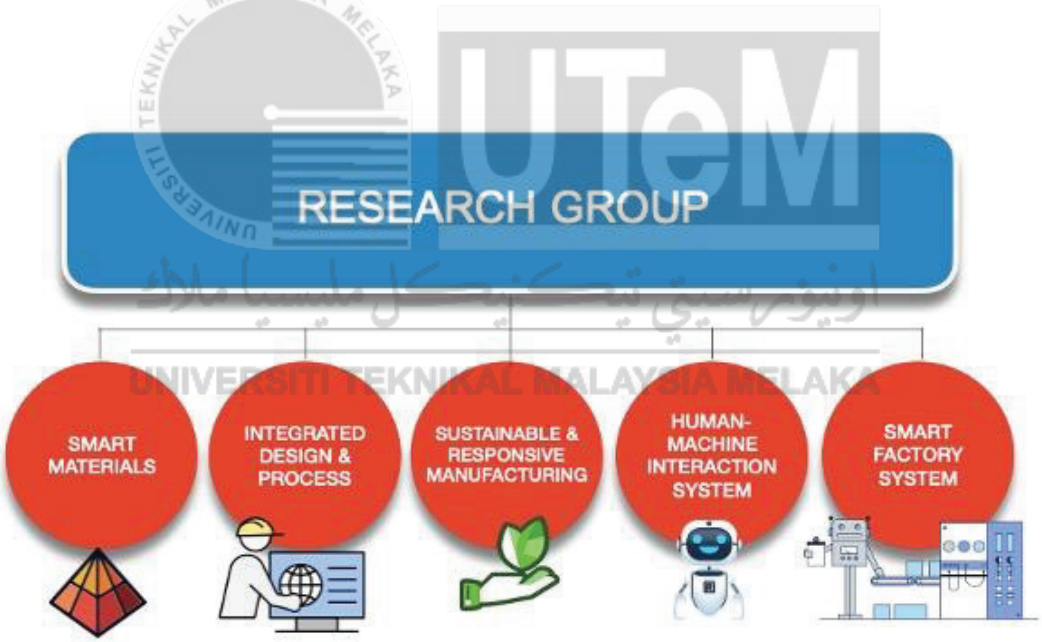
Accreditations for undergraduate academic programs in the Faculty of Manufacturing Engineering, both for Degree and Diploma programs, are conducted by the registered councils and agency to uphold the highest quality of engineering education. The Bachelor of Manufacturing Engineering is accredited by the Engineering Accreditation Council (EAC) since 2006 and continue to achieve the required standard until today. Meanwhile, the Diploma of Manufacturing Engineering is continuing to achieve the standard set by the Malaysian Qualification Agency (MQA) since 2011. This program is recently under evaluation for full accreditation by the Engineering Technology Accreditation Council (ETAC). Should the programs meet the accrediting agency's standards, the agency will recommend the Public Services Department (PSD) to grant accreditation to the applied courses. The following indicates the program's accreditation in the Faculty of Manufacturing Engineering.

Academic Program	Accreditation Body	Accreditation
Bachelor of Manufacturing Engineering	MQA / EAC	2018 -2023
Diploma of Manufacturing Engineering	MQA ETAC	Since 2011 2021-2026

Graduates from the accredited engineering programs that satisfy the minimum academic requirements can register as a graduate engineer with the Board of Engineers (BEM) and apply to be a certified graduate member of the Institution of Engineer Malaysia (IEM).

RESEARCH GROUP

Besides teaching activities, faculty also involves in research activities. Research Group (RG) is a platform to support the research activities which promotes industrial driven research among the FKP staff. This group consists of five research groups which are Smart Materials, Integrated Design and Process, Sustainable Responsive, Smart Factory System and Human-Machine Interaction System.



ACADEMIC SYSTEM

UTeM practices a semester academic system. Every academic year comprises of two semesters and in some instances the faculty also offer special semester which is arranged during the semester break. There are **18 weeks of study week** which include 7 weeks of first part lecture, followed by 1 week mid semester break. Students will continue another 7 weeks second part lecture before 1 week of study leave and 2 weeks for final examination.

Learning process in UTeM includes l**ectures, tutorials, written assignments, practical, laboratory and projects** which will be done either by individual or by group work. A Bachelor Degree student has to fulfil all credit hours required to graduate within 8 - 12 semesters while a Diploma student has to do so between 6 – 10 semesters to graduate.

ENTRY REQUIREMENTS

Bachelor Degree Programme

DIPLOMA HOLDERS/ EQUIVALENT

General Requirements:

- ☑ Pass SPM / equivalent with credit in Bahasa Melayu/ Bahasa Malaysia or credit in Bahasa Melayu/Bahasa Malaysia July Examination; **AND**
- ☑ Pass Diploma / equivalent qualification recognized by the Government of Malaysia and approved by the University Senate; **AND**
- ☑ A minimum of Band 2 in Malaysian University English Test (MUET).

Program's Special Requirements:

- ☑ Pass a Diploma in relevant field (Engineering Technology) with at least a CGPA of 3.00 or Diploma in Engineering with at least a CGPA of 2.75, recognized by the Government of Malaysia and approved by the University Senate **AND**
- ☑ Credit exemptions are subject to the faculty's approval **AND**
- ☑ Pass the Diploma program before the academic session begins.

MATRICULATION CERTIFICATE

General Requirements:

- ☑ Pass SPM / equivalent with credit in Bahasa Melayu/ Bahasa Malaysia or credit in Bahasa Melayu/Bahasa Malaysia July Examination; **AND**
- ☑ Pass KPM Matriculation / Asasi with at least a CGPA of 2.00; **AND**
- ☑ A minimum of Band 2 in Malaysian University English Test (MUET).

Program's Special Requirements:

- ☑ Pass with at least Grade C (2.00) in Mathematics/ Engineering Mathematics, Physics/ Engineering Science and Chemistry/ Basic Engineering

STPM HOLDERS

General Requirements:

- ☑ Pass SPM / equivalent with credit in Bahasa Melayu/ Bahasa Malaysia or credit in Bahasa Melayu/Bahasa Malaysia July Examination; **AND**
- ☑ Pass STPM with at least Grade C (CGPA 2.00) in the General Paper **AND**
- ☑ A minimum of Band 2 in Malaysian University English Test (MUET).

Program's Special Requirements:

- ☑ Pass with at least Grade C (2.00) in Mathematics, Physics, and Chemistry.

ENTRY REQUIREMENTS

Diploma Programme

SPM HOLDERS

University's General Requirements:

- ☑ Pass SPM or equivalent with a minimum of 5 credits for the Courses inclusive of Bahasa Melayu.
- ☑ Pass in History (SPM 2013 and above)
- ☑ Pass in Additional Mathematics
- ☑ Malaysian

Program's Special Requirements:

- ☑ Fulfil the University's General Requirement with a minimum of 4 Credits for the Courses below:
  - Mathematics
  - Physics
- ☑ **AND** 2 of the following Courses:
  - Additional Science
  - Science
  - Chemistry
  - Biology
  - Mechanical Engineering/ Civil Engineering, Electrics & Electronics Engineering
  - Engineering Drawing
  - Computer Science
  - Geography/History/ Accounting/ Economics/ Entrepreneurship/Islamic Studies
- ☑ Pass English Language
- ☑ Minimum of Grade D in Additional Mathematics
- ☑ Candidate does not have limited capability in performing the practical work

Definition of Course Categories

UNIVERSITY COMPULSORY COURSES

These courses are determined by the University and are compulsory for all students.

PROGRAMME CORE COURSES

These courses are determined by the University and the Faculty and are compulsory for all engineering students.

COURSE CORE

These courses are determined by the Faculty and are compulsory for all engineering students enrolled in the program.

ELECTIVE COURSES

These courses are determined by the Faculty and are compulsory for all students specialising in respected fields.

Definition of Credit Hour

CREDIT SYSTEM FOR COURSES

In the semester system, each subject is given credit values except for Courses, which are determined by the University. Each subject is given credit to show the importance of the contents. The amount of credit represents the effort expected to be performed by students.
As a result, students should wisely allocate their study time based on the credit of the Courses.

CREDIT SYSTEM INDUSTRIAL TRAINING

The duration of Industrial Training for Bachelor Degree Program is 10 weeks for a total of 5 credit hours.
For Diploma Program, the duration of Industrial Training is 16 weeks for a total of 8 credits hours.

Student Learning Time (SLT)

Student Learning Time (SLT) is the average number of hours expected of a student to allocate for a given credit hour in a semester. Learning time is computed for guided learning session, independent learning session, and preparation for course assessment.

GUIDED LEARNING	
☑ Lecture	1 hours per credit per week
☑ Tutorial	2 hours per credit per week
☑ Practical	2-3 hours per credit per week
☑ Others	3 hours per credit per week, distributed accordingly.
☑ (Project, Problem-Based Learning, Assignment)	
INDEPENDENT LEARNING	
☑ Preparation for lecture	0.5 - 1 hour per lecture session
☑ Preparation for tutorial	0.5 - 1 hour per tutorial session
☑ Preparation for practical	0.5 - 1 hour per practical session
☑ Other Preparations (Project,Problem-BasedLearning, Assignment)	3 hours per credit per week, distributed accordingly.
☑ Final Exam	~ 4 minutes for each assessment minute.
☑ Test	~ 4 minutes for each assessment minute.
☑ Coursework / Assignment	~ 4 minutes for each assessment minute.
☑ Others	~ 4 minutes for each assessment minute.
ASSESSMENT	
☑ Final Exam	~ 1 minutes per unit marks per credit
☑ Test	~ 1 minutes per unit marks per credit
☑ Assignment	~ 1 minutes per unit marks per credit
☑ Others	~ 1 minutes per unit marks per credit
CREDIT PER SEMESTER	**18 credits (maximum)** **12 credits (minimum)** **22 credits (with the Dean's permission)**

Grading System

The following shows the grading system adopted by the university.

Marks	Grades	Grade Point Value Marks	Grade Point Value Achievement
80-100	A	4.0	Distinction
75-79	A-	3.7	Distinction
70-74	B+	3.3	Credit
65-69	B	3.0	Credit
60-64	B-	2.7	Pass
55-59	C+	2.3	Pass
50-54	C	2.0	Pass
47-49	C-	1.7	Conditional Pass
44-46	D+	1.3	Conditional Pass
40-43	D	1.0	Conditional Pass
00-39	E	0.0	Fail

Academic Achievement

Grading Point

Grade Point Average (GPA) is a grade point average earned by a student in a semester.

- Total Grade Point (JMN) $= k_1 m_1 + k_2 m_2 + \cdots + k_n m_n$
- Total Calculated Point (JKK) $= k_1 + k_2 + \cdots + k_n$
- Grade Point Averae (GPA) $= \frac{JMN}{JKK}$

Where
k = credit hour for subject
m = grade points earned for subject
n = number of courses registered

Average Calculation

Cumulative Grade Point Average (CGPA) is a grade point average earned by a student inclusive all semesters he/she registers.

- CGPA $= \frac{JMN_1 + JMN_2 + \cdots + JMN_n}{JKK_1 + JKK_2 + \cdots + JKK_n}$

Academic Standing

The academic standing for each student is determined by the examination results obtained at the end of every semester. The status is categorized as shown.

Good Standing / Kedudukan Baik	CGPA ≥ 2.00
Conditional Status / Kedudukan Bersyarat	1.70 ≤ CGPA < 2.00
Fail / Kedudukan Gagal	CGPA < 1.70

① Subject to the approval of Senate, a student who obtains **CGPA ≥ 2.00 but GPA < 1.00** may;

(i) be allowed to continue his studies with KB; or

(ii) be directed to postpone his studies in the next semester with KB; or

(iii) Be dismissed from his studies with **KG.**

② Subject to the approval of the Senate, a student who obtains **1.70 ≤ CGPA < 2.00 but GPA < 1.00** may;

(i) Be directed to postpone his studies in the next semester with **KS**; or

(ii) Be dismissed from his studies with **KG**.

③ The Academic Standing of a student in a Special Semester shall not be determined. Grades obtained in the Special Semester shall be counted when calculating the CGPA for the subsequent semester. However CGPA will be determined for a student who is due to graduate in the Special Semester based on the Repeat/Redeem Course.

④ A student who obtains **KS** status for three (3) consecutive semesters shall be given **KG** status.

⑤ A student who obtains a **KG** shall be dismissed from his studies.

⑥ For students with **KS**, maximum permissible credit for the upcoming semester is 12 credits.

Graduation Requirement

A student shall only be conferred a Bachelor Degree or Diploma subject to the following conditions: -

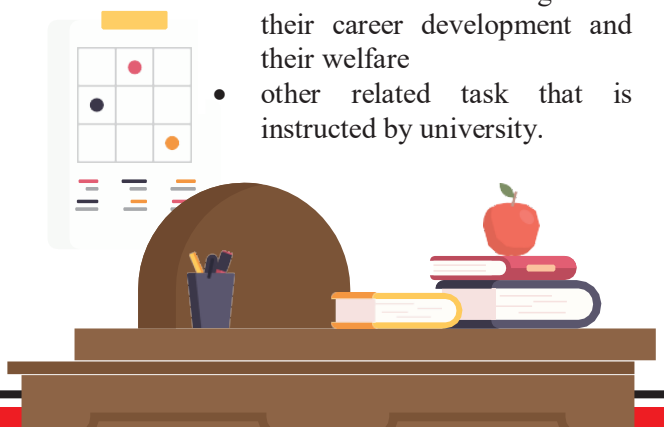
(a) The student must obtain a Good Academic Standing (KB) in his final semester;
(b) The student must pass all Courses required by the curriculum;
(c) Any other conditions set by the University.
(d) The **Good Academic Standing Award (KBA)** shall be given to students who have fulfilled the conditions of all above.

Academic Advisory System

Academic Advisor Responsibility

An academic advisor is required to explain to the students:

- the important information concerning university's policy and procedure, curriculum and syllabus, academic calendar etc.
- to assess the students' aptitude to ensure credit hours and courses registered are according to the policy and suitable with their capability.
- to approve application of students during drop/add courses based on student performance.
- to assist student with regards to their career development and their welfare
- other related task that is instructed by university.



Student's Responsibility

Students are responsible to consistently meet with their academic advisor twice per semester to get advice and help in solving any academic problems that arise. Every semester, students need to discuss their study plan with their academic advisor and to consult their academic advisor before registering their Courses for the respective semester.

In general, students are responsible to:

- meet up with the academic advisor in the first week of the semester and obtain the general explanation about the Semester System and related issues concerning learning process as well as monitoring student's performance.
- obtain an assistance from the academic advisor in preparing their study plan throughout their four years of study in UTeM, such as Courses to be registered every semester, credit hours, etc.
- inform the Faculty's Administration and academic advisor concerning their performance and problems.
- check and verify Courses registered for the examination.
- seek advice and explanation from their academic advisor the effects of registering and dropping Courses

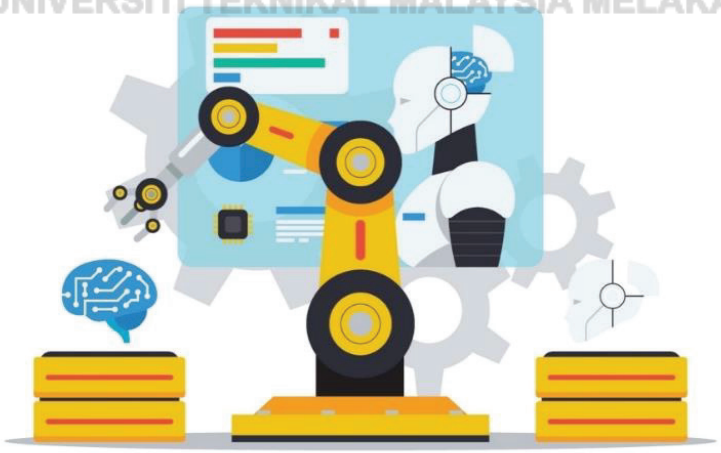
STUDENTS' ACTIVITIES

SOCIETY OF MANUFACTURING ENGINEERS

Society of Manufacturing Engineers (SME) is a society set up by the faculty for manufacturing engineering students. The vision of SME is to produce graduates with excellent leadership skills, highly competitive and critical thinking.

The mission of SME is to produce graduates with good personality and applying rational attitude in an organisation. Here you will find that SME is a society which organise the social events which involve the FKP students via their activities that can promote professional development and enhancing their soft skills such as communication, problem solving, entrepreneurship and leadership. Therefore, students are encouraged to be active in the SME as the activities carried out could supplement the formal engineering education obtained.

SME organises many activities either independently, or in cooperation with the faculty. Examples of the activities include: industrial visits, open day, outdoor activities, motivational courses, community services and industrial talks.



Academic Mobility

Every year, the faculty will choose several selected students to local and International Universities to experience certain program as a way to incorporate wider dimension to their university training. The students exchange program in which UTeM students go and study at other University is called Outbound Mobility. UTeM also welcomes students from other University to study here under the program called Inbound Mobility. There are two types of academic mobility: Mobility with Credit and Mobility without Credit. For interested applicants, please get more information from the FKP Mobility Committee and if qualified feel free to fill up the Mobility application form.

Institutes/ University

Institute of Technology (ITS) Sepuluh Nopember, Indonesia

Hoschule Hannover University of Applied Sciences & Arts, Germany

Universiti Brawijaya, Indonesia

Universiti Negeri Malang, Indonesia

Islamic Univ. of Technology (IUT), Bangladesh

OUTCOME BASED EDUCATION

Washington Accord (WA) is an agreement between various countries to endorse the equivalency of engineering programs whereby Malaysia is one of its provisional signatories. All graduates of engineering programs that have been accredited in a member country are considered already fulfilling the academic requirements to enter engineering practice in all countries signing the agreement.

The WA has adopted the Outcome Based Education (OBE) as its teaching and learning approach. OBE is a process that involves the restructuring of curriculum, assessment and reporting practices in education to reflect the achievement of high order learning and mastery rather than accumulation of course credits.

BMFG

PROGRAM DETAILS

Bachelor of Manufacturing Engineering

Bachelor of Manufacturing Engineering is first offered in September 2014 to replace previous specialised programs in Manufacturing Engineering. This program is designed to fulfil the government's aspiration to produce multi-skilled graduates in Manufacturing Engineering that would uphold the growth of manufacturing industries in Malaysia. In this program, students are taught generic skills, mathematics and sciences, common engineering domains, manufacturing engineering and knowledge specifics to Materials Engineering, Manufacturing Design, Manufacturing Process, Robotics and Automation, and Manufacturing Management. Graduates from this program are expected to have strong engineering background and skills required by the industries to build their career as Process Engineers, Product Design Engineers, Production Engineers, Manufacturing Engineers, Sales Engineers, Machine Tool Designers and Manufacturing Engineering Consultants.

BMFG

Programme Educational Objectives (PEO)

Program Educational Objectives (PEO) are specific goals describing graduates' expected achievements in their career and professional life after graduation. Following are the PEO for the Bachelor of Manufacturing Engineering programme.

PEO 1	Alumni adapt to transformation of knowledge and are highly competent to solve engineering and manufacturing related problem.
PEO 2	Alumni demonstrate leadership skills with good ethics.
PEO 3	Alumni pursue lifelong learning activities as well as creative and innovative to the needs of the industry and society.

BMFG

Programme Learning Outcomes (PLO)

Programme Learning Outcomes (PLO) are statements describing what students are expected to know and be able to perform or attain by the time of graduation. These relate to the skills, knowledge, and behaviours that students acquire through their program of studies.

PLO1	Able to apply knowledge of mathematics, science, engineering fundamentals and manufacturing engineering to the solution of complex engineering problems.
PLO2	Able to identify, formulate, research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
PLO3	Able to design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
PLO4	Able to conduct investigation into complex problems using research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
PLO5	Able to create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering activities, with an understanding of the limitations.
PLO6	Able to apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.
PLO7	Able to understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.
PLO8	Able to apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
PLO9	Able to communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PLO10	Able to demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PLO11	Able to 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 and acquire knowledge on entrepreneurship.
PLO12	Able to demonstrate knowledge and understanding of the principles of finance and project management

BMFG

Programme Implementation

This program would take four (4) years minimum and consist of a least 135 credit hours. The programme will emphasis of Manufacturing Engineering with the composition of the credits are follows:

COMPONENTS		CREDIT HOURS	PERCENTAGE
Compulsory University Course (W)		12	8.90%
Co-Curriculum (W)		2	1.48%
Core Course (P)	Programme	93	68.9%
	Engineering Seminar	1	0.74%
	Industrial Training	5	3.70%
	Final Year Project	6	4.44%
Elective (E)	University	4	2.96%
	Programme	12	8.88%
Total		**135**	**100%**

This programme emphasizes on the theoretical and tutorial, computer-aided learning, and problem base learning (PBL). It also encourages active and cooperative learning activities other than carrying out assignments, job, workshops, industrial tanning and final year project.

BMFG

Curriculum Details & Structure 2022/2023

		YEAR 1		YEAR 2		YEAR 3			YEAR 4		Credits
		Sem. 1	Sem. 2	Sem. 1	Sem. 2	Sem. 1	Sem. 2	Sem. 3	Sem. 1	Sem. 2	
University Compulsory Courses		BKK* ***1 Co-Curriculum I	BLLW 1142 English For Academic Purposes	BLLW 2152 Academic Writing	BLLW 3162 English For Professional Interaction				BTMW 4012 Technological Entrepreneurship		14
			BIPW 1132 Philosophy and Current Issues		BIPW 2132 Appreciation of Ethics and Civilization						
			BKK* ***1 Co-Curriculum 2								
Programme Core Course	Math, Statistics & Computing	BMFG 1313 Engineering Mathematics 1	BMCG 1013 Differential Equatio	BENG 2143 Engineering Statistic	BEKG 2443 Engineering Mathematics 2						15
		BITG 1233 Computer Programming									
	Engineering	BMCG 1523 Engineering Graphic and CADD	BEKG 1123 Principle of Electric and Electronics	BEKG 1233 Principles of Instrumentation & Measurement	BEKG 2433 Electrical Systems	BMFG 3213 Engineering Economy and Management		BMFU 3935 Industrial Training (10weeks)	BMFU 4912 Bachelor Degree Project 1	BMFU 4924 Bachelor Degree Project 2	38
		BMCG 1113 Statics	BMFG 1213 Engineering Materials						BMFU 4223 Integrated Design Project	BMFU 4322 Engineer and Socie	
										BMFU 4321 Engineering Seminar	
Course Core		BMFS 1122 Manufacturing Workshop	BMFB 1223 Strength of Material	BMFA 2123 Dynamics	BMFP 2223 Quality Control	BMFR 3313 Mechanics of Machine	BMFR 3513 Product Design and Manufacturing		BMFP 4413 Manufacturing Management		52
				BMFR 2213 Thermo Fluids		BMFB 3323 Material Selection	BMFP 3122 Manufacturing Sustainability				
				BMFS 2613 Manufacturing Process	BMFS 2623 Advanced Manufacturing Process	BMFA 3213 Industrial Automation	BMFS 4613 CNC Machining				
						BMFP 3423 Industrial Engineering	BMFR 3223 CAD/CAM/CAE				
			BMFB 1221 Engineering Lab 1		BMFA 2121 Engineering Lab 2	BMFP 3111 Engineering Lab 3	BMFA 3313 Control Systems				
Electives		BLHW ***2 Language Elective					BLH* ***2 General Elective		BMF* 4**3 Elective 1	BMF* 4**3 Elective 3	16
									BMF* 4**3 Elective 2	BMF* 4**3 Elective 4	
Additional Courses									BMFG 4**0 Kursus Persediaan Sijil Profesional		
Credits		17	18	17	17	16	16	5	16	13	135

^ For international students only

BMFI

PROGRAM DETAILS Bachelor of Industrial Engineering

WHAT IS INDUSTRIAL ENGINEERING?

Industrial Engineering concerns with the design, installation, and improvement of integrated systems of people, material, information, equipment, and energy. It draws upon specialized knowledge and skills in the mathematical, physical, and social sciences, together with the principles & methods of engineering analysis and design to specify, predict, & evaluate the results to be obtained from such systems.

CAREER PERSPECTIVE

Industrial engineers (IEs) devise efficient systems that integrate workers, machines, materials, information, and energy to make a product or provide a service. They apply science, mathematics, and engineering methods to complex system integration and operations. Thus, IEs have knowledge and skills in a wide variety of disciplines, the ability to work well with people, and a broad, systems perspective. IEs use their knowledge and skills to improve systematic processes through the use of statistical analysis, interpersonal communication, design, planning, quality control, operations management, computer simulation, and problem solving.

BMFI

Programme Educational Objectives (PEO)

Program Educational Objectives (PEO) is specific goals describing expected achievements of graduates in their career and professional life after graduation. Below are the PEO for the Bachelor of Industrial Engineering programme.

PEO 1	Alumni is competence and highly capable as practitioners in Industrial Engineering field.
PEO 2	Alumni demonstrate leadership skills with high ethical values.
PEO 3	Alumni pursue life-long learning as well as creative and innovative engineers that needed by industry and society.

BMFI

Programme Learning Outcomes (PLO)

Programme Learning Outcomes (PLO) are statements describing what students are expected to know and be able to perform or attain by the time of graduation. These relate to the skills, knowledge, and behaviours that students acquire through their program of studies.

PLO1	Able to apply knowledge of mathematics, science, engineering fundamentals and industrial engineering to the solution of complex engineering problems.
PLO2	Able to identify, formulate, research literature and analyse complex industrial engineering related problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
PLO3	Able to design solutions for complex industrial engineering related problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
PLO4	Able to conduct investigation into complex problems using research based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
PLO5	Able to create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering activities, with an understanding of the limitations.
PLO6	Able to apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.
PLO7	Able to understand the impact of professional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development.
PLO8	Able to apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
PLO9	Able to demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PLO10	Able to communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PLO11	Able to demonstrate knowledge and understanding of the principles of finance and project management.
PLO12	Able to 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 and acquire knowledge on entrepreneurship.

BMFI

Programme Implementation

This program would take four (4) years minimum and consist of a least 135 credit hours. The programme will emphasis of Industrial Engineering with the composition of the credits are follows:

COMPONENTS		CREDIT HOURS	PERCENTAGE
Compulsory University Course (W)		12	8.90%
Co-Curriculum (W)		2	1.48%
Core Course (P)	Programme	93	68.9%
	Engineering Seminar	1	0.74%
	Industrial Training	5	3.70%
	Final Year Project	6	4.44%
Elective (E)	University	4	2.96%
	Programme	12	8.88%
Total		**135**	**100%**

This programme emphasizes on the theoretical and tutorial, computer-aided learning, and problem base learning (PBL). It also encourages active and cooperative learning activities other than carrying out assignments, job, workshops, industrial tanning and final year project.

BMFI

Curriculum Details & Structure 2022/2023

		YEAR 1		YEAR 2		YEAR 3			YEAR 4		Credits
		Sem. 1	Sem. 2	Sem. 1	Sem. 2	Sem. 1	Sem. 2	Sem. 3	Sem. 1	Sem. 2	
University Compulsory Courses			BLHW 1442 English For Academic Purpose	BLHW 2452 Academic Writing	BLHW 3462 English For Professional Interaction	BLHW 2772 Penghayatan Etika dan Peradaban					14
			BLHW 1762 Philosophy of Current Issue	BKK* ***1 Co-Curriculum I		BTMW 4012 Technological Entrepreneurship					
			BKK* ***1 Co-Curriculum 1								
Programme Core Course	Math, Statistics & Computing	BMFG 1313 Engineering Mathematics 1	BMCG 1013 Differential Equation	BENG 2143 Engineering Statistic	BEKG 2453 Engineering Mathematics 2						15
			BITG 1233 Computer Programming								
	Engineering	BMCG 1523 Engineering Graphics and CADD	BEKG 1123 Principle of Electric and Electronics	BEKG 1233 Principles of Instrumentation & Measurement	BEKG 2433 Electrical Systems			^^BMFU 3935 Industrial Training (10weeks)	BMFU 4912 Bachelor Degree Project 1	BMFU 4924 Bachelor Degree Project 2	38
		BMCG 1113 Statics				BMFG 3213 Engineering Economy and Management			BMFU 4223 Integrated Design Project	BMFU 4322 Engineer and Society	
		BMFG 1213 Engineering Materials							BMFU 4321 Engineering Seminar		
Course Core		BMFI 1113 Introduction Industrial Engineering		BMFA 2123 Dynamics	BMFP 2223 Quality Control	BMFI 3263 System Modelling: Simulation & Computing	BMFI 3123 Operation Research		BMFG 4123 Cloud Manufacturing	BMFI 4122 Supply Chain Management	53
			BMFS 1122 Manufacturing Workshop	BMFI 2112 Work Systems Design	BMFR 2213 Thermo Fluids	BMFI 3153 Production Planning and Inventory Control	BMFI 3223 Human Factors Engineering				
			BMFB 1221 Engineering Lab 1	BMFS 2613 Manufacturing Process	BMFA 3213 Industrial Automation	BMFA 3313 Control Systems	BMFI 3323 Facility Planning and Design				
					BMFA 2121 Engineering Lab 2		BMFI 3132 Project Management				
							BMFR 3513 Product Design and Manufacturing				
Electives		BLHL ***2 Language Elective					BLH* ***2 General Elective		BMF* 4**3 Elective 1	BMF* 4**3 Elective 3	16
									BMF* 4**3 Elective 2	BMF* 4**3 Elective 4	
Additional Courses									^^^Kursus Persediaan Sijil Professional		
Credits		17	18	17	17	16	16	5	15	14	135

^ For international students only

DMF

PROGRAM DETAILS

Diploma of Manufacturing Engineering

The Diploma Program was first introduced in 2001.The course stresses on knowledge and skills in processing activities, manufacturing methods and machine usage in producing cost-effective products that fulfil customer's requirements. Graduates of this program can build their career as Manufacturing Technical Assistant, Technical Specialist or Entrepreneur. Graduates can also further their study in Bachelor Degree Program.

DMF

Programme Educational Objectives (PEO)

Program Educational Objectives (PEO) is the first pillar of Outcome Based Education (OBE). PEO describe the expected accomplishments of the graduates in respect of their career and professional life three to five years after their graduation. PEO is specific goals describing expected achievements of graduates in their career and professional life after graduation. Below are the current PEO of Diploma programme for Faculty of Manufacturing Engineering.

PEO 1	Alumni are able to apply engineering knowledge and technical skills required to assist in analyzing and solving problems in manufacturing engineering field.
PEO 2	Alumni possess effective skills in communication, teamwork, leadership and supervision with ethical standard.
PEO 3	Alumni are creative and innovative in fulfilling the needs of industry and society for their life-long learning.

DMF

Programme Learning Outcomes (PLO)

Program Outcomes (PLO) are statements describing what students are expected to know and be able to perform or attain by the time of graduation. These relate to the skills, knowledge, and behaviours that students acquire through their program of studies.

PL01	Apply knowledge of mathematics, applied science, engineering fundamentals and manufacturing engineering.
PL02	Identify and analyse well-defined manufacturing engineering problems
PL03	Design solutions for well-defined technical problems and assist the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
PL04	Conduct investigations of well-defined problems by applying relevant codes and standard tests.
PL05	Apply appropriate techniques, resources, and modern engineering and IT tools to a well-defined engineering problems, with an awareness of the limitations.
PL06	Demonstrate knowledge of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to manufacturing engineering practice and solutions to well-defined engineering problems.
PL07	Evaluate the sustainability and impact of manufacturing engineering work in the solution of well-defined engineering problems in societal and environmental context.
PL08	Practice professional ethics and responsibilities, and norms of manufacturing engineering practice.
PL09	Function effectively as an individual, and as a member in diverse technical teams.
PL010	Communicate effectively on well-defined engineering activities with the engineering community and with society at large.
PL011	Demonstrate and apply knowledge of engineering management principles individually, as a member or leader in a technical team and to manage projects in multidisciplinary environments.
PL012	Ability to pursue life-long learning in the context of specialised technical knowledge.

DMF

Programme Implementation

The number of credits required to be awarded a Diploma is 91 credit

This course will take two (2) years and eight (8) months minimum which emphasis on the latest technology and up to date skills. The composition of the credits is as follows:

COMPONENTS		CREDIT HOURS	PERCENTAGE
Compulsory University Course (W)		14	15.38%
Core Course (P)	Engineering	62	68.13%
	Science & Mathematics	15	16.48%
Total		**91**	**100%**

DMF

Curriculum Details & Structure 2022/2023

		YEAR 1			YEAR 2		YEAR	
	Special Sem.	Sem. 1	Sem. 2	Sem. 3	Sem. 1	Sem. 2	Sem. 1	Credits
University Compulsory Courses	DIPW 2112 Appreciation of Ethics & Civilization	DKKM ***1 Co-Curriculum 1	DKKM ***1 Co-Curriculum 2		DLLW 3432 English for Marketability			14
	DIPW 1112 Leadership	DTKW 1012 Basic Cultural Entrepreneurship	DLLW 2422 English for Effective Communication					
	DLLW 1012 Foundation English							
Programme Core Course – Math, Statistics & Computing		DMFM 1283 Engineering Physics			DMFM 2273 Engineering Statistic			
		DMFM 1213 Engineering Mathematics						
		DITG 1113 Computer Programming						
		DENE 1113 Electric & Electronic Principle						
Programme Core Course – Engineering		DMFD 1323 Manufacturing Process	DMFM 1253 Engineering Material	DMFM 2122 CAD/CAM	DMFD 2822 Diploma Project 1	DMFD 2342 Quality Control	DMFU 3368 Industrial Training (16 weeks)	77
			DMFD 1133 Engineering Graphic and CADD	DMFD 1833 Applied Dynamics	DMFD 2853 Mechanics of Materials	DMFD 2512 Total Productive Maintenance		
			DMFD 1823 Statics	DMFD 1231 Engineering Seminar	DMFD 2413 Fluid Power	DMFD 2832 Diploma Project 2		
			DMFD 1843 Thermo-fluids		DMFD 2433 Instrumentation & Control	DMFD 2563 Industrial Automation		
			DMFD 1313 Manufacturing Practise		DMFD 2422 Jigs and Fixtures	DMFD 2333 CNC Technology		
						DMFD 2382 Occupational Safety and Health		
						DMFD 2513 Manufacturing Management		
Credits	6	18	18	6	18	17	8	91

SYLLABUS (BMFG)

Compulsory University Courses

Program Core Courses (Math, Statistics & Computing)

Program Core Courses (Engineering)

BMFG-Course Core

Elective Courses

BMFG-Elective 1 (IR4.0)

- BITI 2513 Introduction to Data Science ***75***
- BITM 2313 Human Computer Interaction ***75***
- BITS 3423 Information Technology Security ***76***
- BMFG 4123 Cloud Manufacturing ***76***
- BMFA 4123 Intelligent System ***77***
- BMFR 4613 Additive Manufacturing ***77***

BMFG-Elective 2

- BMFP 4113 Industrial Ergonomics ***78***
- BMFA 4113 Industrial Robotics ***78***
- BMFP 4313 Modelling and Simulation ***79***
- BMFB 4713 Green Materials and Biomaterials ***79***
- BMFS 4513 Metal Processing Technologies ***80***
- BMFB 4113 Advanced Materials ***80***

BMFG-Elective 3

- BMFA 4323 Industrial Drives System ***81***
- BMFB 4123 Materials Characterization ***81***
- BMFP 4123 Production Optimization ***82***
- BMFR 4223 Production Tools Design ***82***
- BMFS 4123 Surface Engineering in Manufacturing ***83***
- BMFR 4513 Ergonomics in Design ***83***

BMFG-Elective 4

- BMFA 4213 Mechatronics ***84***
- BMFB 4723 Nanotechnology ***84***
- BMFP 4323 Lean Six Sigma ***85***
- BMFR 4423 Concurrent Engineering ***85***
- BMFS 4523 Advanced CNC Machining ***86***
- BMFS 4113 Non-Metallic Processes ***86***

Language Electives Courses

- BLLW 1212 Arabic Language ***93***
- BLLW 1222 Mandarin Language ***93***
- BLLW 1232 Japanese Language ***94***
- BLLW 1172 Bahasa Melayu Komunikasi 1^ ***94***
- BLLW 1242 Korean Language 1 ***94***
- BLLW 1252 German 1 ***95***

General Elective

- BIPW 3112 Creative & Critical Thinking ***96***
- BIPW 4112 Organisational Communication ***96***
- BIPW 1152 Industrial and Organisational Psychology ***97***
- BIPW 4022 Negotiation Skills ***97***
- BIPW **2152** Integrity and Anti corruption ***97***

SYLLABUS (BMFI)

Compulsory University Courses

Program Core Courses (Math, Statistics & Computing)

Program Core Courses (Engineering)

BMFI-Course Core

Elective Courses

BMFI-Elective 1

- BMFI 4**3 Industrial Accounting and Finance ***87***
- BMFI 4**3 Industrial Marketing ***87***
- BMFI 4123 Economics for Decision Making ***88***
- BMFI 4**3 Strategic Innovation Management ***88***

BMFI-Elective 2

- BMFI 4**3 Information Technology Security ***89***
- BMFI 4** 3 Introduction to Data Science ***89***
- BMFI 4**3 Human Computer Interaction ***90***

BMFI-Elective 3

- BMFI 4**3 Global Operation Strategy ***91***
- BMFI 4**3 Emerging Positive Organizational Behavior ***91***
- BMFI 4**3 Optimization Models for Decision Making ***92***
- BMFP 4**3 Lean Six Sigma ***92***

BMFI-Elective 4

- Select one subject from Elective1, 2 or 3

Language Electives Courses

- BLLW 1212 Arabic Language ***93***
- BLLW 1222 Mandarin Language ***93***
- BLLW 1232 Japanese Language ***94***
- BLLW 1172 Bahasa Melayu Komunikasi 1^ ***94***
- BLLW 1242 Korean Language 1 ***94***
- BLLW 1252 German 1 ***95***

General Elective

- BIPW 3112 Creative & Critical Thinking ***96***
- BIPW 4112 Organisational Communication ***96***
- BIPW 1152 Industrial and Organisational Psychology ***97***
- BIPW 4022 Negotiation Skills ***97***
- BIPW **2152** Integrity and Anti corruption ***97***

REMARK:

*Every semester, each elective course ONLY will be offered starting from **minimum 15 students and maximum 80 students.***

**only for international students.*

SYLLABUS (DMF)

Program Core Courses

COMPULSORY UNIVERSITY COURSES
BMFG and BMFI

ENGLISH FOR ACADEMIC PURPOSES (BLLW 1142)

Course Learning Outcome

1. Apply correct grammar rules according to context.
2. Demonstrate knowledge of various reading skills in the reading tasks given.

Synopsis

This course aims to develop students' reading skills and grammar. A variety of academic reading texts and reading skills are explored to facilitate students' comprehension of the texts. These reading skills are also necessary in assisting students to master study skills. Grammar elements are taught in context to develop students' accuracy in the use of the language. This course also includes elements of blended learning.

References

- De Chazal, E., & Rogers, L. (2013). Oxford EAP: A course in English for Academic Purposes. Oxford: Oxford University Press.
- McDonald, A. & Hancock, M. (2010). English result. Oxford: Oxford University Press.
- Paterson, K. & Wedge, R. (2013). Oxford grammar for EAP. Oxford: Oxford University Press.

ACADEMIC WRITING (BLLW 2152)

Course Learning Outcome

1. Prepare clear and detailed descriptions of a product related to fields of interest.
2. Express Express arguments systematically in a composition.
3. Prepare short reviews of technical materials.

Synopsis

This course aims to equip the students with the skills to communicate clear and detailed viewpoints in writing. The students are expected to have a stand on topics of their fields by providing advantages and disadvantages to support their arguments. From time to time, consultations with the students will be conducted throughout the completion of their assignments. This serves as the formative evaluation in the course. Grammar components are embedded in the course to support the required writing skills. Blended learning is incorporated in this course.

Pre-Requisite

BLLW 1142

References

- Chazal, E.d. & Rogers, L. (2012). Oxford EAP: A course in English for Academic Purposes. New York: Oxford University Press.
- Hancock, M. & McDonald, A. (2010). English Result Upper-intermediate. New York: Oxford University Press.
- Paterson, K. & Wedge, R. (2013). Oxford Grammar for EAP. UK: Oxford University Press.

■ *Compulsory University Course (BMFG & BMFI)*
■ *Sharing Course (BMFG & BMFI)*
■ *Program Core Course (BMFG & BMFI)*
■ *Language Elective Course (BMFG & BMFI)*
■ *BMFG*
■ *BMFI*
■ *Diploma*

ENGLISH FOR PROFESSIONAL INTERACTION (BLLW 3162)

Course Learning Outcome

1. Listen and infer based on situations in context.
2. Respond to standard spoken language using communication strategies.
3. Display detailed descriptions by expanding and supporting points of view using relevant examples.

Synopsis

This course which is designed based on a blended and student-centred learning approach aims to develop students' listening skills as well as communication skills and strategies. Among the elements covered are professional interactions that include group discussion and public speaking. Students are also required to express ideas with relevant examples in public speaking and online assessments. They are also exposed to the rudiments of grammar implicitly via the communicative activities.

Pre-Requisite

BLLW2152

References

- Fry, R. (2016). 101 smart questions to ask on your interview. U.K.: New Page Books.
- Cooper, S. (2016). 100 tricks to appear smart in meetings: How to get by without even trying. Andrews McMeel Publishing.
- Hood, J.H. (2013). How to book of meetings: A complete guide for every business. South Australia: Magill.

TECHNOLOGICAL ENTREPRENEURSHIP (BTMW 4012)

Course Learning Outcome

1. Recognize the importance of entrepreneurship, the role of entrepreneurship in today's society, and the technical knowledge of the entrepreneurial process.
2. Explain the basic concepts of interdisciplinary competences in management, and create technology-based businesses.
3. Present a business plan project and develop an entrepreneurial profile.

Synopsis

The course provides students with technological knowledge about entrepreneurship as well as the skills to turn such knowledge into practice. The teaching and learning (T&L) activities include case study and field work with the aim to inculcate entrepreneurship values and entrepreneurship acculturation with a view to successfully launch and subsequently manage their enterprises. Students will be exposed with the support systems available or government agencies in starting new ventures, including the tactics commonly employed by entrepreneurs starting a business. The subject allows students to critically evaluate business in terms of technical feasibility, investment potential, and risks.

References

- Barringer, B. R, and Ireland, R. D., 2012, Entrepreneurship 4th Edition. Pearson.
- Scarborough, N. M., 2011, Essentials of Entrepreneurship and Small Business Management 6th.Edition. Pearson.
- UiTM Entrepreneurship Study Group. Revised Edition, 2010, Fundamentals of Entrepreneurship. Pearson.

■ *Compulsory University Course (BMFG & BMFI)*
■ *Program Core Course (BMFG & BMFI)*
■ *BMFG*
■ *BMFI*
■ *Sharing Course (BMFG & BMFI)*
■ *Language Elective Course (BMFG & BMFI)*
■ *Diploma*

APPRECIATION OF ETHICS AND CIVILISATION (PENGHAYATAN ETIKA DAN PERADABAN) (BIPW 2132)

Hasil Pembelajaran Kursus

① Menerangkan konsep etika dan peradaban dalam konteks penghaytannya mengikut acuan Malaysia.
② Membincangkan system, tahap perkembangan, kemajuan social dan kebudayaan merentas budaya.
③ Menghubung kaitkan isu kontemporari berkaitan ekonomi, politik, social, budaya dan alam sekitar daripada perspektif etika dan peradaban.

Sinopsis

Kursus ini mempersiapkan pelajar untuk menghayati etika dan peradaban yang wujud dalam masyarakat kepelbagaian etnik di Malaysia untuk memperteguhkan pemikiran kritikal dan analitikal mereka bagi menangani kehidupan yang lebih mencabar. Pengisian kursus ini memfokuskan kepada penghayatan etika dan peradaban dalam acuan Malaysia. Pelajar akan didedahkan dengan dinamika konsep etika dan peradaban yang menjadi kekuatan kepada pembentukan negara Malaysia berdasarkan susur masa evolusi sejarahnya dari era pra-kolonial sehingga ke pasca-kolonial. Kefahaman tentang pembentukan etika dan peradaban dalam masyarakat kepelbagaian dibincangkan bagi meningkatkan penghayatan etika dan peradaban ke arah pemantapan kesepaduan nasional dan bangsa Malaysia. Peradaban acuan Malaysia perlu dikupas serta diperdebatkan dalam aktiviti akademik berpandukan Perlembagaan Persekutuan sebagai tapak integrasi dan wahana etika dan peradaban. Pembinaan kesepaduan nasional amat dipengaruhi oleh globalisasi dan perkembangan teknologi maklumat dan komunikasi yang kompleks. Oleh kerana itu, penghayatan etika dan peradaban menzahirkan perilaku tanggungjawab sosial dan digerakkan pada peringkat individu, keluarga, komuniti, masyarakat dan negara. Justeru, perubahan yang berlaku dalam masyarakat dan pembangunan langsung ekonomi telah membawa cabaran baru dalam mengukuhkan kelestarian etika dan peradaban di Malaysia. Amalan Pendidikan Berimpak Tinggi (HIEPS) dipraktikkan dalam pengajaran dan pembelajaran bagi mendalami kursus ini.

Rujukan

- Baharudin, S.A. (Ed). (2012). Modul Hubungan Etnik (2nd ed.). Bangi: Institut Kajian Etnik, UKM.
- Nazri Muslim. (2020) Islam dan Melayu dalam Perlembagaan: Tiang Seri Hubungan Etnik di Malaysia. Edisi Kedua. Bangi: Penerbit UKM.
- Shamsul Amri Baharuddin. (2008). Many Ethnicities, Many Cultures, One Nation: The Malaysian Experience. UKM Ethnic Studies Paper Series No. 2 (November).

MALAYSIAN CULTURE^ (BIPW 2122)

Course Learning Outcome

① Analyse the general issues related to Malaysian culture.
② Report the scenario of cultural diversity in Malaysia.
③ Explain the comparison between Malaysian culture with their home countries in various aspects

Synopsis

This subject exposes international students to the socio-cultural background of Malaysia which includes ethnic composition, religions, traditions and values. Other elements like music, arts, cuisine, costume, ethnic games, celebrations and national festivals are also highlighted. Student Centered Learning (SCL) methods such as group discussion and presentation will be used in order to assist international students in developing their understanding and appreciation of Malaysian culture.

^For International Students Only

- *Compulsory University Course (BMFG & BMFI)*
- *Sharing Course (BMFG & BMFI)*
- *Program Core Course (BMFG & BMFI)*
- *Language Elective Course (BMFG & BMFI)*
- *BMFG*
- *BMFI*
- *Diploma*

PHILOSOPHY OF CURRENT ISSUE (FALSAFAH DAN ISU SEMASA) (BIPW 1132)

Hasil Pembelajaran Kursus

① Menjelaskan isu semasa berlandaskan ilmu falsafah, Falsafah Pendidikan Kebangsaan dan Rukun Negara.MQF 4 (C3)
② Menghuraikan isu semasa berdasarkan aliran pemikiran utama dalam pelbagai aliran falsafah.MQF 3B (A2)
③ Menganalisis isu semasa melalui perspektif perbandingan falsafah sebagai asas bagi menjalinkan dialog antara budaya.MQF 4 (A3)

Sinopsis

Kursus ini merangkumi hubungan ilmu falsafah dengan Falsafah Pendidikan Kebangsaan dan Rukunegara. Penggunaan falsafah sebagai alat untuk memurnikan budaya pemikiran dalam kehidupan melalui seni dan kaedah berfikir serta konsep insan. Topik utama dalam falsafah iaitu epistemologi, metafizik dan etika dibincangkan dalam konteks isu semasa. Penekanan diberi kepada falsafah sebagai asas bagi menjalin dialog antara budaya serta memupuk nilai sepunya. Di hujung kursus ini, pelajar akan mampu melihat disiplin-disiplin ilmu sebagai satu badan ilmu yang komprehensif dan terkait antara satu sama lain.

Rujukan

- Dzulkifli A. R. dan Rosnani H. (Eds). (2019). Pentafsiran Baharu Falsafah Pendidikan Kebangsaan dan Pelaksanaannya Pasca 2020. Kuala Lumpur: IIUM
- Osman Bakar (2019). Classification of Knowledge in Islam: A Study in Islamic Schools of Epistemology. Kuala Lumpur: IBT
- Shaharir Mohamad Zain (2018), Falsafah Ilmu Daripada Karya-Karya Besar Sains dan Matematik Islam Malayonesia, Akademi Kajian Ketamadunan.
- Maszlee Malik (2017). Foundation of Islamic Governance : A Southeast Asian Perspective (1st Ed). London & New York : A Routledge.
- Osman Bakar (2016). Qur'anic Pictures of the Universe: The Scriptural Foundation of Islamic Cosmology. Kuala Lumpur: UBD dan IBT.
- Shaharir Mohamad Zain (2012), Berakhir Sudahkah Ilmu Dalam Acuan Sendiri? Kuala Lumpur: Pusat Dialog Peradaban UM.
- Tajul Ariffin Noordin (1993). Perspektif Falsafah dan Pendidikan di Malaysia. Kuala Lumpur: Dewan Bahasa dan Pustaka.

MALAYSIAN STUDIES^ (BIPW 1122)

Course Learning Outcome

① Analyse the historical and cultural heritage, political and economic scenario in Malaysia.
② Integrate the comparison between Malaysian achievement with their home countries in various aspects.

Synopsis

Students are exposed to a wealth of information on Malaysia. They will gain information on Malaysian's historical background, political system and socioeconomic structure. Additionally, this subject highlights the Malaysian government's development plans and major policies in economic, industrial and socio-cultural aspects. It also gives emphasis on the attitude and commitment of the Malaysian government towards the regional and international issues as reflected in its foreign policy.

^For International Students Only

■ *Compulsory University Course (BMFG & BMFI)*
■ *Program Core Course (BMFG & BMFI)*
■ *BMFG*
■ *Sharing Course (BMFG & BMFI)*
■ *Language Elective Course (BMFG & BMFI)*
■ *BMFI*
■ *Diploma*

PROGRAM CORE COURSES (MATH, STATISTICS & COMPUTING)

ENGINEERING MATHEMATICS 1 (BMFG 1313)

Course Learning Outcome

1. Describe the fundamental concepts of matrices, eigenvalues and eigen vector, complex numbers, interpolation, differentiation, integration and vector-valued functions
2. Solve the mathematical problems that involve matrices, eigenvalues and eigenvector, complex numbers, interpolation, differentiation, integration and vector-valued functions by using an appropriate technique.
3. Apply the knowledge of engineering mathematics to deal with the engineering problems.

Synopsis

This course is a blend of analytical and numerical approaches that mainly focusing on the matrices, nonlinear equations, eigenvalues and eigen vectors, complex numbers, interpolation, differentiation, integration and vector valued functions.

References

- James, G., Modern Engineering Mathematics, 5th edition, Pearson, 2015.
- Khoo, C.F., Sharifah Sakinah, S. A., Zuraini, O. and Lok, Y.Y., Numerical Methods, 3rd edition, Pearson Prentice Hall, 2009.
- Muzalna M.J, Irma Wani J., Rahifa R. and Norazlina A.R., Engineering Mathematics, 2nd edition, Prentice Hall, 2009.

COMPUTER PROGRAMMING (BITG 1233)

Course Learning Outcome

1. Describe the fundamental principles of problem solving, programming techniques and structures in program development.
2. Interrelate the principles of problem solving and programming techniques to solve given problems.
3. Construct computer program codes by applying suitable programming structures and techniques.

Synopsis

This course covers the introductory topics in programming using C++ language. It includes the introduction to computers and programming, the fundamentals of programming, problem solving and software development. Data types and operators, selection, repetition, function, array, file, structured data and pointer are among the topics covered in the course.

References

- Gaddis, T., 2011, Starting Out with C++ Brief Version: From Control Structures Through Objects 7th Edition", Pearson Education.
- Abdullah, N. et. al, 2014, Lab Module Computer Programming BITG 1113, FTMK, UTeM.
- Friedman, K., 2011, Problem Solving, Abstraction and Design using C++, 6th Edition, Pearson Education.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG*
Sharing Course (BMFG & BMFI) | *Language Elective Course (BMFG & BMFI)* | *BMFI*
Diploma

DIFFERENTIAL EQUATION (BMCG 1013)

Course Learning Outcome

1. Describe the basic concept and solution of second order differential equations, Laplace transform and Fourier series.
2. Select an appropriate technique to solve problems involving differential equations.
3. Apply the concept of differential equations in solving engineering problems.

Synopsis

This course is intended to introduce the concept and theories of differential equations. Second order linear differential equations with constant coefficients will be solved by using the methods of undetermined coefficient, variation of parameters and Laplace transform. Fourier series in relation to periodic functions will be discussed. An introduction to the solution and application of partial differential equations with boundary value problems using the method of separation of variables and Fourier series will also be discussed.

References

- Muzalna M. J., Irmawani J., Rahifa R., Nurilyana A. A., 2010, *Module 2: Differential Equations*, Penerbit UTeM.
- Cengel Y. A. & Palm W. J., 2013, Differential Equations for Engineers and Scientists, 1st Ed. McGraw-Hill., U.S.A.
- Nagle R. K., Saff E. B. & Snider A. D., 2011, Fundamentals of Differential Equations and Boundary Value Problems, 6th Ed. Pearson Education Inc., U.S.A.

ENGINEERING STATISTICS (BENG 2143)

Course Learning Outcome

1. Apply the concepts of data description and probability, normal and sampling distributions, estimation and hypothesis testing, ANOVA, regression and nonparametric tests to solve mathematical problems.
2. Analyze engineering data using descriptive statistics.
3. Deduce statistical inference for engineering problems by using the techniques of estimation, hypothesis testing and regression.

Synopsis

This subject comprises of several topics such as data description and probability, normal and sampling distributions, estimation and hypothesis testing for one and two populations, ANOVA, simple linear regression, multiple linear regression, polynomial regression, non-parametric statistics and statistical software application.

References

- Prem S. M., 2016, Introductory Statistics Using Technology, 9th Edition, John Wiley.
- Douglas C. M., George C. R., 2013, Applied Statistics and Probability for Engineers, 6th Edition, John Wiley.
- Richard J., John F., Irwin M., 2017, Probability and Statistics for Engineers, 9th Edition, Pearson – Prentice Hall.

■ *Compulsory University Course (BMFG & BMFI)*
■ *Sharing Course (BMFG & BMFI)*
■ *Program Core Course (BMFG & BMFI)*
■ *Language Elective Course (BMFG & BMFI)*
■ *BMFG*
■ *BMFI*
■ *Diploma*

ENGINEERING MATHEMATICS 2 (BEKG 2443)

Course Learning Outcome

1. Describe the fundamental concepts of multivariable functions, multiple integrals and vector calculus
2. Solve the mathematical problems that involve function of several variable, multiple integrals and vector calculus.
3. Apply the knowledge of advanced engineering mathematics to deal with the engineering problems.

Synopsis

This course introduces errors; solution of nonlinear equations; solution of linear systems; interpolation and curve fitting; eigenvalues and eigenvectors; numerical differentiation; numerical integration; solution of ordinary differential equations; solution of partial differential equation; introduction to SCILAB and its application in the numerical computations.

References

- Burden R. And Faires J.D., 2011, Numerical Analysis, 9th edition, USA: Brooks/Cole, Cengage Learning.
- Khoo C.F., 2011, Using SCILAB for Numerical Methods, Module in preparation.
- Chapra S.C. and Canale R.P., 2010, Numerical Methods for Engineers, 6th edition, New York: McGraw-Hill.

Compulsory University Course (BMFG & BMFI)
Program Core Course (BMFG & BMFI)
BMFG
Sharing Course (BMFG & BMFI)
Language Elective Course (BMFG & BMFI)
BMFI
Diploma

PROGRAM CORE COURSES (ENGINEERING)
BMFG and BMFI

ENGINEERING GRAPHICS AND CADD (BMCG 1523)

Course Learning Outcome

1. Explain the engineering graphics fundamentals.
2. Construct technical drawing using manual sketching and computer aided design.
3. Communicate by using engineering drawings.

Synopsis

The purpose of this course is to provide students with an understanding of the importance of engineering graphic communication to the design process and interpreting the engineering drawings. Students will gain hands-on experience creating freehand technical sketches and CAD technical drawings using orthographic projections, section auxiliary views and isometric drawings. Emphasis is placed on creating drawing that are neat, correctly dimensioned using industry standards. Students will use freehand sketches methods and CAD software to develop visualisation skills and create the engineering drawings.

References

- Giesecke, Mitchell, Spencer, Hill, Dygdon, Novak and Lockhart, Technical drawing with Engineering Graphics, Pearson, 2010.
- Dix Riley, Discovering AutoCAD 2009, Pentice Hall, 2009.
- Zolkarnain Marjom, Hassan Attan, Engineering Graphics & CADD, for Engineering Students, 2008.

STATICS (BMCG 1113)

Course Learning Outcome

1. Describe and apply the basic concepts and fundamental principles of engineering mechanics (statics).
2. Analyze and solve equilibrium problems of particle.
3. Analyze and solve equilibrium problems of rigid body.

Synopsis

The engineering mechanics of statics provides an introduction and the basic concept of statics as physical sciences, system of units, scalars and vectors, Free Body Diagram, forces system, force system resultants and moment, equilibrium of a particle, equilibrium of a rigid body, structural analysis (trusses analysis and simple frames and machines), friction and center of gravity and centroid.

References

- Hibbeler R.C., 2015, Engineering Mechanics – Statics, 13th Ed., Prentice Hall.
- Beer F.P and Johnston. E.R. 2011, Statics and Mechanics of Materials, McGraw-Hill.
- Morrow H.W., 2011, Statics and Strength of Materials, Prentice Hall.

Compulsory University Course (BMFG & BMFI)
Program Core Course (BMFG & BMFI)
BMFG
Sharing Course (BMFG & BMFI)
Language Elective Course (BMFG & BMFI)
BMFI
Diploma

ENGINEERING MATERIALS (BMFG 1213)

Course Learning Outcome

1. Explain the basic concepts of engineering materials in terms of interatomic bonding and crystal structure.
2. Analyze the properties of engineering materials based on its structure.
3. Describe the processing methods for engineering materials.

Synopsis

This course introduces basic concepts of engineering materials that covers introduction to engineering materials, interatomic bonding, crystalline structure, as well as imperfections and diffusion in solid. Introduction to the binary phase diagrams are also provided. Explanation on different types of engineering materials (i.e. Metals, ceramics, polymers, composites, and functional), its mechanical properties, basic processing, and applications are also included.

References

- Callister, W.D. Jr., 2014, Materials Science and Engineering - An Introduction, 9th Edition. John Wiley & Sons Inc.
- Askeland, D.R., Fulay, P.P. and Wright, W.J., (2012), The Science and Engineering of Materials, 6th edition. Thomson.
- Smith, W.F. (2010) Principle of Materials Science & Engineering, 5th edition, Mc. Graw Hill.

PRINCIPLE OF ELECTRIC & ELECTRONICS (BEKG 1123)

Course Learning Outcome

1. Explain the basic principles of electrical and electronics such as the electrical terminologies and components, series and parallel circuit configurations, ohms law, voltage and current divider rules, and Kirchoff laws.
2. Analyse basic electric DC circuits using nodal and mesh analysis methods.
3. Apply diodes (two terminal semiconductor device) in rectifier, clipper and clamper circuits.
4. Perform analysis to the circuits used in BJT, FET and Op-Amp amplifier applications.

Synopsis

This course will discuss about the basic principles of electrical and electronics; Introduction to electric element, symbol and components. KCL, KVL, Node and Mesh in solving DC series and parallel circuit. Introduction in magnetism, electromagnetism and AC characteristic. Introduction to semiconductors, atomic structures, energy band, P-type and N-type. Study on structure, principle and application of diode, BJT and Op-Amp circuits.

References

- Thomas L. F., 2010, Principles of Electric Circuits, Pearson, 9th Ed.
- Thomas L. F. and David M. B., 2010, Electric Circuits Fundamentals, Pearson, 8th Ed.).
- Boylestad, R.L., Nasheslsky, L, 2010, Electronic Devices and Circuit Theory, Pearson Prentice Hall.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG* | *BMFI* | *Sharing Course (BMFG & BMFI)* | *Language Elective Course (BMFG & BMFI)* | *Diploma*

PRINCIPLES OF INSTRUMENTATION & MEASUREMENT (BEKG 1233)

Course Learning Outcome

1. Describe the principle, various terms and standards in measurement.
2. Explain the principle of measurement devices.
3. Apply the suitable bridge techniques to measure component values such as resistance, inductance and capacitance.
4. Explain the operation, function and applications of transducers/sensors.

Synopsis

This subject discusses about units and dimensions, standards, errors, static characteristic, noise and calibration in measurement. It covers most on the measurement devices such as galvanometers, ammeters, voltmeters, wattmeter, temperature, force and torque and pressure measurement as well as accelerator meter. It also introduces oscilloscope and sensors for instrumentation application.

References

- Kalsi, H.S., 2010, Electronic Instrumentation, 3rd Ed., Tata McGraw Hill.
- Bakshi, U.A, Bakshi, A.V. and Bakshi, K.A., 2009, Electronic Measurements and Instrumentation, Technical Publications Pune.
- Wolf, S., Richard, F.M., 2004, Reference Manual for Electronic Instrumentation Laboratories 2nd Ed., Prentice-Hall.

ELECTRICAL SYSTEMS (BEKG 2433)

Course Learning Outcome

1. Explain the concept of electrical power system components (generation, transmission, and distribution), various power generation systems and energy sources.
2. Analyze the basic principle of electrical system (single and three phase system) including power factor correction.
3. Analyze the characteristics of electric machine principles, including AC synchronous generator and transformer.
4. Analyze the characteristics and performance of electrical transmission line and distribution system.

Synopsis

This is an introductory course for students on fundamental knowledge of electrical power system. The students will be taught on the physics of electrical power system, which includes the theory and analysis of electromagnetism, followed by power concepts & equations (single and three phase), power factor & power factor corrections, single and three-phase system and per-unit calculation. There will also topics on characteristics for static and rotating electric machine principles, including AC, DC, synchronous, induction motor and transformer. Furthermore, students will be introduced to the concepts on the electric power system network (generation, transmission and distribution) and various power generation system and energy sources. Students will also learn on basic characteristics and performance of electrical transmission line and distribution system.

References

- Glover, Sarma & Overbye, 2012, Power System Analysis and Design, 5th ed., Cengage Learning
- Saadat, H., 2004, Power System Analysis, 2nd ed., Mc-Graw Hill.
- Hughes, 2008, Electrical and Electronic Technology, 10th Edition, UK, Pearson Edu. Ltd

Compulsory University Course (BMFG & BMFI)
Program Core Course (BMFG & BMFI)
BMFG
BMFI
Sharing Course (BMFG & BMFI)
Language Elective Course (BMFG & BMFI)
Diploma

ENGINEERING ECONOMY & MANAGEMENT (BMFG 3213)

Course Learning Outcome

1. Explain the principles and terminology of engineering economy, concepts of time value of money, and risk planning.
2. Apply the concepts, principle and techniques in project management and engineering economy.
3. Analyze complex problems and scenario using engineering economy factors (F/P, P/F, P/A, A/P, F/ A, A/F, P/G, A/G factors).
4. Evaluate and select between alternatives using suitable methods such as Present Worth, Future Worth, Annual Worth Analysis; Breakeven & Payback Analysis.
5. Evaluate the project risk in engineering project.

Synopsis

This course covers engineering economics and managing risk in an organization. Engineering economics discusses about the time value of money and interest relationships, which are useful to define certain project criteria that are utilized by engineers and project managers to select the best economic choice among several alternatives. Projects examined will include both product and service-producing investments. The effects of escalation, inflation, and taxes on the economic analysis of alternatives are also discussed. Management of risk incorporates the concepts of probability and statistics in the evaluation of alternatives. This allows management to determine the probability of success or failure of the project.

References

- Blank, L and Tarquin, A., 2018, Engineering Economy, 8th Edition, McGraw Hill.
- Sullivan, W.G., Wicks, E.M., and Koelling, C.P., 2018, Engineering Economy, 17th Edition, Pearson.
- Park C.S., 2018, Contemporary Engineering Economics, 5th Edition, Pearson.

INTEGRATED DESIGN PROJECT (BMFU 3223)

Course Learning Outcome

1. Design solution by synthesizing manufacturing engineering knowledge that will solve complex manufacturing engineering problem in accordance with relevant standards.
2. Utilize modern engineering and IT tools in facilitating solutions to complex manufacturing engineering problems with an understanding of the limitations.
3. Evaluate the impact of the design product, component or processes in term of safety, environmental and sustainability factors.
4. Demonstrate effectively teamwork skill in completing the IDP.
5. Apply project management and financial knowledge effectively in completing the IDP.

Synopsis

With integrated design project focuses on integration of learning principles in multidisciplinary application for a product design project and prototype development that include marketing, concept design, material selection, process selection and sustainability, project management, and manufacturing cost. As a result students will gain appreciation for the interdisciplinary cooperation and for the complex and essential roles played by various members of the product development teams. This design project applies team-based approach. Students are expected to be exposed to complex and essential team roles during the development of the design project. Emphasize is also given on issues related to material selection using CES Edupack, quality of the prototypes produced and marketability of the design projects.

References

- Ulrich, K. T. and Eppinger, Steven D., 2016, Product Design and Development, 6th edition, Mc Graw Hill.
- Chitale, A. K. and Gupta, R. C., 2014, Product Design and Manufacture, 6th edition, Prentice Hall, New Delhi, India.
- Kalpakjian, S. and Schmid, S. R., 2013, Manufacturing Engineering & Technology.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG*
Sharing Course (BMFG & BMFI) | *Language Elective Course (BMFG & BMFI)* | *BMFI* | *Diploma*

INDUSTRIAL TRAINING (BMFU 3935)

Course Learning Outcome

1. Apply skills and knowledge on engineering fundamentals.
2. Analyze and/or solve engineering related problems in industry using methods, tools and techniques learnt at the university
3. Demonstrate ethique and professionalism in engineering practice.
4. Able to communicate effectively with the technical community and produce effective reports and presentations.

Synopsis

Industrial training is a compulsory component for degree program students at Universiti Teknikal Malaysia Melaka (UTeM). The experiences and skills acquired from a period of placement can be invaluable and provide the advantage to the students when applying for employment after graduation. During the training period with the relevant industry, students are expected to involve in the following areas of training in order to achieve the underlying objectives, such as; Manufacturing / production process and / or its optimization process, Mechanical design and product / system development, Maintenance and repair of machineries or equipments, and Product testing & quality control. After completing those training, the students are expected to possess a certain level of "hands – on practical experience" related to their own field of studies particularly.

References

- Portal Universiti Teknikal Malaysia Melaka, https://portal.utem.edu.my/iclm/, portal UTeM Industrial Training System.

BACHELOR DEGREE PROJECT 1 (BMFU 4912)

Course Learning Outcome

1. Identify the problem statement, objectives and scope of project.
2. Choose appropriate methodology to solve complex engineering problem based on relevant literature review.
3. Demonstrate ethical principles, responsibilities and norms of engineering practice.
4. Demonstrate knowledge and principles of finance and project management.
5. Communicate effectively on complex engineering activities and write effective reports.

Synopsis

This course refers to individual project in student's area of specialization under the guidance of a supervisor. The work includes designing, evaluating, and analyzing components, assemblies, and systems. Develop products/ manufacturing techniques demonstrating state- of- the- art technology. A written proposal, one or more written progress reports, and final written report are required. An oral presentation is required upon completion of the course.

References

- Student Guidelines for Final Year Project, Fakulti Kejuruteraan Pembuatan, Universiti Teknikal Malaysia Melaka. https://fkp.utem.edu.my/en/about.html

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG*
Sharing Course (BMFG & BMFI) | *Language Elective Course (BMFG & BMFI)* | *BMFI* | *Diploma*

BACHELOR DEGREE PROJECT 2 (BMFU 4924)

Course Learning Outcome

1. Design solutions, systems, components or processes for complex engineering problems that are sustainable and meet specified requirements.
2. Investigation complex problems using research based knowledge, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
3. Demonstrate ethical principles, responsibilities and norms of engineering practice.
4. Engage in life-long learning activities and acquire basic knowledge on entrepreneurship.
5. Communicate effectively on complex engineering activities and write effective reports.

Synopsis

This course refers to individual project in the student's area of specialization under the guidance of supervisors. The work includes designing, evaluating, and analyzing components, assemblies, and systems. Develop products/ manufacturing techniques demonstrating state- of- the- art technology. A written proposal, one or more written progress reports, and final written report are required. An oral presentation is required upon completion of the course.

Pre-Requisite

BMFU 4912

References

- Student Guidelines for Final Year Project, Fakulti Kejuruteraan Pembuatan, Universiti Teknikal Malaysia Melaka. https://fkp.utem.edu.my/en/about.html

ENGINEER AND SOCIETY (BMFU 4322)

Course Learning Outcome

1. Relate the effect and impact of technology on society, culture and environment.
2. Demonstrate as a responsible professional, abiding to the code of professional ethics.
3. Demonstrate effectively the assignment given in a group or individual.
4. Response critically and handle social, cultural and global issues as well as environment, occupational health & safety issues.

Synopsis

This course looks into the role of engineer in nation building, evaluation of engineering, role of engineers in society, laws related to public safety, health & welfare, future engineers, professionalism and codes of ethics, engineering as a profession, ethical theories, IEM and BEM code of ethics. Topics covered also include ethical problem solving techniques, analysis of issues in ethical problems, line drawing, flow charting, handling of conflicting problems, bribery and acceptance of gifts, ethics practice in Occupational Safety and Health at work, rights and responsibilities of engineers, quality from engineering perspective, career guidance and project management.

References

- Charles B. F., 2008, Engineering Ethics, 3rd Ed, Prentice Hall.
- Canning, J., Workplace Safety for Occupational Health and Safety (Safety at Work Series V4), 2007.
- Idrus, A., Shaharin A. S., Khamidi, M. F., 2010, *Engineers in Society*, Mc Graw Hill Education.

Compulsory University Course (BMFG & BMFI)
Sharing Course (BMFG & BMFI)
Program Core Course (BMFG & BMFI)
Language Elective Course (BMFG & BMFI)
BMFG
BMFI
Diploma

ENGINEERING SEMINAR (BMFU 4321)

Course Learning Outcome

1. Recognize the need for life-long learning in the careers of professionals in the field of manufacturing engineering.
2. Recognize the range of career option available.
3. Demonstrate the ability to discuss range of contemporary issues impacting engineering professionals.
4. Discuss the role of professional societies in the careers of professionals in the field of manufacturing engineering.

Synopsis

The main purpose of this course is to instill the recognition of the need for and the ability to engage in life-long learning among students. Through presentation by invited speakers from the industry and academia, students will be exposed to topics such as professional engineering bodies and knowledge of in contemporary issues in related engineering fields. Presentation by successful alumni describing how their careers developed after obtaining their undergraduate degrees will also be included.

- *Compulsory University Course (BMFG & BMFI)*
- *Sharing Course (BMFG & BMFI)*
- *Program Core Course (BMFG & BMFI)*
- *Language Elective Course (BMFG & BMFI)*
- *BMFG*
- *BMFI*
- *Diploma*

COURSE CORE
BMFG & BMFI

MANUFACTURING WORKSHOP (BMFS 1122)

Course Learning Outcome

1. Describe and demonstrate proper use of basic engineering equipment and requirement.
2. Produce product based on technical drawing.
3. Fabricate products that meet specific tolerance.

Synopsis

The practice consists of introduction to basic knowledge of using manual hand tools, cutting tools, machine tools, welding, fabrication, fitting, casting and milling. This course introduces common equipment for performing manufacturing works such as: Lathe and milling machine, arc welding, sheet metal forming, basic foundry, etc.

References

- Kalpakjian, S and Schmid, R., 2013, Manufacturing Engineering and Technology, 7th Edition, Prentice Hall.
- Mikell P. G. (2012) Fundamental of Modern Manufacturing, Prentice Hall Intl. Edition.
- Kibbe, R., Meyer, R.O., Needy, J.E. and White,W.T. (2009) Machine Tool Practices. 5th Edition, Prentice Hall.

STRENGTH OF MATERIALS (BMFB 1223)

Course Learning Outcome

1. Apply basic concepts and fundamental principles of strength of materials.
2. Solve for stress, strain and deformation associated with axial loading, torsional loading and combined stresses, based on statically determinate and indeterminate structures.
3. Analyze stress, strain and deformation of structural members subjected to bending.

Synopsis

This course covers introduction to the concept of stress, strain and deformation of various structural members subjected to tension, compression, torsion, and bending to solve problems related to isotropic elasticity. Free body diagram (FBD) for rigid bodies, 2-D and 3-D structures, frames and machines are important to set up equilibrium equations (i.e. Forces and moments) in order to identify stress or strain at a point in solving problems related to engineering structures. Determination of principal stresses and angles, maximum shearing stresses and angles and the stresses acting on any arbitrary plane within a structural element using Mohr's Circle is also included in this course.

References

- Russell C. Hibbeler, 2017, Mechanics of Materials in SI units 10th edition, Pearson.
- Ferdinand P. Beer, E. Russel Johnston Jr, John T. Dewolf, David F. Kazurek, 2014, Mechanics of Materials 7th edition, Mc Graw Hill.
- William F. Riley, Leroy D. Sturges, Don H. Morris, 2007, Mechanics of Materials, 6th edition, Wiley.

Compulsory University Course (BMFG & BMFI)
Program Core Course (BMFG & BMFI)
BMFG
BMFI
Sharing Course (BMFG & BMFI)
Language Elective Course (BMFG & BMFI)
Diploma

ENGINEERING LABORATORY 1 (BMFB 1221)

Course Learning Outcome

1. Perform laboratory experiments on engineering materials and statics.
2. Write sufficient technical reports on engineering materials and statics experiments.

Synopsis

Engineering Laboratory 1 consists of laboratory works combining the engineering materials and statics fundamentals. In the engineering materials session, clear understanding of welding metallurgy related to robot welding process and engineering materials properties characterization (standard engineering materials laboratory testing) will be provided. In addition, students will also be exposed to the fundamental relationship between robot welding process parameters (current, voltage, speed) structure and properties of the materials focusing on welding metallurgy. Through the engineering statics laboratory, the students will be conducting three experiments related to the topics what they have learned in the lectures. Examples of experiments include equilibrium of a particle, force system resultants (moment), and dry friction. In overall, emphasis will be placed on safe laboratory practices, proper methodology of data recording and skillful technical writing of reports.

References

- Kalpakjian, S. and Schimd, R. (2013) Manufacturing Engineering and Technology, 5th Edition, Prentice Hall.
- Hibbeler R.C., (2013) Engineering Mechanics – Statics, 13th Edition, Prentice Hall.
- Beer F.P and Johnston E.R., (2011) Statics and Mechanics of Materials, McGraw-Hill.

MANUFACTURING PROCESS (BMFS 2613)

Course Learning Outcome

1. Describe characteristics of manufacturing processes applied in the industry.
2. Analyze the capability of various manufacturing processes in products development.
3. Develop various skills and techniques in manufacturing process as an individual or in a group.

Synopsis

This course introduces students to manufacturing activities that mainly focus on metal removal, metal forming, shaping processes and joining process. For metal removal processes, students will be taught the fundamental concept of cutting, cutting tool materials and cutting fluids. It also includes the machining processes used to produce round shapes such as lathe operation, boring, drilling, reaming and tapping. For producing other shapes using milling, shaping, broaching and sawing processes, filling operation will be required. Besides, the students will be provided with a clear understanding of metal forming and metal shaping processes such as rolling, forging, extrusion, drawing of metals and sheet metal forming. Student will also be exposed to various welding processes.

References

- Kalpakjian, S and Schmid, R., 2013, Manufacturing Engineering and Technology, 5th Edition, Prentice Hall.
- Mikell P. Groover, Introduction to Manufacturing Processes, 3rd Edition, Mc Graw-Hill International Editions, 2011.
- Rao, P.N., 2013, Manufacturing Technology – Metal Cutting and Machine Tool, Mc Graw Hill.

Compulsory University Course (BMFG & BMFI)
Sharing Course (BMFG & BMFI)
Program Core Course (BMFG & BMFI)
Language Elective Course (BMFG & BMFI)
BMFG
BMFI
Diploma

THERMO FLUIDS (BMFR 2213)

Course Learning Outcome

1. Determine the thermodynamic properties of pure substances using tables of property data.
2. Apply the thermodynamic First Law and Second Law to evaluate the performance of thermal systems.
3. Apply the basic concepts of fluid mechanics and heat transfer to solve engineering problems.

Synopsis

The course is given to introduce the student to the basic engineering of thermodynamics that involved study on the energy transformation, working fluids, theory and application of first and second laws of thermodynamics. The course also covers explanation on the steam and gas power plant as a direct application of the thermodynamic theory. Fundamental of heat transfer is also given to expose student to the many practice examples of the thermodynamics principles. The other phase of this course is to introduce the students to the basic of fluid mechanics. The course covers the study of the fluid static and dynamic analysis, buoyancy and stability, bernoulli equation, momentum principle and flow behavior.

References

- Cengel, Y.A., Turner, R.H., Cimbala, J.M., 2017, 5th Edition in SI Units, "Fundamentals of Thermal-Fluid Sciences", McGraw Hill, New York.
- Young, D.F., Young, B.R., Munson, T.H., Okiishi, 2018, "Fundamental of Fluid Mechanics", 8th Edition, John Wiley & Sons, Inc.
- Cengel, Y.A., Michael, A.B., (2018), 9th edition, Thermodynamics, an Engineering Approach, Mc Graw Hill, New York.

DYNAMICS (BMFA 2123)

Course Learning Outcome

1. Solve engineering dynamics problems using kinematics and equations of motion.
2. Apply concepts of of energy-work done, as well as linear and angular impulse-momentum.
3. Analyse the dynamics of particle and rigid body either by using the theory of force and acceleration, work and energy, and/or impulse and momentum

Synopsis

The course develops student's ability to solve a range of problems in engineering dynamics. Dynamics involves the action of forces ona system in motion. Topics covered include kinematics, force and acceleration, work and energy, and impulse and momentum formulations for particle and rigid body. Students are expected to have fundamentals in engineering statics, algebra, trigonometry, and calculus.

References

- Russell C. Hibbeler, 2013 , Engineering Mechanics: Dynamics, 13th Edition, Prentice Hall.
- Ferdinand P. Beer, E. Russell Johnston Jr., Phillip J. Cornwell, 2013, *Vector Mechanics for Engineers: Dynamics,* 10th Edition, New York, NY: McGraw-Hill.
- Meriam, J.L., Kraige, L.G. 2013, *Engineering Mechanics: Dynamics,* 6th Edition, New York, NJ: John Wiley & Sons.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG* | *BMFI* | *Sharing Course (BMFG & BMFI)* | *Language Elective Course (BMFG & BMFI)* | *Diploma*

ADVANCED MANUFACTURING PROCESS (BMFS 2623)

Course Learning Outcome

1. Describe the operating principles of the manufacturing processes.
2. Select the most appropriate process for a given product design, application requirements and cost constraint. Identify the principles of non- traditional manufacturing system.
3. Work cooperatively in groups to complete the assigned project

Synopsis

Advanced manufacturing processes are often use to machine or finish products that are made of hard materials, tough super alloys, ceramics, and composites. Another reason for choosing advanced manufacturing process is that the features to be machined are often difficult or impossible to do with traditional methods. Advanced manufacturing processes utilize electrical, chemical, and optimal sources of energy to form and cut materials through subtractive, additive, continuous or net shape mechanism. This course will provide students with the fundamentals and understanding of the advanced manufacturing processes principle utilised in industries.

References

- Mikell, P.G., 2016, Fundamental of Modern Manufacturing Process, 6th Edition, Prentice Hall.
- Gregg, R., 2004, Modern Materials and Manufacturing Processes, Prentice Hall.
- Degarmo, B.K., 2003, Materials and Processes in Manufacturing, 9th Edition, Prentice Hall.

QUALITY CONTROL (BMFP 2223)

Course Learning Outcome

1. Explain the basic quality principles, tools and techniques related to manufacturing industries.
2. Apply the quality tools and/or techniques such as Statistical Process Control, control charts, Taguchi methods, Quality Functional Deployment, and Failure Mode and Effect Analysis.
3. Analyze manufacturing process and its issues using quality tools and/or techniques.

Synopsis

This course provides a sound understanding of the basic principles of quality control and the applications of quality improvement tools. Students will be first introduced to the evolution and fundamentals of quality followed by the philosophy and implementation of lean concepts and the methodology of six sigma statistics. Apart from providing sufficient theory to ensure a strong understanding of basic quality principles, the course also stressed on a practical approach with focus on the quantitative aspects of statistical process control. This will include sections on the use of pareto charts, cause and effect diagrams, process flow and scatter diagrams. Specific focus will be on the use of control charts for variables and attributes. The end of the course will expand the scope of quality to the importance of acceptance sampling and systems' reliability.

References

- B. Donna, C. S. Summers (2010) Quality. 5th edition, Prentice Hall.
- C. Fryman, M.A. (2002) Quality and Process Improvement, Thomson Learning.
- D. Montgomery, D.C. (2012) Statistical Quality Control, 7th edition, John Wiley and Sons, Inc.

Compulsory University Course (BMFG & BMFI)
Sharing Course (BMFG & BMFI)
Program Core Course (BMFG & BMFI)
Language Elective Course (BMFG & BMFI)
BMFG
BMFI
Diploma

ENGINEERING LABORATORY 2 (BMFA 2121)

Course Learning Outcome

1. Apply the fundamental of fluid mechanics and thermodynamic laws.
2. Apply the principle of kinematics and kinetics of particle and rigid body in dynamics laboratory activity.
3. Collect, analyze, interpret and present them in technical report.
4. Work cooperatively with group members, developing teamwork in the assigned activity.

Synopsis

The course is the practical introduction to the thermo-fluids and dynamics fundamentals. It offers the practical understanding of the basic concepts of fluid mechanics properties and thermodynamic laws. The course also covers the principles and theory in dynamics motions. For fluid mechanics the practical work related to fluid dynamic, Bernoulli principle and cyclic thermodynamic system. Meanwhile for dynamics part, Newton's Second Law, projectile motion, and moment of inertia principles are covered.

Generally, the course will emphasis on the data collection skill, analyzing and critical thinking in presenting technical reports and implementing safe laboratory practice.

References

- Cengel, Y.A., Turner, R.H., Cimbala, J.M., (2012), 4th Edition in SI Units, "Fundamentals of Thermal-Fluid Sciences", McGraw Hill, New York.
- Mott. R.L (2006) Applied Fluid Mechanics 6th edition,Pearson
- Russell C. Hibbeler, 2013, Engineering Mechanics: Dynamics. 13th Edition, Prentice Hall.

INDUSTRIAL AUTOMATION (BMFA 3213)

Course Learning Outcome

1. Apply knowledge in industrial automation system for control of automation processes and the machineries involved.
2. Design PLC programmes to solve complex problems in automation using logic control and logic diagram.
3. Analyze an automated system that consists either of fluid power equipment, robot work cell, PLC, vision system or other types of automation tools.
4. Demonstrate practical skills to construct PLC as well as pneumatic and hydraulic circuitry using software.

Synopsis

This course focuses on concepts of automation technologies and the integration of automated systems. Student will learn about sensors, machine vision, electrical motors, pneumatics, and hydraulic components. In addition, students shall be exposed to the design and analysis of Programmable Logic Controller (PLC) to solve complex automation problems. Topics of this course also cover the elements in automated system which include industrial robotics, material handling technologies, flexible manufacturing system, integration between automated manufacturing process and equipment, as well as some introduction to the revolution of industrial automation.

References

- Stenerson J., 2003, Industrial Automation and Process Control, Prentice Hall.
- Mikell, P.G., 2001, Automation, Production Systems, and Computer Integrated Manufacturing, 2nd Edition, Prentice Hall, New Jersey.
- Ashfal, C.R., 1992, Robots and Manufacturing Automation, John Wiley & Sons Inc., New York.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG* | *BMFI* | *Sharing Course (BMFG & BMFI)* | *Language Elective Course (BMFG & BMFI)* | *Diploma*

PRODUCT DESIGN AND MANUFACTURING (BMFR 3513)

Course Learning Outcome

1. Apply the methodologies for product design as a means to develop an idea from concept through to production to satisfy customer needs.
2. Apply environmental concerns in creating sustainable products.
3. Recommend suitable manufacturing processes associated with functional and product development requirements.
4. Demonstrate the ability to collaborate efficiently among team members.
5. Demonstrate the ability to communicate effectively both orally and writing project.

Synopsis

This course introduces the integration of design and manufacturing in creating a new product. Students will be exposed to the concepts and principles of product design as well as the best processes to manufacture a product. Knowledge of the economic factors influencing design such as product cost analysis and human engineering consideration in product design is also covered in this course. In addition, knowledge of the environmental impacts and issues on sustainability is also taught. The project in this course applies team-based approach to which will improve students teamwork and communication skills.

References

- Ulrich, K. T. and Eppinger, S. D., 2012, Product Design and Development. 5th Edition. McGraw Hill.
- Chitale, A. K. and Gupta, R. C., 2013, Product Design and Manufacture. 6th Edition. Prentice Hall, New Delhi, India.
- Kalpakjian, S. and Schmid, S. R., 2001, Manufacturing Engineering & Technology. 4th Edition. Prentice Hall.

MECHANICS OF MACHINE (BMFR 3313)

Course Learning Outcome

1. Apply the basic principles of mechanics of rigid body on machines and its mechanism.
2. Solve complex problems involving mechanisms, balancing, vibration, and power transmission through belts and gears.
3. Solve the mechanics of machines elements and their performance.

Synopsis

This is a 3-credit hour course offered to all third year Faculty of Manufacturing Engineering students. This course focuses on the principles of the mechanics of machines and their application in practice. It covers the basic concept of gear and belt drive, dynamic balancing, flywheel, governor, gyroscope, cams design and vibrations.

References

- Ramamurti, V., 2005, Mechanics of Machines, 2nd Edition, Alpha Science International Ltd, U.K.
- Roslan A. R., Che Abas C. I. and Mohd Yunus A., 2003, Mekanik Mesin, Universiti Teknologi Malaysia, Johor.
- Theory of Machines, Khurmi, R.S. and Gupta, J.K., 14th Edition, S. Chand & Co. Ltd., New Delhi, 2005.
- Hibbeler, R. C., Engineering Mechanics Dynamics, 13th Edition, Prentice Hall Inc., Singapore, 2013.
- Vinogradov, O., Fundamentals of Kinematics and Dynamics of Machines and Mechanisms, CRC Press, United States of America, 2000.

Compulsory University Course (BMFG & BMFI)
Sharing Course (BMFG & BMFI)
Program Core Course (BMFG & BMFI)
Language Elective Course (BMFG & BMFI)
BMFG
BMFI
Diploma

MATERIAL SELECTION (BMFB 3323)

Course Learning Outcome

1. Explain the relationships between design requirements, materials properties, processing and product performance.
2. Justify the suitability of a particular processing method for a specific selected material and design activity using data, charts and software.
3. Select the most appropriate materials and processes to be used for products fabrication and commercialization.
4. Communicate ideas relevant to materials selection analysis in product design and manufacturing.
5. Perform self-directed study in gaining new knowledge and skill.

Synopsis

This course integrates all types of engineering materials (metals, polymers, ceramics and composites) and its properties (modulus, strength, hardness and toughness etc.) for materials selection in any engineering design. Various processing techniques (shaping, joining and finishing etc.) are also summarized. Cooperative problem based learning activities are used to reinforce the concept and capabilities in applying selection of materials utilizing materials properties charts, data and software.

References

- Ashby, M.F., 2016, Materials Selection In Mechanical Design, 5th Edition, Butterworth- Heinemann.
- Kenneth G.B., 2010, Engineering Materials: Properties and Selection, Prentice Hall.

CONTROL SYSTEMS (BMFA 3313)

Course Learning Outcome

1. Construct mathematical model of dynamic systems.
2. Analyze transient response, steady-state error and stability of first-order and second-order systems.
3. Design controllers for complex engineering problems.
4. Construct and numerically validate a control system using numerical software such as Matlab / Simulink.

Synopsis

This course focuses on control system theory, design and analysis. Students will learn to construct mathematical model of dynamic systems such as translational and rotational mechanical systems and electromechanical systems as well as reduction of multiple subsystems. Students will also be introduced to control system theory on specifications of control systems that include transient response, stability and steady state error for first-order and second-order systems. Subsequently, students will also design classical controllers such as PI, PD, PID, lag, lead and lag-lead using root locus technique and frequency response technique. Fundamental knowledge in Laplace transform, linear algebra, Kirchoff's voltage, current laws and Newton's laws are essential to excel in this course.

References

- Nise, N. S., 2015, Control System Engineering, 7th Edition, John Wiley.
- Ogata, K., 2010, Modern Control Engineering, 5th Edition, Prentice Hall.
- Rafan, N.A and Kamsani, S.H, Control Systems Theory. Penerbit Universiti UTeM, Malaysia, 2015.

Compulsory University Course (BMFG & BMFI)
Sharing Course (BMFG & BMFI)
Program Core Course (BMFG & BMFI)
Language Elective Course (BMFG & BMFI)
BMFG
BMFI
Diploma

ENGINEERING LABORATORY 3 (BMFP 3111)

Course Learning Outcome

1. Model, simulate and analyze manufacturing systems by using state of the art discrete event simulation software.
2. Perform computer-based simulations and technical report writing on human factors engineering/ ergonomics related to manufacturing industry environment.
3. Work cooperatively with group members, developing teamwork in the assigned activity.

Synopsis

With the very high cost of investment in manufacturing industries, it is very important that good decisions are made about buying and operating manufacturing systems. At the same time, the increasing complexity of manufacturing systems makes decision making more difficult: simulation is often the only way to gather the necessary information. Engineering Laboratory 3 consists of computer simulation work combining the simulation of manufacturing systems and human factors engineering (ergonomics). In the simulation of manufacturing system laboratory, students will deal with the simulation as a method to analyze and evaluate the operation or design of manufacturing processes and facilities. In the human factors engineering (ergonomics) computer laboratory, the students will be conducting two simulation works related to the topics what they have learned in the lectures. Examples of simulations include manikin and workspace, and human activity analysis.

References

- Jerry Banks, John Carson, Barry Nelson & David Nicol. Discrete Event System Simulation, Prentice-Hall, Inc. Upper Saddle River, New Jersey, 2001.
- Steffen Bangsow. Manufacturing Simulation with Plant Simulation and Simtalk – Usage and Programming with Examples and Solution. Springer, 2010.
- DELMIA – Digital Manufacturing and Production Virtual Ergonomics Solutions, version 5, Release 20, Dassault Systemes.

INDUSTRIAL ENGINEERING (BMFP 3423)

Course Learning Outcome

1. Explain the fundamental concepts, tools and techniques applied in Industrial Engineering.
2. Apply tools and techniques in Industrial Engineering.
3. Analyze and solve complex problems that are related to Industrial Engineering.
4. Evaluate manufacturing operation scenarios using Industrial Engineering tools and techniques.

Synopsis

This is a 3-credit hours course offered to all third year faculty of manufacturing engineering students. Students will be exposed to the concept of productivity and the various tools and techniques to improve productivity. Thus, emphasize for this course will be on improving productivity, efficiency and effectiveness in manufacturing. Initially, students will be exposed to forecasting, strategic capacity planning and facilities layout. The second part of this course will cover topics such as works system design, material requirements planning, inventory control and production scheduling. Lastly, the topic of lean manufacturing is covered.

References

- Heizer, J. and Render B., 2014, Principles of Operations Management, 9th Edition. Prentice Hall.
- Stevenson, W.J., Chuong, S.C., 2014, Operations Management: An Asian Perspective, 2nd Edition. McGraw Hill.
- Krajewski, L.J., Ritzman L.P., and Malhotra M. K., 2013, Operations Management: Processes and Supply Chains, 10th Edition. Prentice Hall.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG*
Sharing Course (BMFG & BMFI) | *Language Elective Course (BMFG & BMFI)* | *BMFI* | *Diploma*

CAD / CAM / CAE (BMFR 3223)

Course Learning Outcome

1. Explain CAD/CAM/CAE systems and applications in manufacturing industry.
2. Apply basic principal of CAD/CAM in creating 2D sketches, 3D models and CAM operation (milling and turning).
3. Analyze a mechanical design using finite element analysis method.
4. Optimize a mechanical design using finite element analysis method.

Synopsis

This course is an introduction to the CAD/CAM/CAE system and its application in industry. The students will be exposed to the application of the high-end CAD/CAM software (CATIA) and CAE software (ANSYS) for generating geometric modeling (2D and 3D) and the using of CAE software to analyze, evaluate and optimize the mechanical design. The course covers Geometric modeling Systems, Generative/ Interactive Drafting, CAD/ CAM Programming, Finite Element analysis using manual approach and using a FEA software.

References

- N Rao, CAD/CAM Principles and Applications, 3rd Edition, McGraw Hill, 2010.
- Logan D.L., (2002) A First Course in the Finite Element Method, 3rd Edition, Brooks/Cole, Pacific Grove, CA.
- .Fred Karam, Using CATIA V5, Tomson (Delma Learning), 2004.

MANUFACTURING SUSTAINABILITY (BMFP 3122)

Course Learning Outcome

1. Describe the sustainable development concepts, scope, and the impacts in aspects of manufacturing.
2. Apply sustainable manufacturing, including the 6 R's, in relation to environmental regulations and the implications in business process.
3. Evaluate impact of manufacturing on economic, environment and social sustainability.

Synopsis

This course is designed to provide students with an understanding of sustainability issues, the concepts and the scope of Sustainable manufacturing (SM), the strategies in SM, the management approaches in SM, and tools commonly used in SM. In the current situation, integrating sustainability into business process will enhance business's total performance and competitiveness. Skills developed and knowledge acquired from this course will prepare students to be environmentally conscious engineers who are sensitive to environmentally, economic and social/ community related problems and capable to solve those problems and enhance total performance of industries.

References

- Vezzoli, C. and Manzini, E., (2008), Design for environmental sustainability, Springer-verlag. Milan, Italy.
- Fabio, G., Rosa, G.L., and Risitano, A. (2006), Product design for the environment, Taylor & Francis Group, LLC.
- Mahmoud M. El-Halwagi (2012), Sustainable design through process integration: fundamentals and applications to industrial pollution prevention, resource conservation, and profitability enhancement, Oxford: Butterworth-Heinemann.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG*
Sharing Course (BMFG & BMFI) | *Language Elective Course (BMFG & BMFI)* | *BMFI* | *Diploma*

CNC MACHINING (BMFS 4613)

Course Learning Outcome

1. Explain the principle of CNC systems, mechanics and dynamics of machine tool.
2. Analyze CAD/CAM methodology in 2D, 3D, surface modeling and CAM operation.
3. Describe recognizable basic features of Computer Numerical Control (CNC) and CNC Programming.
4. Plan and analyze process planning for part machining.

Synopsis

This course introduces to the principles of Computer Numerical Control (CNC), machine structures, planning for manufacture, part programming and CADCAM software operation. In this course the student is exposes to the CNC programming features of various CNC controls, the application of G and M codes, and mechanics and dynamics of machine tool.

References

- Mattson M., 2002, CNC Programming Principles and Applications. Delmar.
- Madison J., 1996, CNC Machining Handbook. Industrial Press Inc.
- Kip Hanson, 2018, Machining for Dummies. Wiley.

MANUFACTURING MANAGEMENT (BMFP 4413)

Course Learning Outcome

1. Demonstrate principles of Project Management, Total Quality Management, Lean Manufacturing, Innovation Management, Manufacturing Strategy, and Supply Chain.
2. Apply tools and techniques of Project Management, Total Quality Management, Lean Manufacturing, Innovation Management, Manufacturing Strategy, and Supply Chain.
3. Evaluate the best solutions for managing resources and cost implications.

Synopsis

This course covers management of manufacturing operations internally and externally. Project Management (PM), Total Quality Management (TQM), Lean Manufacturing (LM), and Innovation Management (IM) are management practices for internal issues such as project, quality, continuous improvements etc. Supply Chain Management (SCM) is management practices deal with external issues such as suppliers and logistics. Project Management covers techniques of planning and scheduling for project resources such as manpower, machines, money, and materials. Total Quality Management covers Product quality and its controls, creating quality by design, quality control of purchased product, quality control of manufacturing processes, the concept of Six Sigma, organizing effective quality management. Lean Manufacturing covers the tools and techniques applied in determining the LM baselines such as Where to start?; What to do next?; Exploit value stream; Develop metrics and measurements. Manufacturing Strategy covers strategic plan by Corporate Management, strategy for market winner, and strategy for choosing the process.

Innovation Management covers the types of innovation; Research and Development management; Processes in innovation; Models of innovation. Supply Chain Management covers all processes in managing supply chain that caters the aspects of economy, environment, and social.

References

- Tony, M., 2012, 20:20 Project Management, Kogan Page.
- H. Lal, 2008, Organisational Excellence Through Total Quality Management, New Age International Pvt. Ltd.
- Bill, C., 2004, Lean Manufacturing That Works: Powerful Tools for Dramatically Reducing Waste and Maximizing Profits, AMACOM.
- Mark, D., David, M. Gann, and Ammon, S., 2008, The Management of Technological Innovation: Strategy and Practice, OUP Oxford.
- Joalle, M., 2013, Sustainable Supply Chain Management, John Wiley & Sons Incorporated.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG*
Sharing Course (BMFG & BMFI) | *Language Elective Course (BMFG & BMFI)* | *BMFI*
Diploma

INTRODUCTION TO INDUSTRIAL ENGINEERING (BMFI 1113)

Course Learning Outcome

1. Explain fundamentals knowledge of industrial engineering.
2. Apply appropriate tools or techniques in solving problems related to industrial engineering.
3. Communicate effectively with the team members to write and present reports on industrial engineering.

Synopsis

This is a 3-credit hours course offered to first year students of Industrial Engineering program. Through this course, the students will be exposed to fundamentals knowledge on industrial engineering such as plan layout, materials handling, work and time study, human factors and ergonomics, supply chain management, automation and social systems. Additionally, students will have direct observations at industries (experiential learning) to enhance understanding on industrial engineering practices.

References

- William, J. S. and Sum, C. C., Operations Management, Second Edition, McGraw-Hill Education (Asia), 2014
- Groover, M.P. Automation, Production Systems, and Computer Integrated Manufacturing, Pearson Higher USA, 2013.
- Heizer, J. and Render, B. Operations Management, 10th Ed., Pearson Int. Edu., 2010.

WORK SYSTEM DESIGN (BMFI 2112)

Course Learning Outcome

1. Explain the application an ergonomics, method study and work measurement principles and tools to create healthy and efficient work activities.
2. Apply the model work systems using standard techniques, such as flow diagrams, process charts, operation charts, activity charts, block diagrams, and process maps, for purposes of work system documentation, analysis, and design.
3. Analyse the normal and standard times using several methods such as; Direct Time Study, Predetermined Time Standards, and Work Sampling.
4. Evaluate manufacturing operation scenarios using ergonomics, time study and work measurement tools and techniques

Synopsis

This course concentrates the design of work systems in terms of human, machine and process operations. Method Study, selecting, recording/charting analysis and improving the methods by which tasks are performed will be covered as well as manufacturing process flow analysis, operation process charts, human machine interaction, hand process analysis and methods standardization. Work Measurement, methods of establishing the time for a manual task, stopwatch time study, predetermined time systems, standard data, work sampling will be examined. Human factors in workplace, including ergonomic factors in workplace design, accidents and injuries will also be covered. The emphasis is on how these methods are used to study, improve, and/or optimize a process/system and workplace.

References

- Occupational Ergonomics: Theory and Applications, Second Edition, Amit Bhattacharya, James D. Mc Glothlin , CRC Press, 2012
- Ergonomics: How to Design for Ease and Efficiency, K. H. E. Kroemer, H. B. Kroemer, Katrin E. Kroemer-Elbert, Prentice Hall, 2001.
- Work System: The Methods, Measurement and Management of Work, Mikell P. Groover, First Edition, Pearson, 2014
- Operations Management, Jay Heizer and Barry Render, Pearson, 2014

Compulsory University Course (BMFG & BMFI)
Program Core Course (BMFG & BMFI)
BMFG
Sharing Course (BMFG & BMFI)
Language Elective Course (BMFG & BMFI)
BMFI
Diploma

FACILITIES PLANNING AND DESIGN (BMFI 3323)

Course Learning Outcome

1. Explain the fundamental concepts, tools and techniques applied in facilities planning and design
2. Apply tools and techniques in facilities planning and design.
3. Analyze related problems to facilities planning and design.
4. Evaluate facilities operation using facilities planning and design tools and techniques

Synopsis

This is a 3-credit hours course offered to all third year students in program of Bachelor Of Industrial Engineering at Faculty of Manufacturing Engineering. The students will be exposed to the tools and techniques in planning and design of facilities. In the early stage of the course, the students will be exposed to defining facilities requirements, product, process and schedule design, flow systems, activity relationship and space requirements and personnel requirements. Subsequently, this course will cover topics such as material handling, layout planning model and design algorithms, warehouse operations, manufacturing systems, facilities systems, quantitative facilities planning models, evaluating and selecting facilities plan.

References

- James A. Tompkins, John A. White, Yavuz A. Bozer, J.M.A. Tanchoco (2010) Facilities Planning, 4th Edition, John-Wiley and Sons.
- Cotts, D.G., Roper K.O., Payant R.P. (2010) The Facilities Management Handbook, 3rd Edition, Library of Congress.

PROJECT MANAGEMENT (BMFI 3132)

Course Learning Outcome

1. Explain the concepts of Project Management, strategic planning process, organization structure and culture, project scope and Work Breakdown Structure (WBS), risk management and planning, and characteristics of effective project manager.
2. Develop Project Network using Critical Path Method (CPM) and Program Evaluation and Review Technique (PERT).
3. Analyse project times, costs, and resources.
4. Evaluate project performance using Earned Value Cost/ Schedule System.
5. Demonstrate student competency in using software of Project Management.

Synopsis

Project Management is essential for most engineers in delivering projects with meet predetermined objectives. This course consists of; Organizational strategy & projects, Organizational structure and culture, Project definition, Estimating project times & costs, Developing a project plan, Risk Management, Scheduling resources, Project time compression, The role of leadership, Managing project teams, and Project Monitoring.

References

- Managing Engineering, Construction and Manufacturing Projects to PMI, APM and BSI Standards, 7th Edition, Butterworth-Heinemann, 2017.
- E-book; W. James, Project management for the unofficial project manager, BenBella Books, 2015.
- J.Cabanis-Brewin P.C. Dinsmore, AMA Handbook Of Project Management, 5th Edition, AMACOM US, 2018.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG* | *BMFI* | *Sharing Course (BMFG & BMFI)* | *Language Elective Course (BMFG & BMFI)* | *Diploma*

SYSTEM MODELLING: SIMULATION AND COMPUTING (BMFI 3263)

Course Learning Outcome

1. Describe the principles and techniques of simulation in manufacturing system.
2. Apply discrete event simulation techniques to model industrial system.
3. Propose solutions to engineering problems based on analysis of simulation and computing.

Synopsis

Simulation is a powerful system tool for analyzing a wide variety of complex engineering and business problems. This course introduces the students to principles and techniques of discrete event simulation. The emphasis is on problem formulation, building conceptual models and using appropriate statistical methods for the input modeling, validation, verification and output analysis of simulation models. The course will also discuss applications of simulation and related issues for current and future manufacturing systems.

References

- Banks, J., Carson, J. S., Nelson, B. L. , Nicol, D. M., 2010,Discrete-Event System Simulation (5th Edition), Prentice Hall.
- Leemis, Lawrence, M., Park, Stephen K., 2006. Discrete-Event Simulation. A First Course. Pearson International Edition.
- Robinson, S., 2004, Simulation: The Practice of Model Development and Use, John Wiley & Sons.

OPERATION RESEARCH (BMFI 3123)

Course Learning Outcome

1. Formulate operational problem in mathematical modeling.
2. Apply linear programming, transportation, assignment and queueing techniques to solve complex operation planning.
3. Analyze alternative solutions for decision-making process in industry.
4. Evaluate decisions through sensitivity analysis and apply what if scenarios as a tool for alternative solutions.

Synopsis

Optimization in industrial operation is a common problem as industry needs to make the most effective use of an organization's resources. Resources in organization such as machinery, money, energy, labor force are elements to make products. These resources are limited; managers need to deal with these limitations. Linear programming is one of the techniques discussed, is widely used, based on mathematical technique to help managers plan and make decisions necessary to allocate resources.

This course covers principles and practices, tools and techniques, fundamentals of optimization problem in manufacturing engineering. It discusses mathematical formulation of production or operational problems and solve them using linear programming and other optimization techniques. This course consists of two parts; Part I - Linear programming technique: Part II: Transportation models, and queueing technique.

References

- Hamdy, A.Taha., Operation Research : An Introduction, 10th Edition, 2017.
- Hillier, F. & Lieberman, G. J., *Introduction to Operation Research*. 10th ed. McGraw-Hill, 2014.
- Ignizio J.P., *Linear Programming in Single & Multiple Objective Systems,* Prentice Hall 2007.

HUMAN FACTORS ENGINEERING (BMFI 3223)

Course Learning Outcome

1. Describe human capabilities and limitations in performing jobs activities.
2. Apply basic human factor principles and assessment to minimize occupational injuries in the workplace
3. Design a work system by taking into consideration human capabilities as limitations
4. Analyze the effectiveness of a work system and workplace designed.

Synopsis

This course provides students with the rationale for providing an occupationally safe and healthy work environment in industry. Three main elements of this course are: human, equipment and work environment. These elements are classified into different areas; however, correlations of them are discussed and exemplified in each topic. Through human study, students will be explained about the human anthropometric, physiology, psychology as well as capabilities and limitations of human. Meanwhile, through ergonomic design of equipment, students will learn on how to design the hand tools and workstations that are safe to the users. Students are also exposed to management of work environment such as thermal comfort, noise, etc. resulting in better understanding of occupational health in industries.

References

- McPhee, B. (2005). Practical Ergonomics. Human Factors at Work. Coal Services Health and Safety Trust, Sydney.
- Ergonomics Risk Assessment Guideline by Department of Occupational Safety and Health Malaysia
- Wickens, C. D., Gordon, S. E., Liu, Y., & Lee, J. (1998). An introduction to human factors engineering.

PRODUCTION PLANNING AND INVENTORY CONTROL (BMFI 3153)

Course Learning Outcome

1. Explain fundamentals knowledge in production planning and inventory control.
2. Apply appropriate tools or techniques in solving problems related to production planning and inventory control.
3. Analyze various production planning and inventory control scenarios.

Synopsis

A production (or manufacturing) planning and control (MPC) system is concerned with planning and controlling all aspects of manufacturing, including materials, scheduling machines and people, and coordinating suppliers and customers. An effective MPC system is critical to the success of any company. An MPC system's design is not a one-off undertaking; it should be adaptive to respond to changes in the competitive arena, customer requirements, strategy, supply chain and other possible problems. Initial costs of establishing a production planning and control system can be high. Ongoing operational costs can also be high given the number of professionals and resources such as computers, training and space needed. Moreover, an ineffective MPC system can even lead to the collapse of the whole business because of poor customer service, excessive inventory and misallocation of material, workers and equipment. On the other hand, successful implementation of a production planning and control system can have crosscutting benefits such as appropriate level of work-in-process, smooth production, rapid delivery times, economic production lot sizes and improved labor productivity

This course covers the principles and practices, tools and techniques of production planning and control which are the dynamic backbone in basic production operation. This course consists of operations planning, order scheduling, supply chain, and shop floor control viewed within the framework of Material Requirement Planning (MRP) and Enterprise Resource Planning (ERP) systems.

Compulsory University Course (BMFG & BMFI)
Sharing Course (BMFG & BMFI)
Program Core Course (BMFG & BMFI)
Language Elective Course (BMFG & BMFI)
BMFG
BMFI
Diploma

The students will also be shown engineering concept involving production lean with improvement analysis method such as Lean Six Sigma. In addition, the students will be exposed to management information system within the dynamic environment.

References

- Nahmias, S. (2008) Production Operations Analysis. Mc Graw Hill/ Irwin. 6th Edition
- Vollman, T.E., Berry, W.L. Whyback, D.C. and Jacobs, F.R. (2005). Manufacturing PPlanning and Control for Supply Chain Management. 5th Edition. Mc Graw Hill/Irwin
- Stephen, N.C. (2005). Fundamentals of production Planning and Control. Prentice Hall.
- Krawjewski J.L. and Ritzman P. L., (2002), Operations Management: Processes Value Chains. 7th Edition, Prentice Hall International Series.
- Seng,Y.Kam (2003), Industrial Management, 3rd Edition Prentice Hall

SUPPLY CHAIN AND LOGISTICS MANAGEMENT (BMFI 4123)

Course Learning Outcome

1. Demonstrate the systematic and in-depth understanding of the issues in supply chain and logistics management.
2. Analyze appropriate tools, techniques and technologies to evaluate and explore managerial approaches for complex industrial problems.
3. Categorize the proper tools and techniques for managing manufacturing supply chains.
4. Evaluate in writing and presentation in terms of fundamentals, concepts, issues and managerial approaches in each supply chain case study in terms of its design, planning and operations.

Synopsis

This course will help the students to understand how to plan, implement and manage the flow of goods, services and related information to customers, in a process known as supply chain management, which to be an engineer, such information must be able to comprehend. Students will also acquire knowledge of the associated tools and techniques employed within the supply chain management, including forecasting, planning, inventory and distribution, together with the strategic and management aspects of supply chain management. This is principally related to manufacturing industries that works within and using concepts such as strategies, alignment, working within networks, purchasing, partnerships, collaboration, communication, coordination and new business models. Students will be able to discuss in the group research in terms of a particular industry from a strategic standpoint, to determine important competitive aims and the supply chain techniques that are applied within that industry. A group presentation on such findings will be made near the end of the course.

References

- Chopra, S and Meindl, P (2016), Supply Chain Management: Strategy, Planning and Operation, 6th Edition, Global edition, Pearson. ISBN 9781292093574, 9781292093567
- Harrison, A, Skipworth H, Van Hoek R, Aitken J (2019), Logistics Management and Strategy: Competing through the Supply Chain, 6th Edition, Global Edition, Pearson. ISBN-10: 1292183683 • ISBN-13: 9781292183688
- Slack, N and Lewis, M (2002), Operations Strategy, 2nd Edition, Prentice Hall, ISBN 000-0-273-63781-9

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG*
Sharing Course (BMFG & BMFI) | *Language Elective Course (BMFG & BMFI)* | *BMFI* | *Diploma*

CLOUD MANUFACTURING (BMFG 4123)

Course Learning Outcome

1. Identify the characteristics, drivers and enablers of CM in comparison to previous manufacturing paradigms.
2. Apply the knowledge of the systems and technologies related to CM to create basic CM framework for specific platform.
3. Analyze the opportunity and challenges of CM based on case study.

Synopsis

Cloud Manufacturing (CM) is the latest manufacturing paradigm that enables manufacturing to be looked at as a service industry. The aim is to offer manufacturing as a service so that an individual or organization that intends to manufacture products can utilize this service and do not have to make capital investment in manufacturing infrastructure. CM is enabled by the advancements in IT that has resulted in immense improvements in computational power across nearly all electronic devices and enhanced capabilities in connecting the dots in an increasingly networked society. This provides immense flexibility in process and logistical planning. Digital platforms in the CM provides a perfect canvas for inventing new business models and for intelligent algorithms to analyze data and derive knowledge for operationalize use by cyber physical systems. This course provides a comprehensive coverage on CM, among others, the role of data, manufacturing systems, various cyber physical technologies, applications and case studies. In addition to that, input from researchers and practitioners on the opportunities and challenges brought about by CM will also be covered so that organizations can be better prepared to reap the benefits of this latest manufacturing paradigm.

References

- Weidong Li and Jörn Mehnen, Eds. Cloud Manufacturing: Distributed Computing Technologies for Global and Sustainable Manufacturing. Springer Science & Business Media, 2013
- Cloud-Based Design and Manufacturing (CBDM): A Service-Oriented Product Development Paradigm for the 21st Century, Schaefer, Dirk, 2014, 1st Edition, Springer.

■ *Compulsory University Course (BMFG & BMFI)* ■ *Program Core Course (BMFG & BMFI)* ■ *BMFG*
■ *Sharing Course (BMFG & BMFI)* ■ *Language Elective Course (BMFG & BMFI)* ■ *BMFI* ■ *Diploma*

ELECTIVE 1
BMFG

INTRODUCTION TO DATA SCIENCE (BITI 2513)

Course Learning Outcome

1. Analyse a data science problem.
2. Define the computing requirements appropriate to a data science problem.
3. Demonstrate computer programme based on data science fundamental for problem solving.
4. Analyze the effectiveness of a work system and workplace designed.

Synopsis

This course delivers an essential exposure on the fundamental concepts and techniques of data science. It is divided into two parts; Part 1 is the introductory lecture and guided practical session for the first 5 weeks. The main topics covers the five important phases in understanding data science; introduction to data science, data wrangling, exploratory data analysis, data manipulation, applied machine learning and data visualization and communication. Part 2 is a guided capstone project for another 9 weeks. The capstone project provides a platform to the students to apply their previously learn knowledge especially in Artificial Intelligent, AI, statistics, analytics, project managements and data science in a real project setting. The last 3 weeks is the project presentation and technical report submission. There is no final written examination for this course.

References

- EMC Education Services, Ed. (2015) Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data, 1st Ed., John Wiley.
- Thomas, E., Wajid, K. & Paul, B. (2016) Big Data Fundamentals: Concepts, Drivers & Techniques, 1st Ed., Prentice Hall.
- Nolan, D. & Lang, D. T. (2015) Data Science in R: A Case Studies Approach to Computational Reasoning and Problem Solving, CRC Press.
- Donoho, D. (2015) 50 Years of Data Science, available at: http://courses.csail.mit.edu/18.337/2015/docs/50YearsDataScience.pdf [Accessed on 12 February 2016].
- Kabacoff, R. (2015) R in Action: Data Analysis and Graphics with R, 2nd Ed., Manning Publications.

HUMAN COMPUTER INTERACTION (BITM 2313)

Course Learning Outcome

1. Apply the concepts and theories of human computer interaction (HCI) in the system development.
2. Show conceptual thinking in problems solving related to application, website or product design.
3. Follow to the usability evaluation activities.

Synopsis

This course introduces the concept of HCI and its relationship in system development. The topics include the basic understanding of cognitive psychology, user interface design, interaction design, usability and evaluation. Other topics such as user-centered design, task analysis and user support design are also covered. The current issues on accessibility and localization are also discussed at the end of this course.

References

- Preece, J., Rogers, Y. & Sharp, H. (2015) Interaction Design: Beyond Human-Computer Interaction, 4th Ed., John Wiley & Sons.
- Dix, A., Finlay, J., Abowd, G. D. & Beale, R. (2005) Human-Computer Interaction, 3rd Ed., Prentice Hall.
- Dov Te'eni, D., Jane Carey, J. & Zhang, P. (2007)

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG*
Sharing Course (BMFG & BMFI) | *Language Elective Course (BMFG & BMFI)* | *BMFI*
Diploma

Human Computer Interaction: Developing Effective Organizational Information Systems, John Wiley & Sons.
- Preece, J., Rogers, Y., Sharp, H., Holland, S., Carey, T. & Benyon, D. (1994) Human-Computer Interaction, Addison Wesley.
- Roojen, P. V. (2006) Sign and Symbols, The Pepin Press.
- Frase, T. & Banks, A. (2004) The Complete Guide To Colour, ILEX Press Limited.
- Hay, G. (2004) Activity-Centered Design: An Ecological Approach to Designing Smart Tools and Usable Systems, The MIT Press.

INFORMATION TECHNOLOGY SECURITY (BITS 3423)

Course Learning Outcome

1. Explain the concept and issues of information technology security.
2. Distinguish the suitable components in providing security services and mechanism in computer software, operating system, database and network system.
3. Manipulate an appropriate security system mechanism ethically.

Synopsis

Security in information technology is a very important issue. It is an area that deserves study by computer professionals, students, and even many computer users. Through this course, student will be able to learn security services that covered Confidentiality, Integrity and Availability (CIA) in ICT based system. This course also highlights use of cyberlaw in protecting user rights. Finally, students will be able to learn methods in disaster recovery plan.

References

- Goodrich, M. & Tamassia, R. (2013) Introduction to Computer Security, International Ed., Pearson New.
- Stallings, W. (2014) Network Security Essentials: Applications and Standards, 5th Ed., Pearson Education Limited.
- Pfleeger, C. P. & Pfleeger, S. L. (2011) Analyzing Computer Security: A Threat / Vulnerability / Countermeasure Approach, 1st Ed., Prentice Hall International.
- Gollmann, D. (2011) Computer Security, 3rd Ed., John Wiley & Sons.

CLOUD MANUFACTURING (BMFG 4123)

Course Learning Outcome

1. Identify the characteristics, drivers and enablers of CM in comparison to previous manufacturing paradigms.
2. Apply the knowledge of the systems and technologies related to CM to create basic CM framework for specific platform.
3. Analyze the opportunity and challenges of CM based on case study.

Synopsis

Cloud Manufacturing (CM) is the latest manufacturing paradigm that enables manufacturing to be looked at as a service industry. The aim is to offer manufacturing as a service so that an individual or organization that intends to manufacture products can utilize this service and do not have to make capital investment in manufacturing infrastructure. CM is enabled by the advancements in IT that has resulted in immense improvements in computational power across nearly all electronic devices and enhanced capabilities in connecting the dots in an increasingly networked society. This provides immense flexibility in process and logistical planning. Digital platforms in the CM provides a perfect canvas for inventing new business models and for intelligent algorithms to analyze data and derive knowledge for operationalize use by cyber physical systems. This course provides a comprehensive coverage on CM, among others, the role of data, manufacturing systems, various cyber physical technologies, applications and case studies. In addition to that, input from researchers and practitioners on the opportunities and challenges brought about by CM will also be covered so that organizations can be better prepared to reap the benefits of this latest manufacturing paradigm.

References
- Weidong Li and Jörn Mehnen, Eds. Cloud Manufacturing: Distributed Computing Technologies for Global and Sustainable Manufacturing. Springer Science & Business Media, 2013
- Cloud-Based Design and Manufacturing (CBDM): A Service-Oriented Product Development Paradigm for the 21st Century, Schaefer, Dirk, 2014, 1st Edition, Springer.

INTELLIGENT SYSTEM (BMFA 4123)

Course Learning Outcome
1. Discuss the solutions to manufacturing issues based on various techniques in computational intelligence.
2. Explain the operational performance of different methods in artificial intelligence applied in manufacturing system.
3. Devise an intelligent system for an application in a manufacturing system.

Synopsis
This course introduces the theory and concepts of artificial intelligence. It examines the structure of the current techniques of computational intelligence applied in a manufacturing system. The prospects of intelligent systems in manufacturing operations will be discussed. The implementation of computational intelligence in actual practices will be carried out.

References
- Michael Negnevitsky (2005). Artificial Intelligence: A Guide to Intelligent Systems, 2nd edition, China: Addison Wesley.
- Russel, S.and Norvig, P., 2003, Artificial Intelligence – A Modern Approach, 2nd Edition, Prentice Hall.
- Tsoukalas, L.H. and Uhrig, R.E., 1997, Fuzzy and Neural Approaches in Engineering, 1st Edition, Wiley-Interscience.

ADDITIVE MANUFACTURING (BMFR 4613)

Course Learning Outcome
1. Explain the processes, the limitations and areas of application of various Additive Manufacturing (AM) technologies.
2. Illustrate the design factors that influence choice of appropriate AM technology on product development.
3. Analyse the principles of various AM technologies and their influence on product development.
4. Develop a product with the appropriate AM technology.

Synopsis
Additive manufacturing (AM), also known as 3D printing, is transforming how products are designed, produced, and serviced. Additive manufacturing is a process in which a three-dimensional computer model design is built into a physical object by joining thin layers of material. AM is a versatile field that encompasses a variety of methods, materials, and applications. AM lets us produce parts on-demand, without dedicated equipment or tooling. That unparalleled flexibility unlocks digital design tools that can create complex parts with breakthrough performance. Many companies are starting to recognize the benefits additive manufacturing (AM) offers in terms of speed, simplicity, reliability, and cost. But knowledge of the fundamental principles of AM, its applications, and its implications is one of the main barriers to its rapid adoption. The course will introduce the concepts of various AM techniques. It will emphasis the strengths and weaknesses of the various technologies and will highlight applications and case studies from the AM industry.

References
- Gibson I., Rosen D.W., Stucker B., Additive Manufacturing Technologies: Rapid Prototyping to Direct Digital Manufacturing by New York, NY: Springer, 2015.
- Chua C. K., Leong K. F., Lim C.S., Rapid Prototyping: Principles and Applications, 3rd ed., Singapore: World Scientific Pub., 2015.
- T.S. Srivatsan, T.S. Sudarshan (2015), Additive Manufacturing: Innovations, Advances, and Applications, CRC Press, Taylor and Francis Group.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG* | *BMFI*
Sharing Course (BMFG & BMFI) | *Language Elective Course (BMFG & BMFI)* | *Diploma*

ELECTIVE 2
BMFG

INDUSTRIAL ERGONOMICS (BMFP 4113)

Course Learning Outcome

1. Describe human capabilities and limitations in performing jobs activities.
2. Apply basic ergonomic principles and assessment to minimize occupational injuries in the workplace.
3. Design a work system by taking into consideration human capabilities as limitations.
4. Analyze the effectiveness of a work system and workplace designed.

Synopsis

This course provides students with the rationale for providing an occupationally safe and healthy work environment in industry. Three main elements of this course are: human, equipment and work environment.; their correlations are discussed and exemplified in each topic. Through human study, students will be explained about the human anthropometric, physiology, psychology as well as capabilities and limitations of human. Meanwhile, through ergonomic design of equipment, students will learn on how to design the hand tools and workstations that are safe to the users. Students are also exposed to management of work environment resulting in better understanding of occupational health in industries.

References

- McPhee, B. (2005). Practical Ergonomics. Human Factors at Work. Coal Services Health and Safety Trust, Sydney.
- Ergonomics Risk Assessment Guideline by Department of Occupational Safety and Health Malaysia
- Wickens, C. D., Gordon, S. E., Liu, Y., & Lee, J. (1998). An introduction to human factors engineering.

INDUSTRIAL ROBOTICS (BMFA 4113)

Course Learning Outcome

1. Explain the components of robots, their structures and applications in manufacturing industry.
2. Explain the role of forward and inverse kinematics in robot arms.
3. Analyze the planned trajectory of a robot arm in a production cell.
4. Devise the motion controls of a robot arm in a production cell.

Synopsis

The course aims at delivering a basic knowledge of robotics with an emphasis on the understanding of robotic concepts. The topics include the components of robots, their structure, applications in manufacturing system, and the role of forward and inverse kinematics in robot arms. The planned trajectory of a robotic system and the motion control of a robot arm in a production cell will be investigated as well.

References

- Niku, S. B., 2010, Introduction to Robotics Analysis Systems Applications, Prentice Hall.
- Rehg, J. A., 2003, Introduction to Robotics in CIM Systems, 5th Edition, Prentice Hall.
- Craig, J.J., 2013, Introduction to Robotics: Mechanics and Control, Pearson Prentice Hall.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG*
Sharing Course (BMFG & BMFI) | *Language Elective Course (BMFG & BMFI)* | *BMFI*
Diploma

MODELING AND SIMULATION (BMFP 4313)

Course Learning Outcome

1. Describe the principles and techniques of simulation in manufacturing system.
2. Apply simulation techniques to design and construct discrete event simulation models.
3. Analyse and evaluate simulation model by applying statistical analysis.

Synopsis

Simulation is a powerful system tool for analyzing a wide variety of complex engineering and business problems. This course introduces the students to principles and techniques of discrete event simulation. The emphasis is on problem formulation, building conceptual models and using appropriate statistical methods for the input modeling, validation, verification and output analysis of simulation models. The course will also discuss applications of simulation and related issues for current and future manufacturing systems.

References

- Banks, J., Carson, J. S., Nelson, B. L, Nicol, D. M., 2010, Discrete-Event System Simulation (5th Edition), Prentice Hall.
- Leemis, Lawrence, M., Park, Stephen K., 2006. Discrete-Event Simulation. A First Course. Pearson International Edition.
- Robinson, S., 2004, Simulation: The Practice of Model Development and Use, John Wiley & Sons

GREEN MATERIALS AND BIOMATERIALS (BMFB 4713)

Course Learning Outcome

1. Describe the types of green materials and biomaterials.
2. Relate the materials properties with their structure and processing methods.
3. Recommend suitable processing method with their potential applications.

Synopsis

The course focuses into the green materials and biomaterial. The first half of the course focusing on biomaterials topics -their properties, compatibility and toxicity requirement, processing methods, in- vitro and in-vivo testing and their application. The second half of the course introduces basic concepts of working with green materials such as degradable and recycled materials. It covers the introduction to biodegradability and recycling, types and properties of these materials and well as their applications and limitations. It emphasizes the processing methods of biodegradable materials and recycled materials such as polymer and composite for sustainable applications.

References

- Johnson, B. M. & Berkel, Z. E., 2 0 1 1, Biodegradable Materials: Production, Properties and Applications, Nova Science Pub Incorporated.
- Mantia, F.L., 2002, Handbook of Plastics Recycling, Rapra Technology Limited.
- Holand, W. & Beall, G.H., 2012, Glass Ceramic Technology, WILEY.
- Schmitz, C., 2007, Handbook of Aluminium Recycling, Vulkan-Verlag GmbH.
- Hollinger, J. O., 2011, an Introduction to Biomaterials: Biomedical Engineering, CRC Press.

METAL PROCESSING TECHNOLOGIES (BMFS 4513)

Course Learning Outcome

1. Utilize the knowledge and understanding of strength aspects on various metallic materials and impact of additive material.
2. Conduct the work procedures for the design of welding, casting and sheet metal products.
3. Determine constructive design; static and dynamic design of welding, casting and sheet metal products.
4. Recognize the optimization techniques for welding, casting and sheet metal products.

Synopsis

This course is an extension to manufacturing process. Three major manufacturing processes namely welding, casting and sheet metal are covered in details. Topics include strength of various metallic construction materials; work procedures for the design of welding, casting and sheet metal products; constructive design; static and dynamic design of welding, casting and sheet metal products; impact of additive material; optimization selection of materials, additive, parameters etc. Also included are optimization of quality and costs ability to formulate new standards, rules and procedure specifications for welding, casting and sheet metal products.

References

- Norrish, J., 2006, Advanced Welding Processes (New Manufacturing Processes).
- Easwaran, J., 2007, Advanced Casting Technology ASM International.
- Remus, T., 2003, Advanced Sheet Metal Fabrication, Wolfgang Publications.

ADVANCED MATERIALS (BMFB 4113)

Course Learning Outcome

1. Classify different types of advanced materials based on their novel functions and properties.
2. Relate the smart properties of materials to their molecular structures.
3. Select the appropriate advanced material for a specific application considering its properties and limitations.

Synopsis

This course introduces various types of advanced materials to students by addressing their structures, properties and applications. It intends to provide students with understanding of the basic principles of some important advanced materials. The advanced materials covered in this course are smart materials which include piezoelectric materials, shape memory alloys and polymers, electroactive polymers, as well as other types of advanced materials such as lightweight materials, advanced composite, superconductors and advanced coating.

References

- Leo, D.J., 2007, Engineering Analysis of Smart Material Systems, John Wiley & Sons, Inc.
- Srinivasan, A.V., & McFarland, D.M., 2001, Smart Structures Analysis and Design, Cambridge University Press.
- Martin, P.M., 2005, Handbook of Deposition Technologies for Films and Coatings, Elsevier Inc.

Compulsory University Course (BMFG & BMFI)
Program Core Course (BMFG & BMFI)
BMFG
BMFI
Sharing Course (BMFG & BMFI)
Language Elective Course (BMFG & BMFI)
Diploma

ELECTIVE 3
BMFG

INDUSTRIAL DRIVES SYSTEM (BMFA 4323)

Course Learning Outcome

1. Explain the principles, constructions and application of components in drives system.
2. Analyze operational performances of drives system.
3. Design an industrial drives system.

Synopsis

Topics include electro-mechanical, pneumatic, and hydraulic drive components and systems with emphasis on selection, application, and proper installation techniques. The fundamental knowledge and theory of major components in fluids power and technologies, namely hydraulics and pneumatics, as well as electro motors, servo and stepper motors in robotics are covered. This includes the different types of actuators of linear and rotary configurations. Machine safety, torque, power, efficiency, bearings and couplings are also addressed. Characteristics of mechanical power train such as belt drives, chain, drives and gear drives are included as well. Moreover, basic concept of electric drives systems, with emphasis on system analysis and application is also discussed in this subject. Installation, alignment, and maintenance of various drive systems are performed utilizing industrial equipment.

References

- K. T. Chau, Zheng Wang, 2011, Chaos in Electric Drive Sys-tems Analysis Control & Application, 1st Ed., Wiley.
- Esposito, A., 2009, Fluid Power with Applications, 7th Edition, Prentice Hall.
- Rabie, M. G., 2009, Fluid Power Engineering, McGraw-Hill.

MATERIALS CHARACTERIZATION (BMFB 4123)

Course Learning Outcome

1. Summarize the fundamental of materials characterization including the theory, working principle and application.
2. Characterize materials structure and chemical element through interpretation and analysis of characterization output.
3. Display good communication skill on matters related to materials characterization in a written report and presentation.

Synopsis

This course focusses on material characterization techniques, including theoretical aspect, working principle and application. Analytical techniques include microstructural analyses (Optical Microscope, Scanning Electron Microscopy, Transmission Electron Microscopy, Scanning Probe Microscopy), phase analyses (X-Ray Diffractometer Analysis and X-Ray Fluorescence), thermal analyses (Thermal gravimetry, Differential Thermal Analysis and Differential Scanning Calorimetry) and spectroscopy analysis (X- ray Spectroscopy and Vibrational spectroscopy).

References

- Leng, Y., 2008, Materials Characterization Introduction to Microscopic and Spectroscopic Methods), John Wiley & Sons.
- Brandon, D. and Wayne. D. K., 2008, Microstructural Characterization of Materials, John Wiley & Sons.
- B.D. Cullity, S.R. Stock, 2001, Elements of X- Ray Diffraction, 3rd Ed. Prentice Hall.

Compulsory University Course (BMFG & BMFI)
Program Core Course (BMFG & BMFI)
BMFG
BMFI
Sharing Course (BMFG & BMFI)
Language Elective Course (BMFG & BMFI)
Diploma

PRODUCTION OPTIMIZATION (BMFP 4123)

Course Learning Outcome

1. Formulate production planning problem in mathematical modeling.
2. Apply linear programming, transportation, assignment and queueing techniques to solve complex production planning.
3. Analyze alternative solutions for decision-making process in the manufacturing industry.
4. Evaluate decisions through sensitivity analysis and apply what if scenarios as a tool for alternative solutions.

Synopsis

Optimization in production is a common problem as industry needs to make the most effective use of an organization's resources. Resources in organization such as machinery, money, energy, labor force are elements to make products. These resources are limited; managers need to deal with these limitations. Linear programming is one of the techniques discussed, is widely used, based mathematical technique to help manager plan and make decisions necessary to allocate resources. This course covers principles and practices, tools and techniques, fundamental of optimization problem in manufacturing engineering. It discusses mathematical formulation of production or operational problems and solve them using linear programming and other optimization techniques. This course consists of two parts; Part I - Linear programming technique: Part II: Transportation models, assignment models and Queueing technique.

References

- Hamdy, A.Taha., 2017, Operation Research : An Introduction, 10th Edition.
- Hillier, F. & Lieberman, G. J., 2010, Introduction to Operation Research. 9th ed. McGraw-Hill.
- Ignizio J.P., 2007, Linear Programming in Single & Multiple Objective Systems, Prentice Hall.

PRODUCTION TOOL DESIGN (BMFR 4223)

Course Learning Outcome

1. Explain the basic principles of production tools design in manufacturing field.
2. Apply the basic principles of production tool design with current industrial practice.
3. Design the efficient production tools for manufacturing, assembly and inspection processes.

Synopsis

This course introduces the basic principles and methods of production tools design, such as jigs and fixtures for material removal processes, manual work operations, joining processes, and inspection processes. The student will be exposed to the process of designing and developing the tools, methods, and techniques to improve manufacturing efficiency and productivity. The working drawings will be aided by standards, company catalogues, and handbooks. The production tools design focuses on locating elements, clamping elements, tool guiding, and setting elements. Final project design is subjected to student's presentation and evaluation.

References

- Hoffman, Edward G., 2004, Jig and Fixture Design, 5th Edition, Delmar Publisher.
- Joshi, P.H., 2010, Jigs and Fixtures, 3rd Edition, McGraw-Hill.
- John G. N., 2003, Fundamentals of Tool Design. Society of Manufacturing Engineer, Michigan.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG* | *BMFI* | *Sharing Course (BMFG & BMFI)* | *Language Elective Course (BMFG & BMFI)* | *Diploma*

SURFACE ENGINEERING IN MANUFACTURING (BMFS 4123)

Course Learning Outcome

1. Describe the necessary surface treatment of the substrate prior to coating process.
2. Distinguish the available coating techniques and coating materials.
3. Match the various coating techniques and materials with a particular application.

Synopsis

This is an introductory course on the synthesis and application of surface treatment and coatings. The course covers the necessary surface preparation technique prior to coating, the techniques to synthesis the coating, the various coating materials and the function of coating in various applications.

References

- Kalpakjian S. & Schmid S, 2006, Manufacturing Engineering and Technology, Singapore, Pearson.
- Mattox M. D., PVD Handbook.
- Schweitzer, Philip A., 2006, Paint and coatings: applications and corrosion resistance - CRC Press Taylor & Francis Group.

ERGONOMICS IN DESIGN (BMFR 4513)

Course Learning Outcome

1. Explain the concepts and functions of ergonomics in engineering design process.
2. Apply the principles of ergonomics in the engineering design process.
3. Evaluate product or workstation design from ergonomics point of view.

Synopsis

This course looks into the application of ergonomics principles and knowledge in the engineering design process of workstations and products. The aims of this course to expose students on design principles when designing for human use. The content emphasizes on optimizing potential interactions and interfaces between user and the system, at the front-end engineering design stage. Students will be involved in integrating, evaluating, and simulating the design and analysis of workstations and products through the lenses of ergonomist and human factors engineer.

References

- Tillman, B., Tillman, P., Rose, R. R., & Woodson, W. E. (2016). Human factors and ergonomics design handbook. McGraw-Hill Education.
- Eppinger, S. D., & Ulrich, K. T. (2011). Product design and development. McGraw-Hill.
  Kroemer, K. H., Kroemer, H. B., & Kroemer-Elbert, K. E. (2001). Ergonomics: how to design for ease and efficiency. Pearson College Division.
- Pheasant, S. (2014). Bodyspace: Anthropometry, Ergonomics & The Design of Work: Anthropometry, Ergonomics And The Design Of Work. CRC Press.

■ *Compulsory University Course (BMFG & BMFI)*
■ *Sharing Course (BMFG & BMFI)*
■ *Program Core Course (BMFG & BMFI)*
■ *Language Elective Course (BMFG & BMFI)*
■ *BMFG*
■ *BMFI*
■ *Diploma*

ELECTIVE 4
BMFG

MECHATRONICS (BMFA 4213)

Course Learning Outcome

1. Solve mechatronics related problems which include actuators, sensors and controllers.
2. Design and develop complex mechatronics system to be implemented as an industrial application.
3. Function effectively as an individual and in a group with the capacity to be a leader as well as an effective team member.
4. Communicate and present technical project confidently.

Synopsis

Mechatronics technologies are extensively used in developing manufacturing equipment. Mechatronics is defined as the synergistic combination of precision mechanical, electronic, and computer control in the design of products and manufacturing processes. This is a project based subject. Students are expected to work in a mechatronics design project that includes integration, programming of microcontroller and interfacing of mechatronics components such as fluid power system, sensors, electric actuators, mechanical drives and mechanisms. Students are expected to work in teams and have good communication skills.

References

- Bolton, W., 2013, Mechatronics: Electronic Control System in Mechanical and Electrical Engineering, 4th Edition, Prentice Hall.
- Carryer, O. K., 2011, Introduction to Mechatronic Design, Pearson.
- Dean, C. K., Margolis, D. L. and Rosenberg, R. C., 2012, System Dynamics: Modeling, Simulation, and Control of Mechatronic Systems, John Wiley & Sons.

NANOTECHNOLOGY (BMFB 4723)

Course Learning Outcome

1. Explain the significant of nanotechnology.
2. Analyze the properties of nanomaterials based on its structures.
3. Relate the understanding of nanomaterials properties with its synthesizing techniques and characterization methods.
4. Recommend suitable processing methods and potential application for particular type of nanocomposites.

Synopsis

This course introduces basic concepts of nanotechnology that covers introduction to nanotechnology, type and properties of nanomaterials as well as its synthesis and characterization techniques. it emphasizes the processing methods involve in nanomaterials exploitation technology such as sol-gel techniques, mechanical alloying, control solidifications, direct mixing, solution mixing, in situ polymerization and etc. besides, it covers the various application of nanotechnology for industrials, energy, medicines, biotechnology as well as the safety and impact of nanotechnology to human and environment.

References

- Karkare, M., 2008, Nanotechnology: Fundamentals and Applications, I.K. International Pvt. Ltd.
- Cao, G. & Wang, Y., 2011, Nanostructures & Nanomaterials: Synthesis, Properties & Applications, 2nd Edition, New Jersey, N J: World Scientific.
- Mahmood, A., 2011, Nanocoatings: Size Effects in Nanostrutured Films, Springer-Verlag Berlin Heidelberg.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG*
Sharing Course (BMFG & BMFI) | *Language Elective Course (BMFG & BMFI)* | *BMFI*
Diploma

LEAN SIX SIGMA (BMFP 4323)

Course Learning Outcome

1. Describe principle of Lean Manufacturing and Six Sigma.
2. Apply appropriate tools and techniques of Lean Six Sigma for complex industrial problems.
3. Evaluate the source of production wastes using Six Sigma approach.
4. Construct improvement strategy through the combination of Lean and Six Sigma concept.

Synopsis

Lean Management course provides a fundamental thinking of the principle of eliminating production wastes. Understanding the Lean Thinking is essential in order success in implementing the lean principles. In the meantime, Six Sigma approach emphasizes the important of controlling variation in process. As a result, the Six Sigma approach able to control defects at only 3 pieces per million production quantity. Thus, combination of Lean tools & techniques and Six Sigma approach would be able to enhance productivity and quality.

References

- Watson-Hemphill, K., 2016, Innovating Lean Six Sigma: A strategic guide deploying the world's most effective business improvement process, McGraw Hill.
- Pyzdek, T., Keller, P., 2010, The Six Sigma Handbook, 3rd ed., .Mc Graw Hill.
- Ron, B., 2009, Implementing Six Sigma and Lean: A Practical Guide to Tools & Techniques, Butterworth-Heinemann

CONCURRENT ENGINEERING (BMFR 4423)

Course Learning Outcome

1. Apply various design tools to analyze product.
2. Produce the alternative design that concerns with concurrent engineering technique and approach.
3. Demonstrate the design on concurrent engineering in a group design project.

Synopsis

This course introduces the principles of Concurrent Engineering (CE). This includes the use of associated CE tools and methods in order to develop a customer- oriented approach to New Product Introduction and Development (NPI/D). Manufacturing competitiveness, process reengineering, cooperative workgroups, information modeling, and product, process and organization integration are also included in this subject. Students will develop skills in team dynamics and management of concurrent engineering projects. This subject covers customer orientation, decision support systems, failure mode effect critical analysis, design for manufacturing and assembly, rapid prototyping methodologies and etc. Students are required to produce and analyze product based on concurrent engineering concept and hear working engineers' commentaries on concurrent engineering as it is practiced in the industry.

References

- Walker D.J., 2000, Creative Techniques in Product and Engineering Design: A Practical Workbook.
- Biren P., 1997, Concurrent Engineering fundamental: integrated product development. Prentice-Hall Inc.
- Thomas A. S, 1995, What Every Engineer Should Know About Concurrent Engineering. Amazon.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG*
Sharing Course (BMFG & BMFI) | *Language Elective Course (BMFG & BMFI)* | *BMFI* | *Diploma*

ADVANCED CNC MACHINING (BMFS 4523)

Course Learning Outcome

1. Recognize the capabilities of 2, 3, and 5 axis CNC machining.
2. Develop complex programs for milling and turning operations.
3. Apply advanced CNC machining techniques to specific process.
4. Use CAM software in producing complex product.

Synopsis

This course provides students with advanced concepts and practices in CNC machining that are advanced computer programming of CNC milling and turning with specific processes such as drilling, tapping, boring, grooving, facing and threading. Emphasis is on programming and production of complex parts including investigation in 3, 4 and 5- axis programming techniques, utilizing canned cycles, macros (subroutines), looping and parametric programming. The uses of CAM in producing complex and efficient programming techniques are also covered.

References

- Valentino, J. V. and Goldenberg J., 2010, Introduction to Computer Numerical Control CNC, 4th Edition, Pearson Prentice Hall.
- Karam, F., 2004, Using CATIA V5, Thomson (Delma Learning).
- Mattson, M, 2002, CNC Programming: Principles and Applications, Delmar Thompson Learning.

NON-METALLIC PROCESSES (BMFS 4113)

Course Learning Outcome

1. Identify the non-metallic materials in term of classification and properties.
2. Explain the fundamental principles of non- metallic processing.
3. Explain the appropriate non-metallic processing to produce the end products.
4. Analyze the process parameters on the performance of products.

Synopsis

This course provides a basic knowledge of classification of non-metallic materials, such as polymers, ceramics and composites. Basically, non- metallic processes cover the topics of powder metallurgy, ceramic processing, polymers, plastics processing and composites manufacturing. This subject provides strong fundamental concept and techniques particularly in fundamentals of processing such as injection molding, extrusion, pressing, etc.

References

- Kalpakjian, S. and Schimd, R. (2014) Manufacturing Engineering and Technology, 7th Edition, Prentice.
- Callister, W.D. Jr. (2010) Materials Science and Engineering - An Introduction, 8th Edition. John Wiley & Sons Inc.
- Degarmo, B.K., (2017), Materials and Processes in Manufacturing, 12th edition, Prentice Hall.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG*
Sharing Course (BMFG & BMFI) | *Language Elective Course (BMFG & BMFI)* | *BMFI*
Diploma

ELECTIVE 1
BMFI

INDUSTRIAL ACCOUNTING AND FINANCE (BMFI 4**3)

Synopsis

The course discussed on techniques and methods to analyze, interpret and use of financial information in planning and monitoring organizational operations. Among the topics covered are various costing methods, relevant costs for decision making, budgeting and budgetary control, accounting information for product pricing, and evaluation of company's performance. It also covers procedures and standards of financial reporting, analysis and evaluation of financial statements, internal control and computerised accounting system. Students will gain knowledge and skills in managing financial resources and apply techniques and methods in business decision ethically that will contribute to the organization's strategy. The course also discussed on techniques and methods to analyze, interpret and use of financial information in planning and monitoring organizational operations.

References

- Kimmel, P.D., Weygandt, J.J. and Kieso, D.E. (2014). *Accounting Principles* 11th Edition International Student Version. John Wiley.
- Peter Atrill and Eddie McLaney (2013). *Accounting and Finance for Non-specialists*. Pearson.
- Libby, R, Libby P., Philips, F., and Whitecotton, S. (2009). *Principles of Accounting*, McGraw Hill.
- Garrrison, R.H., Noreen, E.W., and Brewer, P.C. (2010). *Managerial Accounting*, 13th Edition. McGraw Hill.

INDUSTRIAL MARKETING (BMFI 4**3)

Synopsis

This subject will introduce the student to the marketing concepts and various strategic issues of marketing also their implication on business and organisational performance. Students will be taught the necessary skills and knowledge in preparing an effective marketing report on products and services to be marketed. Among the topics covered are marketing strategies, marketing analysis. This subject will provide students with practical guides on how to make decisions in strategic high-technology marketing that takes into account all disciplines. Topics include strategic analysis, strategic control and strategic marketing. Besides, students will be exposed to the various high-tech approaches of decision making such as pricing strategies, promotion etc. The subject also provides students with knowledge on global marketing, direct marketing, service marketing, etc. Students will also learn about the concepts and theories on high-tech application through problem-based learning activities, case study analysis and group project.

References

- Kotler, P., and Armstrong, G.M., (2014). *Principles of Marketing*. 15th Edition. New York, Pearson
- Brassington, F. and Petititt, S., (2010). *Principles of Marketing*. 4th Edition. New York, Pearson.
- Jobber, D., (2007). *Principles and Practice of Marketing*. New York, Pearson.

Compulsory University Course (BMFG & BMFI)
Sharing Course (BMFG & BMFI)
Program Core Course (BMFG & BMFI)
Language Elective Course (BMFG & BMFI)
BMFG
BMFI
Diploma

ECONOMICS FOR DECISION MAKING (BMFI 4123)

Synopsis

The core components of this subject is the application of economic concepts in managing business transaction through optimising scarce resources. The subject discusses issues within the microeconomics and macroeconomics perspective. It provides understanding of how economists model various economic situations pertaining to end users and firms, market coordination and marketing functions effectively and efficiently. The focus is on the concepts of supply and demand, market concentration, quantitative demand and supply analysis, industrial environment, process and production flows and production function game theory in oligopolistic economy. The subject enriches students' knowledge on the impact of economy on businesses and increase understanding of government economic policies, national annual budget through the creation of productive human capital.

References

- Case, K.E., Fair, R.C. and Oster S.M. 2014. Priciples of Economics (11th Edition). Pearson Education Limited, Harlow Essex England.
- Bade, Robin, Parkin, Michael. 2013. Foundations of Economics (6th Edition). Pearson Education South Asia Ltd, Singapore.
- Parkin, Michael. 2014. Economics (11th Edition). Pearson Education Limited.Harlow, Essex, England.

STRATEGIC INNOVATION MANAGEMENT (BMFI 4**3)

Synopsis

This subject discusses strategic imperatives in research implementation and innovation management. Topics include developing research and innovation processes, as well as technology and innovation strategic management. Students will acquire the necessary knowledge and skills in innovation processes and management. The subject also discusses intellectual property rights. Case studies will be incorporated to enhance students' understanding on strategic innovation management.

References

- Schilling, M. A., (2013), Strategic Management of Technological Innovation, 4th Edition, New York: McGraw Hill International Edition. (Main Reference).
- Tidd, J., & Bessant, J. (2014). Strategic innovation management. John Wiley & Sons.
- Dodgson, M., Gann, D. M., & Salter, A. (2008). The

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG*
Sharing Course (BMFG & BMFI) | *Language Elective Course (BMFG & BMFI)* | *BMFI* | *Diploma*

ELECTIVE 2
BMFI

INFORMATION TECHNOLOGY SECURITY (BMFI 4**3)

Synopsis

Security in Information Technology is a very important issue. It is an area that deserves study by computer professionals, students, and even many computer users. Through this subject, student will be able to learn security services that covered Confidentiality, Integrity and Availability (CIA) in ICT based system. This subject also highlights use of cyberlaw in protecting user rights. Finally, students will be able to learn methods in disaster recovery plan.

References

- Mohd Zaki Mas'ud, Mohd Faizal Abdollah, Zaheera Zainal Abidin, Siti Rahayu Selamat and Robiah Yusof (2011), Lab Manual Information Technology Security, Penerbit Universiti UTeM.
- Michael Goodrich, and Roberto Tamassia (2010), Introduction to Computer Security , Addison Wesley, ISBN 9780321512949.
- Mark Merkow and Jim Breithaupt (2006), Information Security: Principles and Practices, Pearson Prentice Hall, ISBN 0-13-154729-1.

INTRODUCTION TO DATA SCIENCE (BMFI 4**3)

Synopsis

The course provides an introduction to data science, which is the study of the generalizable extraction of knowledge from data. Being a data scientist requires an integrated skill set spanning mathematics, statistics, machine learning, databases and other branches of computer science along with a good understanding of the craft of problem formulation to engineer effective solutions. This course provides an overview of today's big data environment, the rationale and opportunity for a new approach to analytics, the roles required, including the Data Scientist, and representative examples of big data analytics in industry. This course introduces students to the fundamental principles of data science that underlie the algorithms, processes, methods, and data-analytic thinking. It also introduces students to algorithms and tools based on these principles, and frameworks to support problem-focused data-analytic thinking. The course ends by examining students understanding on integration and synthesis of concepts and their application to solving problems.

References

- F. Provost and T. Fawcett, "Data Science for Business," O'Reilly Media, 2013.
- F. Provost and T. Fawcett, "Data Science and its Relationship to Big Data and Data-Driven Decision Making," Data Sci. Big Data, vol. 1, no. 1, pp. 51–59, 2013.
- D. Donoho, "50 Years of Data Science," R Software., 2015.
- J. Stanton, "Data Science," An Introduction., 2012.
- Nina Zumel & John Mount, Practical Data Science with R, Manning Publication, 2014.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG*
Sharing Course (BMFG & BMFI) | *Language Elective Course (BMFG & BMFI)* | *BMFI* | *Diploma*

HUMAN COMPUTER INTERACTION (BMFI 4**3)

Synopsis

This is a 3-credit hours course offered to fourth year students of Industrial Engineering program. This course provides an overview of a number of areas in human-computer interaction (HCI). HCI is an interdisciplinary area concerned with the design, evaluation, and implementation of interactive systems for human use and with the study of major phenomena surrounding them. HCI addresses any interaction with computers by humans, as developers or as users, as individuals or as groups. On completion of the course, students are expected to have theoretical knowledge of and practical experience in the fundamental aspects of designing, implementing, and evaluating interactive systems that are useful and usable. It is expected that students will become familiar with some of the literature in HCI and develop sufficient background in HCI issues to do more advanced work in this area. This course consists of 3 lecture hours per week, reading assignments, in-class discussions, a team-based project and presentation.

References

- Preece, J., Rogers, Y., & Sharp, H. (2019). Interaction design: Beyond human-computer interaction (5th ed.) John Wiley & Sons Ltd. ISBN 978-1-119-02075-2.You can find all of the resources related to this book online from the book's website at http://www.id-book.com/index.php
- Dix, A., Finlay, J., Abowd, G.D., & Beale, R. (2004). Human computer interaction (3rd ed.). Prentice Hall. ISBN 0-13-046109-1. You can find all of the resources related to this book online from the book's website at http://www.hcibook.com/e3/plain/about/book/. This is currently the major textbook used for teaching undergraduate HCI courses.
- Dov Te'eni, Jane Carey and Ping Zhang, Human Computer Interaction: Developing Effective Organizational Information Systems, John Wiley & Sons, 2007.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG* | *BMFI* | *Sharing Course (BMFG & BMFI)* | *Language Elective Course (BMFG & BMFI)* | *Diploma*

ELECTIVE 3
BMFI

GLOBAL OPERATION STRATEGY (BMFI 4**3)

Synopsis

In today's economic environment, the number one driving force behind focusing on manufacturing operations is to "reduce the total cost of manufacturing." Prior research has found that to accomplish this objective, many executives are attempting to synchronize manufacturing operations by deploying a common platform to manage maintenance, production, quality, and inventory. This course provides the students with the knowledge of macro level of policies which influence any nation in production of goods and services. This subject gives an overview of globalization and its impact in the scope of manufacturing. Topics discuss among others are: political and economical organization, trade institutions, globalization of world economy, trade barriers, enterprise type and global strategies. In sort, students will learn about globalization and its influence to manufacturing management. Furthermore, in micro level policies this subject also enriched with company level policies/ management to improve company's competitiveness. This covers: knowledge management, enterprise planning, supply chain, location decision, logistics control and procurement. Students shall be enabled to form a systematic manufacturing management and project execution considering relevant decision criteria in the framework of global conditions. Complexity is managed by analysis and design being related to reference models.

References

- Gong, Y., 2013, Global Operations Strategy: Fundamentals and Practice in Business and Economics, Springer.
- Yeming G., 2013, Basic concepts of global operations strategy, DOI 10.1007/978-3-642-36708-3_1
- C.M.Chang, 2016, Engineering Management: Meeting the global challenges, 2nd Edition, CRC Press.

EMERGING POSITIVE ORGANIZATIONAL BEHAVIOR (BMFI 4**3)

Synopsis

This is a 3-credit hours course offered to fourth year students of Industrial Engineering program. This course consists of 3 lecture hours per week, reading assignments, in-class discussions, a team-based project and presentation. This subject emphasizes a study on individual and team behavior within the context of an organization. It provides contemporary topics, emerging theoretical and practical knowledge such as motivation, leadership, managerial decision-making group processes and conflict resolution. The major objective of this subject is to understand the organizational behavior concepts and models, moving from individual behavior to the team and organization. Areas of study include perception and learning, individual and personality motivation, values and job attitudes, stress, group dynamics, teamwork, decision making, conflict management inter-group relations, negotiation, communication leadership organization culture, organizational change and stress management.

References

- Stephen P. Robbins and Timothy A. Judge. Essential of Organizational Behavior, 14th Edition. Pearson, 2017.
- Robbins, S.P. and Judge, T.A. Organizational Behavior, 16th Ed. New Jersey, Prentice Hall 2019.
- Greenberg, J. and Baron, R.A. Behavior in Organization, 9th Ed: Upper Saddle River New Jersey: Prentice Hall, 2007.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG*
Sharing Course (BMFG & BMFI) | *Language Elective Course (BMFG & BMFI)* | *BMFI* | *Diploma*

OPTIMIZATION MODELS FOR DECISION MAKING (BMFI 4**3)

Synopsis

Resources in organization such as machinery, money, energy, labor force are elements to make products or provide services. These resources are limited and managers need to make decisions on how to manage these resources in an optimal way. Thus, optimization in industrial operation is a common problem in industries as organizations seek to use their resources effectively. This course will introduce optimization models and methods for solving common optimization problems in industrial engineering applications. This course will cover two main topics of optimization models. The first phase of the course will focus of networks problems while the second phase will concentrate on the fundamental and methods in integer programming models. Student will be exposed to a variety of typical applications of these optimization models in industrial planning problems.

References

- Carter, Michael W., and Camille C. Price. Operations research: a practical introduction. Crc Press, 2nd Edition, 2017
- Hamdy, A.Taha., Operation Research : An Introduction, 10th Edition, 2017.
- Hillier, F. & Lieberman, G. J., Introduction to Operation Research. 10th ed. McGraw-Hill, 2014

LEAN SIX SIGMA (BMFP 4**3)

Synopsis

Lean Management course provides a fundamental thinking of the principle of eliminating production wastes. Understanding the Lean Thinking is essential in order success in implementing the lean principles. In the meantime, Six Sigma approach emphasizes the important of controlling variation in process. As a result, the Six Sigma approach able to control defects at only 3 pieces per million production quantity. Thus, combination of Lean tools & techniques and Six Sigma approach would be able to enhance productivity and quality.

References

- Watson-Hemphill, K., 2016, Innovating Lean Six Sigma: A strategic guide deploying the world's most effective business improvement process, McGraw Hill.
- Pyzdek, T., Keller, P., 2010, The Six Sigma Handbook, 3rd ed.
- Mc Graw Hill. Ron, B., 2009, Implementing Six Sigma and Lean: A Practical Guide to Tools & Techniques, Butterworth-Heinemann
- George, L.M., 2002, Lean Six Sigma: Combining Six Sigma Quality with Lean Production Speed, McGraw Hill.

Compulsory University Course (BMFG & BMFI)
Sharing Course (BMFG & BMFI)
Program Core Course (BMFG & BMFI)
Language Elective Course (BMFG & BMFI)
BMFG
BMFI
Diploma

LANGUAGE ELECTIVES COURSES
BMFG and BMFI

ARABIC LANGUAGE (BLLW 1212)

Course Learning Outcome

① Use the basic Arabic grammar correctly and apply the information from the text.
② Construct sentences and apply selected vocabulary in a report.
③ Demonstrate communication skills.

Synopsis

Basic Arabic is a subject which adopts the communicative approach and introduces the phonology, grammar, vocabulary and writing system. Students will be exposed to basic reading materials in the language and discuss topics in groups besides the exercises and practical conversations. Interaction among students is based on information from oral texts and face-to-face or group activities.

References

- Hasan, A. T., 2009, Mausuah An-Nahwu Wassorp Wali'raf. Shah Alam: UPENA,UiTM.
- Abdul Masih, G. M., 2009, Mu'jam Kawaid Al- Lugatul Arobiah Fi Jadawal Walauhat, Lubnan: Maktabah Lubnan.
- Rahim, A., 2010, Pembelajaran bahasa Arab bagi golongan yang bukan Arab.

MANDARIN LANGUAGE (BLLW 1222)

Course Learning Outcome

① Demonstrate the ability to converse in Mandarin with correct and accurate pronunciation and intonation.
② Use the rules of Chinese writing and the theory of word and sentence formation.
③ Interpret the information in the simple text.

Synopsis

This course is designed for students who do not have prior knowledge in Mandarin. It provides students with the foundation of knowledge to enable them to understand and respond in the oral and written forms. This subject encompasses the listening, speaking, reading and writing components. This subject aims to help students to obtain enough exposure of the Mandarin phonetics (Han Yu Pin Yin). The basic grammar introduced is related to the language used daily by the Chinese. Particular care is also taken to ensure the development of verbal communication and written skills in mandarin.

References

- Hoon, A. L., Lee, O. B., 2012, Basic Chinese for Everyone. Selangor: Pelanduk Publications.
- Wu, J., and Lu, B., 2011, Chinese Grammar Step by Step. Singapore: Cengage Learning Asia Pte Ltd.
- Nee, S. W., Heng, C. T., San, L. L., Sim, M. S., 2009, Conversational Mandarin Chinese for non- native speakers. Selangor: Xueer publisher.

Compulsory University Course (BMFG & BMFI)
Sharing Course (BMFG & BMFI)
Program Core Course (BMFG & BMFI)
Language Elective Course (BMFG & BMFI)
BMFG
BMFI
Diploma

JAPANESE LANGUAGE (BLLW 1232)

Course Learning Outcome

1. Use grammar and classify the features of Japanese phonology correctly.
2. Demonstrate correct pronunciation.
3. Construct sentences and demonstrate writing skills.

Synopsis

This course is designed for students who do not have any background in Japanese. It provides students with the knowledge to enable them to understand and communicate in the oral and written forms. This course encompasses the listening, speaking, reading and writing components. The grammar introduced is related to the language used daily by the Japanese. In addition, two types of Japanese language writing systems; Hiragana and Katakana are also introduced. Students are also exposed to elementary reading materials.

References

- Minna no Nihongo shokyu 1, 2012, (Beginners 1) Sentence Pattern Workbook 3A Network.
- Minna no Nihongo shokyu 1, 2012, (Beginners 1) Translation & Grammatical Notes, 3A Network.
- Shin Nihongo No Kiso 1 English Translation Asian Edition, 2009, Association for Japanese- Language Teaching.

BAHASA MELAYU KOMUNIKASI^ (COMMUNICATIVE MALAY LANGUAGE) (BLLW 1172)

Course Learning Outcome

1. Provide responses to regular conversations and other situations.
2. Relate the sounds or speeches in Bahasa Melayu in terms of grammar, phonology and oral skills about yourself, family, friends and daily activities.
3. Discuss easily about a current topic.
4. Build sentences and speak Bahasa Melayu with grammar.

Synopsis

This course introduces the grammar of Bahasa Melayu. Students are exposed to aspects of clauses, terminology, sentence building, mastering numbers and literary elements. It is hoped that students can speak or communicate well and easily based on the ability of foreign students.

References

- Buttner, A., 2013, Aktivitas, permainan dan strategi penilaian untuk kelas bahasa asing. PT Indeks, Jakarta, Indonesia.
- Chye, Y. C., Mashudi, R. and Abd Rahman, M., 2012, Bahasa Kebangsaan untuk pelajar luar negara (Malay Language for International Students). Kuala Lumpur: Pearson Malaysia Sdn Bhd.
- Othman, Z., Hashim, R. and Abdullah, R., 2012, *Modul Komunikasi Melayu Antarabangsa.* Bangi, Selangor: Penerbit Universiti Kebangsaan Malaysia.

^Only for International students.

KOREAN LANGUAGE 1 (BLLW 1242)

Course Learning Outcomes

1. Demonstrate the ability to converse in Korean with correct and accurate pronunciation and respond to it accordingly.
2. Identify basic vocabulary and demonstrate writing skills.
3. Interpret the information in the simple text and construct sentences with correct grammar.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG*
Sharing Course (BMFG & BMFI) | *Language Elective Course (BMFG & BMFI)* | *BMFI* | *Diploma*

Synopsis
This course is designed for students who do not have prior knowledge in Korean. It provides students with the foundation of knowledge to enable them to understand and respond in the oral and written forms. This course encompasses the listening, speaking, reading and writing components. This course aims to help students to obtain basic knowledge about Korean language. The basic grammar introduced is related to the language used daily by the Korean. Particular care is also taken to ensure the development of verbal communication and written skills in Korean.

Pre-Requisite None.

References

- K. Park (2015). Essential Korean Vocabulary. Tuttle Publishing.
- P. Jun Seok & S. Chaemin. (2015). Korean: Language 1 For Beginners. Institut Terjemahan & Buku Malaysia.
- J. Hong & W. Lee. (2008). Korean For Dummies. Wiley Publishing Inc

GERMAN LANGUAGE 1 (BLLW 1252)

Course Learning Outcomes
1. Demonstrate the ability to converse in basic German with correct and accurate pronunciation and respond to it accordingly.
2. Identify basic vocabulary and demonstrate writing skills.
3. Interpret the information in the simple text and construct sentences with correct grammar.

Synopsis
This course is designed for students who do not have prior knowledge in German. It provides students with the foundation of knowledge to enable them to understand and respond in the oral and written forms. This course encompasses the listening, speaking, reading and writing components. This course aims to help students to obtain basic exposure of the German phonetics. The basic grammar introduced is related to the language used daily by the German. Particular care is also taken to ensure the development of verbal communication and written skills in German.

Pre-Requisite None.

References

- Rusch, P. (2016). Netzwerk: Intensivtrainer A1 (German Edition). Stuttgart: Klett (Ernst) Verlag,
- Wexenberger, D. (2018). Practise German: Practise-book for German learners A2: Practice German While Reading. German: Independently published

Compulsory University Course (BMFG & BMFI)
Sharing Course (BMFG & BMFI)
Program Core Course (BMFG & BMFI)
Language Elective Course (BMFG & BMFI)
BMFG
BMFI
Diploma

GENERAL ELECTIVE

CREATIVE AND CRITICAL THINKING (BIPW 3112)

Course Learning Outcome

1. Identify the fundamental principle of creative and critical thinking skills.
2. Analyze all gathered and observed information to make decisions.
3. Create new concept or solution.

Synopsis

This subject is created to give an exposure on the fundamental principles of creative and critical thinking. The students will apply the creative and critical thinking method in problem solving through students' centered learning approach including problem based learning approach. Students will be guided in the final project, in which the future market demand analysis will be conducted the solution proposals are based on the market needs product from various perspective and out of the box.

References

- Aziz Yahya, Aida Nasirah Abdullah, Hazmilah Hasan, Raja Roslan Raja Abd Rahman. 2011, Critical and Creative Thinking Module 2. Melaka. Penerbit UTeM.
- Buzan, T., 2009, Mind maps for business: revolutionise your business thinking and practice, New York: Pearson BBC Active.
- Fisher, A., 2011, Critical Thinking: An Introduction. London: Cambridge University Press.

ORGANISATIONAL COMMUNICATION (BIPW 4112)

Course Learning Outcome

1. Discuss the basic principles of organizational communication skills for the purpose of interaction within the organization.
2. Provide feedback on issues related to the development of organizational communication skills.
3. Solve organizational communication problems based on the context of the actual organization environment.

Synopsis

This course will expose students to the fundamental ideas of organizations in public and organizational communications. In addition, students will be able to find out theories related to organizational communication and understand key elements of the organization such as leadership, official communication and informal communication. Additionally, students will be aware of obstacles, problem solving and decision-making skills in organizational communication. Finally, students will have an understanding of organizational climate, technology relations and organizational and corporate communications within the organization.

References

- Miller, K. (2012). Organizational Communication. (4rd ed). Belmont: Thomson Wadsworth Publishing Company.
- Dennis K. Mumby (2018). Organizational Communication: A Critical Approach. (2nd ed). SAGE Publications, Incorporated.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG*
Sharing Course (BMFG & BMFI) | *Language Elective Course (BMFG & BMFI)* | *BMFI* | *Diploma*

INDUSTRIAL & ORGANISATIONAL PSYCHOLOGY (BIPW 1152)

Course Learning Outcome

1. Relate the surrounding process and theory at the workplace of organisation and industrial world.
2. Show leadership in a group task activity.
3. Response to role and responsibility as a future employee in an organisation.

Synopsis

This course provides exposure to the psychological aspect in the industrial employment world and issues regarding behavior in an organization. There are several discussed topics including current issues in psychology, personnel planning, stress at workplace, and engineering psychology.

References

- Azlina Abu Bakar (2013). Psikologi Industri dan Pengurusan Sumber Manusia. Terengganu: Penerbit Universiti Malaysia Terengganu.
- Schultz & Schultz, Duane (2010). Psychology and Work Today. New York: Prentice Hall.
- Yukl, G. (2010). Leadership in Organizations.

NEGOTIATION SKILLS (BIPW 4122)

Course Learning Outcome

1. Identify fundamental concepts in consultation process by using effective communication practice.
2. Produce conclusion on best consultation techniques based on various theory approaches.
3. Solve consultation issues based on effective consultation skill techniques in various situations.

Synopsis

This course discussed the basic consultation concept, creative and critical thinking technique, effective communication technique, and effective listening and questioning technique. The students are exposed to the required knowledge and skill to manage a consultation process effectively. Besides, the required creative and critical thinking skill, together with effective communication skill to conduct a consultation process are discussed.

References

- Lemiwki, R., Barry, B. & Saunders, D. (2016). Essentials of negotiation. USA: McGraw Hill Education.
- Fisher, R & Ury. (2011). Getting to YES: Negotiating agreement without giving in. Third Edition. Penguin Books.
- Covey, S. (2013) The 3rd Alternative: Solving Life's Most Difficult Problems. New York: Free Press.

INTEGRITY & ANTICORRUPTION (BIPW 2152)

Course Learning Outcome

1. Elaborate integrity value in daily life
2. Evaluate forms of corruption and misuse of power in life and organization.
3. Demonstrate the value of integrity and prevention of corruption through community activities

Synopsis

This Integrity and Anti-Corruption Course (KIAR) aims to introduce students to integrity practices and corruption prevention management in society and organizations. Emphasis will be given to theory and practice related to the value of integrity and prevention of corruption, issues, problems and challenges of corruption crime management in society and organizations. Learning activities include training in groups, simulations, writing official documents and field work in the community of various sectors (public sector, private sector, NGOs, politics and students).

Compulsory University Course (BMFG & BMFI) ■ *Program Core Course (BMFG & BMFI)* ■ *BMFG* ■ *BMFI* ■ *Sharing Course (BMFG & BMFI)* ■ *Language Elective Course (BMFG & BMFI)* ■ *Diploma*

References

- Mohamad Tarmize (2014). Nota Pencegahan Rasuah. Penerbit Bahagian Pendidikan Masyarakat, Suruhanjaya Pencegahan Rasuah Malaysia.Pengurusan Pembangunan Islam Universiti Sains Malaysia.
- Akta Suruhanjaya Pencegahan Rasuah Malaysia 2009 (2009).
- Akta Pencegahan Pengubahan Wang Haram, Pencegahan Pembiayaan Keganasan dan Hasil daripada Aktiviti Haram 2001.
- Akta Perlindungan Pemberi Maklumat 2010. Akta Perlindungan Saksi 2009.
- Institut Integriti Malaysia (2005). Pelan Integriti Nasional. Rahimah Abdul Rahim (2016). Siri Penyelidikan Pengajian Rasuah: Rasuah, Governans & Integriti. Penerbitan Akademi Pencegahan Rasuah Malaysia.
- Syed Hussein Alatas (2009). Rasuah: Sifat, sebab dan fungsi. Dewan Bahasa dan Pustaka: Kuala Lumpur Zulkarnian Abdul Rahman, Ahmad Kamal Ariffin Mohd Rus & Noor Ain Mat Noor (2017). Sejarah Perjuangan SPRM Satu Perjalanan. Universiti Malaya, Kuala Lumpur.
- Syed Hussein Al-Attas. (1983). Sosiologi Korupsi. Singapura: Delta Press Syed Ibrahim. (2007). Malaysia Kita. Kuala Lumpur: Institut Tadbiran Awam Negara (INTAN).

PROGRAM CORE COURSES
DMF

ENGINEERING PHYSIC (DMFM 1283)

Course Learning Outcome

1. Define the basic laws and comprehend the basic concepts in physics.
2. Apply the laws and the concepts systematically in problem solving.
3. Relate between the various topics covered and their application in the field of engineering.
4. Make accurate measurement and present result in a proper scientific report.

Synopsis

The topics covers in this subject are: Forces, Acceleration and Newton's Second Law of Motion, Motion with a Changing Velocity, Circular Motion, Conservation of Energy, Linear Momentum, Fluids, Heat, Temperature, Electric Forces and Fields, Capacitor, Electric Current and Circuits, Reflection and Refraction of Light.

References

- Giambatista A., Richardson B.M and Richardson R.C., College Physics, 5th edition. Mc-Graw Hill, 2019.
- Walker J.S., Physics, 5th edition, Addison Wesley, 2016.
- Cutnell J.D. and Johnson K.W., Physics, 11th edition, Wiley, 2018.

ENGINEERING MATHEMATICS (DMFM 1213)

Course Learning Outcome

1. Describe the fundamental concepts of matrices, eigenvalues and eigen vector, complex numbers, interpolation, differentiation, integration and vector-valued functions.
2. Solve the mathematical problems that involve matrices, eigenvalues and eigenvector, complex numbers, interpolation, differentiation, integration and vector-valued functions by using an appropriate technique.
3. Explain and use the fundamental theorems in function and graph, trigonometry polynomial and its partial fraction transformation.

Synopsis

This course is a blend of analytical and numerical approaches that mainly focusing on the matrices, nonlinear equations, eigenvalues and eigen vectors, complex numbers, interpolation, differentiation, integration and vector valued functions.

References

- James, G., Modern Engineering Mathematics, 5th edition, Pearson, 2015.
- Muzalna M.J, Irma Wani J., Rahifa R. and Norazlina A.R., Engineering Mathematics, 2nd Edition, Prentice Hall, 2009.
- Khoo, C.F., Sharifah Sakinah, S. A., Zuraini, O. And Lok, Y.Y., Numerical Methods, 3rd Edition, Pearson Prentice Hall, 2009.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG* | *BMFI* | *Sharing Course (BMFG & BMFI)* | *Language Elective Course (BMFG & BMFI)* | *Diploma*

ENGINEERING STATISTICS (DMFM 2273)

Course Learning Outcome

1. Intepret data by using descriptive statistics.
2. Apply the probability concept and probability distributions to solve statisticalproblem.
3. Distinguish the linear relationship between two variables and measure the strengthof the linear relationship.
4. Verify data and generalize results by using inferential statistics.

Synopsis

Data description and numerical measures, probability, discrete random variables, continuous random variables, sampling distribution,estimation, hypothesis testing, estimation and hypothesis testing: two populations, analysis of variance, simple linear regression and correlation, multiple linearregression.

References

- Sh. Sara, Hanissah, Fauziah, Nortazi and Farah Shahnaz (2008). Introduction to Statistics & Probability: A Study Guide, Petaling Jaya: Pearson Prentice Hall.
- Moore, D.S. and Mc Cabe, G.P. (2021). Introduction to the Practice of Statistics, 10th Ed New York, W.H. Freeman And Company.
- Montgomery, D.C. Andrunger, G.C. (2018). Applied Statistics And Probability For Engineers, 7th Edition, John Wiley.

COMPUTER PROGRAMMING (DITG 1113)

Course Learning Outcome

1. Describe the fundamental principles of problem solving, programming techniques and programming structures in program development.
2. Give solutions to given problem based on the principles of problem solving, programming technique and programming structures.
3. Construct program codes by applying suitable programming structure and techniques.

Synopsis

This course covers the introductory topics in programming using computer language. It includes the introduction to computers and programming, the fundamentals of programming, problem solving and software development. Data types and operators, selection, repetition, function, array, file, structured data and pointer are among the topics covered in the course.

References

- Gaddis, T., (2016), "Starting Out with C++ Brief Version: From Control Structures Through Objects 8th Edition", Pearson Education.
- Savitch, Walter (2015), "Problem Solving with C++", 9th Edition, Pearson Education.
- Etter, D.M., Ingber, J.A., (2012), "Engineering Problem Solving with C++", 3rd Edition, Pearson Education.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG*
Sharing Course (BMFG & BMFI) | *Language Elective Course (BMFG & BMFI)* | *BMFI* | *Diploma*

PRINCIPLES OF ELECTRICAL AND ELECTRONIC (DENE 1113)

Course Learning Outcome

1. Describe the fundamentals of electrical and principles, construction of capacitor and magnetism.
2. Explain the function and operation of DC and AC circuits, the concept of semiconductors theory and devices.
3. Demonstrate experiments in group and report the findings in writing.

Synopsis

This course will discuss about electric and electronic principles; passive elements, DC and AC circuit analysis, transformer, semiconductor theory and devices: diode, Bipolar Junction Transistor, op-amp, timer and Integrated Circuits.

References

- Thomas L. Floyd, *Principles of Electric Circuits*, Prentice Hall, 7th Edition, 2003.
- Thomas L. Floyd, *Electronic Devices*, Prentice Hall, 6th Edition, 2002.
- John Hiley, Keith brown and Ian McKenzie Smith, Hughes Electrical and electronic technology, tenth edition, Prentice Hall, 2008.

MANUFACTURING PROCESSES (DMFM 1323)

Course Learning Outcome

1. Describe the basic principles and operation of common processes in manufacturing.
2. Explain the appropriate machine tool and its ability in producing required part.
3. Apply the principles of machining and manufacturing process in developing a part using learnt processes.
4. Produce a project with engineering values based on the skills acquired.

Synopsis

This course is an introduction to the manufacturing processes and machineries involved. Manufacturing engineers should have strong knowledge and fundamentals about various manufacturing processes. In this course the students will be exposed to the general introduction of manufacturing activities. The students will be provided with clear understanding of four broad manufacturing topics; forming, removing, joining and finishing. The sub elements of these topics will enable the student to have strong shield of manufacturing processes. Besides that, the students will also be taught the fundamentals of non-metallic processes.

References

- Kalpakjian, S., Schmid, S. R. S. R., & Musa, H. Manufacturing Engineering and Technology ed 8th. Pearson, 2019.
- Dr. Mohd Shahir Kasim, Manufacturing Process Module 1 and 2
- Groover, M. P. Fundamentals of modern manufacturing: materials, processes, and systems. John Wiley & Sons, 2020.

STATICS (DMFD 1823)

Course Learning Outcome

1. Describe the basic concepts and principles of engineering mechanics (statics).
2. Solve equilibrium problems of a particle and rigid bodies.
3. Apply equilibrium concepts to solve problems related to rigid bodies.

Synopsis

Statics is one of the primary topics of mechanics. Mechanics is the branch of physics that considers the action of forces on bodies that are at rest or in motion. This course is offered to study the mechanics of a particle and a rigid body at rest (statics). Topics include are: forces and equilibrium systems, moments and couples, structures and members, friction, centroids and moment of inertia.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG*
Sharing Course (BMFG & BMFI) | *Language Elective Course (BMFG & BMFI)* | *BMFI*
Diploma

References
- Hibbeler R.C., 2017, Engineering Mechanics – Statics, 14th SI Ed., Prentice Hall, New York.
- Beer, F. P. and Johnston Jr., E. R. and Eisenberg, R., 2018, Vector Mechanics for Engineers - Statics, 12th Ed. in SI Units, McGraw Hill, New York.
- Meriam, J. L. and Kraige L. G., 2016, Engineering Mechanics – Static SI Version, 8th Ed., John Wiley & Sons, New York.

ENGINEERING GRAPHICS & CAD (DMFD 1133)

Course Learning Outcome

1. Describe the basic graphic principles in generating an engineering drawing.
2. Create clear and legible sketches to represent roughly the idea or object in mind.
3. Generate engineering drawing in CAD software that can be interpreted by engineering professionals.

Synopsis

The purpose of this course is to provide students with an understanding of the importance of engineering graphic communication to the design process and interpreting the engineering drawings. Students will gain hands-on experience creating freehand technical sketches and CAD technical drawings using orthographic projections, section auxiliary views and isometric drawings. Emphasis is placed on creating drawing that are neat, correctly dimensioned using industry standards. Students will use freehand sketches methods and CAD software to develop visualisation skills and create the engineering drawings in 2D and 3D.

References
- F.E. Giesecke, A. Mitchell, H.C. Spencer, I.L. Hill, J.T. Dygdon, J.E. Novak and S. Lockhart, *Technical Drawing with Engineering Graphics,* Pearson Education, Inc., 2016.
- M. Dix & P. Riley, *Discovering AutoCAD 2017*, Pearson Education, Inc., 2017.
- M. Lombard, Mastering SolidWorks, John Wiley & Sons. Inc, 2019.
- https://www.autodesk.com/education/home, 2021.

APPLIED DYNAMICS (DMFD 1813)

Course Learning Outcome

1. Solve dynamics problems using the basic concept of kinematics, force and acceleration of a particle and a rigid body.
2. Apply the concept and principle involving design mechanisms, balancing, and dynamic analysis in transmission elements, joints and bearings.
3. Analyse problems in relation to mechanics of machines and its dynamics performance.

Synopsis

This course focuses on the fundamental of dynamics analysis and the principles of the mechanics of machines, with their application in practice. It also covers the basic concept of transmission elements including gear, screw, belt, joints, and bearings. Topics included are; kinematics for particle and rigid body, force and acceleration for particle and rigid body, transmission elements design, dynamic analysis, and its application on joints and bearings.

References
- Hibbeler, R. C., Engineering Mechanics: Dynamics, 14th Edition, Pearson, 2016.
- Theory of Machines, RS Khurmi, JK Gupta, 14th Edition, S. Chand & Co. Ltf., New Delhi, 2005.
- Roslan A. R., Che Abas C. I. and Mohd Yunus A, Mekanik Mesin, Universiti Teknologi Malaysia, Johor, 2003.
- Ramamurti, V., Mechanics of Machines, 3rd Edition, Alpha Science International Ltd, U.K., 2012.
- Vinogradov, O., Fundamentals of Kinematics and Dynamics of Machines and Mechanisms, CRC Press, USA, 2000.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG* | *BMFI*
Sharing Course (BMFG & BMFI) | *Language Elective Course (BMFG & BMFI)* | *Diploma*

THERMO-FLUIDS (DMFD 1843)

Course Learning Outcome

1. Apply the thermodynamic First Law and Second Law to determine the performance of thermal systems.
2. Apply appropriate conservation equations in analyzing steady fluid problems.
3. Demonstrate the principles of thermodynamics and fluid mechanics through laboratory experiments.

Synopsis

The course is given to introduce the student to the basic engineering of thermodynamics that involved study on the energy transformation, working fluids, theory and application of first and second laws of thermodynamics. The course also covers explanation on the steam and gas power plant as a direct application of the thermodynamic theory. Refrigeration system is also given to expose student to the many practice examples of the thermodynamics principles. The other phase of this course is to introduce the students to the basic of fluid mechanics. The course covers the study of the pressure and fluid static, buoyancy and stability, dynamic analysis, Bernoulli equation, momentum principle, and the internal and external flow behavior of the fluids.

References

- Cengel, Y.A., Turner, R.H., Cimbala, J.M., (2017), 5th Edition in SI Units, "Fundamentals of Thermal-Fluid Sciences", McGraw Hill, New York.
- Young, D.F. Young, B.R. Munson, T.H. Okiishi, (2016), "Fundamental of Fluid Mechanics", 8th Edition, John Wiley & Sons, Inc.
- Cengel, Y.A., Michael, A.B., (2014), 8th Edition, "Thermodynamics, An Engineering Approach", Mc Graw Hill, New York.

ENGINEERING MATERIALS (DMFM 1253)

Course Learning Outcome

1. Describe the fundamental principles of engineering materials in terms of its structure.
2. Explain the engineering materials properties based on its structure towards specific performance.
3. Choose suitable processing methods according to their engineering materials structure and properties towards specific performance.

Synopsis

This course introduces students to basic concepts of engineering materials that covers interatomic bonding, crystalline structure, imperfections and diffusion in solids. Introduction to the binary phase diagrams is also provided. Explanation on various types of engineering materials (i.e. metals, ceramics, polymers, composites and semiconductors), their mechanical properties, basic processing techniques and applications are also included.

References

- William F. Smith & Javad Hashemi (2017) Materials Science and Engineering, 5th Edition, McGraw Hill.
- William D. Callister & David G. Reithwisch (2000) Materials Science and Engineering 10th Edition, John Wiley & Sons.
- Michael F. Ashby, David R.H. Jones (2018) Engineering Materials 1- An Introduction to Properties, Applications and Design, 5th Edition. Elsevier, Butterworth Heinemann.
- Shackelford, J.F. (2000) Materials Science and Engineering – An Introduction, 5th Edition. Prentice Hall.

MANUFACTURING PRACTICE (DMFD 1313)

Course Learning Outcome

1. Describe the basic engineering communication principle.
2. Demonstrate proper use of basic engineering equipment and abide with safety requirements.
3. Transform drawings to produce according to specifications.
4. Perform finishing works and meeting tolerance.
5. Apply measurement tools in dimensional metrology.
6. Work in group to complete project

Synopsis

The practice consists of introducing basic knowledge of using manual hand tools and equipment, machine tools, welding, fabrication, fitting, casting, milling, metrology measurement and some manual work within manufacturing daily activities. It introduces standard equipment for performing manufacturing works such as lathe and milling machines, arc welding, sheet metal forming, basic foundry kit, fitting and metrology measurement. Due to its nature as an introductory course, students must prepare at home before having the practice to acquire any knowledge concerning the practices.

References

- Anup G., Manufacturing Technology 1 – (Processes and Applications), Technical Publications, 2021.
- Rao P. N., Manufacturing Technology—Foundry, Forming and Welding, 5e (Volume 1), McGraw Hill Education, 2018.
- Kalpakjian S. & Schmid S., Manufacturing Engineering and Technology, 7th Edition, Prentice Hall, 2014.
- Amstead B.H., Manufacturing Processes, 3rd John Wiley & Son, 1997.
- Mikell P. Groover, Fundamental of Modern Manufacturing, Prentice Hall Int. Ed. 1996.
- Kibbe, Neely, Meyer & White, Machine Tool Practices. 5th Edition. Prentice Hall, 1995.

CAD/ CAM (DMFM 2122)

Course Learning Outcome

1. Explain CAD/CAM system and application in manufacturing industry.
2. Apply basic principal of CAD/CAM methodology in creating 2D sketches, 3D part models, 3D surface and CAM operation.
3. Plan the machining strategies and toolpath methods for machining operations.
4. Investigate and simulate machining operations prior to the machining process.

Synopsis

This course is an introduction to the CAD/CAM system and its application. The student will be exposed to the application of CAD/CAM software for generating geometric modeling and NC part programming. Students will create 2D graphic elements and apply geometric constraints, create geometric modelling and modifying using edit commands, generative drafting and edit drawing block, create CAM programming and perform machining simulation and also generate NC part programming. The machining simulation will present the machining operation prior to the actual machining process. Student will apply all the knowledge in doing group project in order to understand the process in CAD/CAM system and integration from CAD to CAM operation.

References

- CATIA V5-6R2019 for Designers 17th Edition by Sham Tickoo (2020). CADCIM technologies
- Computer Aided Design and Manufacturing by Zhuming Bi and Xiaoqin Wang (2020), John Wiley & Sons Ltd.
- P. N. Rao (2011), 7th Edition, CAD/CAM Principles and Applications, McGraw Hill.
- Computer Aided Manufacturing, 3rd Edition by Chang T. C., Richard A., Wang H. P. (2006), Prentice Hall.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG*
Sharing Course (BMFG & BMFI) | *Language Elective Course (BMFG & BMFI)* | *BMFI* | *Diploma*

ENGINEERING SEMINAR (DMFD 2231)

Course Learning Outcome

1. Demonstrate knowledge of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to manufacturing engineering practice and solutions to well-defined engineering problems.
2. Demonstrate the ability to discuss range of sustainability issues.
3. Apply engineering management principles skills as individual or a leader in a team.
4. Recognize the need for life-long learning in the careers of professionals in the field of manufacturing engineering.

Synopsis

The main purpose of this course is to instill the recognition of the need for and the ability to engage in life-long learning among students. Through presentation by invited speakers from the industry and academia, students will be exposed to topics such as professional engineering bodies and knowledge of contemporary issues in related engineering fields. Presentation by successful alumni describing how their careers developed after obtaining their undergraduate degrees will also be included.

References

- Chris R. Groscurth (2018), Illustrated Edition, Future-Ready Leadership: Strategies for the Fourth Industrial Revolution, Praeger Publisher.
- Gerald Jonker and Jan Harmsen (2012), 1st Edition, Engineering for Sustainability: A Practical Guide for Sustainable Design, Elsevier Publisher.
- Board of Engineers Malaysia, Circular No. 001, Code of Professional Conduct (Registration of Engineers Act 1967 – Act 138).
- David Goetsch (2018), 3rd Edition, The Basics of Occupational Safety, Pearson Education (US).

QUALITY CONTROL (DMFD 2342)

Course Learning Outcome

1. Apply the basic quality principles and practices, quality solving techniques, and product reliability related to manufacturing practices.
2. Analyze the manufacturing process and its capability using variable and attributes control
3. Investigate the problems in manufacturing product using appropriate quality control tools.
4. Design sampling method for quality control solutions.

Synopsis

This course provides a sound understanding of the basic principles of quality control and the applications of quality improvement tools. Students will be first introduced to the evolution and fundamentals of quality followed by the philosophy and implementation of Lean concepts and the methodology of Six Sigma statistics. Apart from providing sufficient theory to ensure a strong understanding of basic quality principles, the course also stressed on a practical approach with focus on the quantitative aspects of statistical process control. This will include sections on the use of Pareto charts, Cause and Effect Diagrams, Process Flow and scatter diagrams. Specific focus will be on the use of control charts for variables and attributes. The end of the course will expand the scope of quality to the importance of acceptance sampling and systems' reliability.

References

- Besterfield, D.H. (2018) Quality Improvement, 10th Edition, Prentice Hall.
- Donna C. S. Summers (2018) Quality. 6th Edition, Prentice Hall.
- Montgomery, D.C. (2019) Statistica Quality Control, 8th Edition, John Wiley and Sons, Inc.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG* | *BMFI* | *Sharing Course (BMFG & BMFI)* | *Language Elective Course (BMFG & BMFI)* | *Diploma*

FLUID POWER (DMFD 2413)

Course Learning Outcome

1. Distinguish the importance, applications, advantages and disadvantages of fluid power systems.
2. Recognize the basic components and systems used in fluid power technologies in terms of its construction, symbol and principle.
3. Calculate the parameters generated from fluid power systems.
4. Design basic pneumatic/ hydraulic and electro pneumatic/hydraulic application circuits.

Synopsis

This course emphasizes on the basic system used in fluid power technologies namely hydraulics and pneumatics by detailing sections for each system. The syllabus covers the type of actuator used such as linear or rotary, control of valves by means of pressure, flow or directional, sources for each system and the components involved, as well as standard symbol for each component and design and analysis of circuit diagram for hydraulics and pneumatics respectively.

References

- James R. Daines, Martha J. Daines, Fluid Power: Hydraulics and Pneumatics, 3rd Edition, Goodheart Willcox Company, 2019.*
- Anthony Esposito, Fluid Power with Applications, 7th Edition, Pearson, 2013.
- Arthur Akers, Hydraulic Power system Analysis, CRC taylor & Francis Group, 2006
- M. Galal Rabie, Fluid Power Engineering, McGraw Hill, 2009.

DIPLOMA PROJECT 1 (DMFD 2822)

Course Learning Outcome

1. Apply the methodologies for product design as a means to develop an idea from concept through to production to satisfy customer needs.
2. Apply environmental concerns in creating sustainable products.
3. Recommend suitable manufacturing processes associated with functional and product development requirements.
4. Demonstrate the ability to collaborate efficiently among team members.
5. Demonstrate the ability to communicate effectively both orally and writing project.

Synopsis

This is the first part of Diploma Final Year Project. This course introduces the integration of design and manufacturing in creating a new product. Students will be exposed to the concepts and principles of product design as well as the best processes to manufacture product. Knowledge on the economic factors influencing design such as product cost analysis and human engineering consideration in product design is also covered in this course. In addition, knowledge of the environment impacts and issues on sustainability is also covered in this course. The project in this course applies team based approached to which will improve students' teamwork and communication skills. Industrial talks delivered by experts from industry give the opportunity in sharing the working experience from the experts to the students.

References

- Ulrich, K., Eppinger, S. and Yang, M.C. Product Design and Development, 7th Edition, McGraw Hill, 2020.
- Chitale, A. K. and Gupta, R. C., Product Design and Manufacture, 6th Edition, Prentice Hall, New Delhi, India, 2013.
- Kalpakjian, S. and Schmid, S. R., Manufacturing Engineering & Technology, 8th Edition, Pearson Ed Asia, 2020.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG* | *BMFI*
Sharing Course (BMFG & BMFI) | *Language Elective Course (BMFG & BMFI)* | *Diploma*

INSTRUMENTATION AND CONTROL (DMFD 2433)

Course Learning Outcome

1. Identify and describe different types of instrumentation and control system, its functional elements and operation principle.
2. Solve for transient response, stability and steady- state error of first-order and second-order systems.
3. Demonstrate instrumentation and control system with the aid of software.

Synopsis

This course is important to engineers because it prepares them with the basic techniques and knowledge of instrumentation and control system engineering. This course aims to motivate students through the application of instrumentation and control system theories, concepts and its relation to the real world. The course contents will expose students to analyze control systems in the industry and solve related problems in the manufacturing world today.

References

- Norman S. Nise, Control System Engineering, John Wiley, 7th Edition, 2015.
- Rafan, N.A and Kamsani, S.H, Control Systems Theory. Penerbit Universiti UTeM, Malaysia, 2015.
- Tony R. Kuphaldt, Lessons In Industrial Instrumentation Version 1.0, 2009.
- Katsuhiko Ogata, MATLAB for Control Engineers, Pearson Education, 2008.
- William C.Dunn, Fundamental of Industrial Instrumentation and Process Control, McGraw Hill, 2005

TOTAL PRODUCTIVE MAINTENANCE (DMFD 2512)

Course Learning Outcome

1. Identify the productivity problems in production line.
2. Conduct investigation of the productivity problems.
3. Design solutions for technical problems of the productivity problems.
4. Apply the tools and techniques in TPM in analyzing the productivity problems

Synopsis

This course is important to engineers because it prepares them with the basic techniques and knowledge of Total Productive Maintenance. This course aims to motivate students through the application of Total Productive Maintenance theories, concepts and its relation to the real world. The course contents will expose students to analyze production maintenance in the industry and solve related problems in the manufacturing world today.

References

- Fumio Gotoh , Autonomous Maintenance in Seven Steps: Implementing TPM on the Shop Floor, CRC Press 2020
- Tina Kanti Agustiady, Elizabeth A. Cudney, Total Productive Maintenance: Strategies and Implementation Guide, CEC Press 2016
- Tina Kanti Agustiady, Elizabeth A CudneyTotal Productive Maintenance: Strategies and Implementation Guide, CRC Press, 2015.

MECHANIC OF MATERIALS (DMFD 2853)

Course Learning Outcome

1. Apply the stress and strain concept of materials in solving engineering problems.
2. Apply the fundamental concept of engineering mechanics to determine the axial loading, torsion, and bending including introductory-level statically indeterminate systems.
3. Demonstrate the principles of stress and strain, shear and torsion, and bending through laboratory experiments.

Synopsis

This course provides a basic introduction to the basic concepts of stress, strain, and relating stress and strain in terms of materials behavior. This course also considers the basic applications of the axial loading, torsion and bending concepts.

References

- Beer, F.P., Johnston, Jr E.R., Dewolf, J.T., Mazurek, D. F., 2018, Mechanics of Materials, 8th Ed.,McGraw Hill.
- Hibbeler, R.C., 2018, Mechanics of Materials, 10th Ed., Pearson Education.
- Goodno, B.J. and Gere, J.M., 2017, Mechanics of Materials, 9th Ed., Cengage Learning.

CNC TECHNOLOGY (DMFD 2333)

Course Learning Outcome

1. Describe the concept of CNC system.
2. Produce correct programming codes.
3. Produce product using CNC machine simulator.

Synopsis

This course introduces the principles of computer numerical control (CNC) which covers the differences between conventional machines and CNC machines, the advantages of CNC machines, and the type of CNC machines. In this course, the student is exposed to the CNC programming planning (programming structure methodology, programming techniques), how to coordinate and control lathe and milling machines, and tool selection as well as the safety factor.

References

1. Yadav, O. P., Ram, M., & Negi, P. (2019), Basics of CNC Programming, River Publishers.
2. Valentino and Goldenberg, (2012) 5TH Edition, Introduction to Numerical Control (CNC), Pearson Prentice Hall.
3. Peter Smid, (2003), 2nd Edition, CNC Programming Handbook, Industrial Press.
4. Warren S. Seames, (2005) 4th Edition Computer Numerical Control – Concept and Programming, Delmar.
5. Steve Krar, Arthur Gill & Peter SMid, (2001), 1st Edition, Computer Numerical Control Simplified, Prentice Hall.

DIPLOMA PROJECT 2 (DMFD 2832)

Course Learning Outcome

1. Identify manufacturing engineering problem and apply knowledge in providing design solutions.
2. Utilize modern engineering and IT tools in facilitating solutions to complex manufacturing engineering problems with an understanding of the limitations.
3. Evaluate the impact of the design product, component or processes in term of safety, environmental and sustainability factors.
4. Demonstrate effectively teamwork skill in completing the Design Project.
5. Communicate effectively in completing the Design Project.

Synopsis

This the final part of Diploma Final Year project. Diploma Project 2 focuses on integration of learning principles in multidisciplinary application for a product design project and prototype development that include marketing, concept

Compulsory University Course (BMFG & BMFI)
Program Core Course (BMFG & BMFI)
BMFG
BMFI
Sharing Course (BMFG & BMFI)
Language Elective Course (BMFG & BMFI)
Diploma

design, material selection, process selection and sustainability, project management, and manufacturing cost. As a result, students will gain appreciation for the interdisciplinary cooperation and for the complex and essential roles played by various members of the product development teams. This design project applies team-based approach. The team-based approach will improve teamwork and communication skills in accordance to the realities of industrial practice. Students are expected to be exposed to complex and essential team roles during the development of the design project. Emphasize is also given on issues related to material selection using CES EduPack, quality of the prototypes produced and marketability of the design projects.

Pre-Requisite
DMFD 2822

References

- Ulrich, K., Eppinger, S. and Yang, M.C. Product Design and Development, 7th Edition, McGraw Hill, 2020.
- Chitale, A. K. and Gupta, R. C., Product Design and Manufacture, 6th Edition, Prentice Hall, New Delhi, India, 2013.
- Kalpakjian, S. and Schmid, S. R., Manufacturing Engineering & Technology, 8th Edition, Pearson Ed Asia, 2020.

OCCUPATIONAL SAFETY AND HEALTH (DMFD 2382)

Course Learning Outcome
1. Explain the different requirements and regulations of Factory and Machinery Act, Occupational Safety and Health Act.
2. Identify various safety, health, and environment hazards that affect human being.
3. Apply various requirements on safety and health principles on working environment.
4. Analyze scenarios in manufacturing industries that are subjected to Factory and Machinery Act, Occupational Safety and Health Act.

Synopsis
The aim of this course is to expose students to industrial Laws and regulations in Malaysia specifically Factory and Machinery Act, Occupational Safety and Health Act. Students will be taught on safety, health and environment hazard that affects human being. The skills and knowledge of this area are crucial for students to accommodate them in the future.

References

- Goetsch, D. L. (2018). Occupational Safety and Health for Technologists, Engineers, and Managers, 9th Edition, Upper Saddle River, NJ: Prentice Hall.
- Reese, C. D. (2015). Occupational Health and Safety Management, A Practical
- Undang- undang Malaysia, (2005). Akta Keselamatan dan Kesihatan Pekerjaan 1994 dan Peraturan-Peraturan, MDC Publishers Sdn Bhd.
- Occupational Safety And Health Act 1994 & Factory and Machinery Act 1974, Department of Occupational Safety and Health Malaysia

JIGS & FIXTURES (DMFD 2422)

Course Learning Outcome
1. Explain the principle of jigs and fixtures.
2. Illustrate the specific applications of jigs and fixtures.
3. Develop the appropriate jigs and fixtures for the manufacturing purposes

Synopsis
This course will introduce the student to the complex field on Jig & Fixture Design with respect to the manufacturing industry. This creative, lab oriented, problem solving course includes the generation of complete working drawings from initial concept to the final outcome. The method of instruction will be: lectures, discussion, design and development of the actual product.

References

- Edward G.Hoffman, Jigs and Fixtures Design, 5th Edition, Delmar, Cengage Learning, 2004.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG*
Sharing Course (BMFG & BMFI) | *Language Elective Course (BMFG & BMFI)* | *BMFI* | *Diploma*

- K.Venkataraman, Design of Jigs, Fixtures and Press Tools, Wiley, 2015.
- Jig and Fixture Handbook, Carr Lane Manufacturing Co, 3rd Edition, 2016.
- Grover, M.P., Fundamentals of Modern Manufacturing: Materials, Processes, and Systems, 7th Edition. Wiley, 2019.
- Serope Kalpakjian, Steven R. Schmid, Manufacturing Processes for Engineering Materials, 6th. Edition. Prentice Hall, 2018.

MANUFACTURING MANAGEMENT (DMFD 2513)

Course Learning Outcome

1. Describe the fundamental concepts and principles of manufacturing management.
2. Explain basic tools and techniques in managing the manufacturing industry.
3. Apply appropriate tools or techniques in solving management problems or issues in manufacturing industry.

Synopsis

Manufacturing management consists of production and operational management, which emphasize on the elements and application of manufacturing. Tools, methods, and applications are introduced in this syllabus.

References

- William Stevenson, Operation Management, 13th Edition, McGraw-Hill 2017.
- Robert Jacobs, Richard Chase. Operations and Supply Chain Management, 15th Edition, McGraw-Hill / Irwin, 2017.
- Jay Heizer, Barry Render. Operations Management, 12th Edition, Pearson 2016.

INDUSTRIAL AUTOMATION (DMFD 2563)

Course Learning Outcome

1. Demonstrate basic skills to control, manipulate and program an industrial robot.
2. Define robot configuration concepts and its advantages.
3. Apply Programmable Logic Controller (PLC) in a simple manufacturing system.
4. Solve basic manufacturing automation calculation.

Synopsis

Robotics and Automation subject introduces students to the automation aspect that can be applied in manufacturing systems. The use of robot, CNC machines, automated guided vehicle (AGV), machine vision, programmable logic controller (PLC), electrical circuit programming and other advanced automation technologies will be given as a fundamental to the students to pursue higher level activities in larger scale industrial automation system. In practical session students are exposed to the real PLC programming as the one applied in the manufacturing industry.

References

- Groover, M.P. (2018) Automation, Production Systems and Computer-Integrated Manufacturing, 5th Edition, Prentice Hall, New Jersey.
- Groover, M.P. (2015) Fundamental of Modern Manufacturing: Materials, Processes and Systems, 6th edition, Prentice Hall.
- Asfahl, C.R. (1992) Robot and Manufacturing Automation, John Wiley & Sons, New York.
- Considine, Douglas M. (1986) Standard Handbook of Industrial Automation, 1st Edition, Chapman and Hall.

Compulsory University Course (BMFG & BMFI) | *Program Core Course (BMFG & BMFI)* | *BMFG* | *BMFI* | *Sharing Course (BMFG & BMFI)* | *Language Elective Course (BMFG & BMFI)* | *Diploma*

INDUSTRIAL TRAINING (DMFU 3368)

Course Learning Outcome

1. Show technical competencies and skills gained throughout their Internship.
2. Prepare a report on the industrial field daily activities in the log book systematically.
3. Produce industrial training report
4. Communicate effectively with staff, colleagues and other personnel.
5. Practice professional ethics in accordance with industry rules and regulations.

Synopsis

Students are expected to be involved in the areas such as; manufacturing / production process and / or its optimization process, mechanical design and product / system development, maintenance and repair of machineries or equipment, and product testing & quality control.

References

- Faculty of Manufacturing Enginering Industrial Training Guide Book, 2nd Edition 2020
- Portal Universiti Teknikal Malaysia Melaka, https://portal.utem.edu.my/iclm/, portal UTeM Industrial Training System.

■ *Compulsory University Course (BMFG & BMFI)*
■ *Sharing Course (BMFG & BMFI)*
■ *Program Core Course (BMFG & BMFI)*
■ *Language Elective Course (BMFG & BMFI)*
■ *BMFG*
■ *BMFI*
■ *Diploma*

STAFF DIRECTORY

Academic

PROFESSOR

Professor Ir. Dr. Hambali bin Arep @ Ariff
hambali@utem.edu.my

Dip. Mechanical Engineering – Manufacturing (UiTM)
B.Eng. Mechanical Engineering (UiTM)
M.Sc. Engineering Design (Loughborough University, UK)
Ph.D. Engineering Design (UPM)

Research interests: Concurrent Engineering; New Product Development; Green Design; 3D Modeling; Finite Element

Professor Dr. Mohd Warikh bin Abd Rashid
warikh@utem.edu.my

B.Eng. Material Engineering (USM)
M.Sc. Material Engineering (USM)
Ph.D. Electroceramics (USM)

Research interests: Electroceramics, Corrosion, Advanced Materials

Professor Ir. Dr. Mohd Asyadi 'Azam bin Mohd Abid, CEng
asyadi@utem.edu.my

B.Eng. Material Science & Engineering (Shibaura Institute of Technology, Japan)
M.Eng. Material Science & Engineering (Shibaura Institute of Technology, Japan)
Ph.D. Materials Science (Japan Advance Institute of Science & Technology, Japan)

Research interests: Carbon Nanotube Growth and Characterization, Carbon Nanotube Device, Energy Storage Device, Thin Films, Corrosion Science and Engineering.

Professor Ir. Dr. Puvanasvaran a/l Perumal
punesh@utem.edu.my

B.Sc. Manufacturing Engineering (UTM)
M.Sc. Engineering Management (UPM)
Ph.D. Manufacturing System (UPM)

Research interests: Operation Research, Manufacturing System, Technology Management

Professor Ir. Ts. Dr. Sivarao a/l Subramonian
sivarao@utem.edu.my

B.Eng. Mechanical – Manufacturing Engineering (UTM)
M.Eng. Mechanical Engineering (Multimedia University)
Ph.D. Mechanical Engineering (Multimedia University)

Research interests: System Engineering

Professor Dr. Zamberi bin Jamaludin
zamberi@utem.edu.my

B.Eng. Chemical Engineering (Lakehead University, Canada)
M.Eng. Manufacturing System (UKM)
Ph.D. in Control Engineering (Katholieke Universiteit Leuven, Belgium)

Research interests: Control Systems, Mechatronic

Professor Dr. Mohd. Rizal bin Salleh
rizal@utem.edu.my

Dip. Mechanical Engineering (Suzuka National College of Tech., Japan)
Adv. Dip. Mechanical Engineering (UiTM)
M.Eng. Mechanical Engineering (University of Tokushima, Japan)
Ph.D. System Engineering (Brunel University, UK)

Research interests: Lean Manufacturing, Industrial Engineering, Metrology, Manufacturing Processes, Measurement Uncertainty, Agile Manufacturing

Professor Ts. Dr. Effendi bin Mohamad
effendi@utem.edu.my

B.Eng. (Honors) Manufacturing Engineering (UM)
MSc. Business Management (Coventry University, UK)
D.Eng. Engineering Intelligence Structures and Mechanics Systems Engineering (University of Tokushima, Japan)

Research interests: Operations Management, Optimization, Production Engineering, Modeling and Simulation

Professor Dr. Md. Nizam bin Abd. Rahman
mdnizam@utem.edu.my

B.Sc. Mechanical Engineering (Lehigh University, P.A. USA)
M.Sc. Mechanical Engineering (Manufacturing Technology) (USM)
Ph.D. Engineering Design (Coventry University, UK)

Research interests: Thin Film Coating, Manufacturing Management

ASSOCIATE PROFESSOR

Associate Professor Dr. Jariah binti Mohamad Juoi
jariah@utem.edu.my

B.Eng. Materials Engineering (USM)
M.Sc. Materials Engineering (USM)
Ph.D. Engineering Materials (University of Sheffield, UK)

Research interests: High temperature Materials, Nanocomposite Coating, Materials Characterization, Waste Immobilization

Associate Professor Dr. Liew Pay Jun, CEng.
payjun@utem.edu.my

B.Eng. Mechanical Engineering (KUiTTHO)
M.Sc. Manufacturing System Engineering (Coventry University, UK)
Ph.D. Mechanical Systems and Design (Tohoku University, Japan)

Research interests: Non-traditional Machining Process

Associate Professor Ir. Dr. Mohamad bin Minhat
mohdm@utem.edu.my

Dip. Industrial Technology (KUSZA)
B.Eng. Mechanical & Manufacturing (Cardiff University, UK)
M.Sc. Engineering & Manufacturing Management (Coventry University, UK.)
Ph.D. Manufacturing Engineering (University of Auckland, N.Z.)

Research interests: Manufacturing Process

Associate Professor Ir. Dr. Mohd. Amran bin Md. Ali
mohdamra@utem.edu.my

Dip. Mechanical Engineering (UTM)
B.Eng. Mechanical Engineering (UTM)
M.Eng. Manufacturing System Engineering (UPM)
Ph.D. Material Science & Engineering (Japan Advanced Institute of Science & Technology, Japan)

Research interests: Machining, Mould & Die

Associate Professor Dr. Mohd. Amri bin Sulaiman
mohdamri@utem.edu.my

B.Eng. CAD/CAM & Manufacturing (UM)
M.Eng. Manufacturing System Engineering (UPM)
Ph.D. Mechanical and Materials Engineering (UKM)

Research interests: Advanced Manufacturing Technology & Design

Associate Professor Dr. Mohd. Shahir bin Kasim, CEng
shahir@utem.edu.my

Dip. Industrial Technology (KUSZA)
B.Eng. Manufacturing Systems Engineering (Coventry University, UK)
M.Eng. Manufacturing System Engineering (UPM)
Ph.D. Mechanical and Materials Engineering (UKM)

Research interests: Manufacturing Systems Engineering

Associate Professor Ir. Ts. Dr. Mohd Shukor bin Salleh, CEng
shukor@utem.edu.my

B.Eng. Manufacturing Engineering (UKM)
M.Sc. Manufacturing Systems Engineering (Coventry University, UK)
Ph.D. Mechanical and Materials Engineering (UKM)

Research interests: Semisolid metal processing, Casting, CNC Machining, Manufacturing System Engineering

Associate Professor Dr. Muhammad Hafidz Fazli bin Md Fauadi
hafidz@utem.edu.my

B.IT Industrial Computing (UKM)
M.Eng. Advanced Manufacturing Technology (UTM)
Ph.D. Information, Production and Systems Engineering (Waseda University, Japan)

Research interests: Intelligent Agent; Automated Guided Vehicle; Material Transportation System; Computer Integrated Manufacturing

Associate Professor Dr. Noraiham binti Mohamad
noraiham@utem.edu.my

B.Eng. Materials Engineering (USM)
Ph.D. Mechanical & Materials Engineering (UKM)

Research Interests: Rubber/Polymer Composites, Green Materials, Body Armour Materials, Nanoparticles Reinforcement

Associate Professor Dr. Nur Izan Syahriah binti Hussein, CEng
izan@utem.edu.my

B.Eng. Manufacturing Engineering (Univ. Islam Antarabangsa Malaysia)
M.Sc. Manufacturing System Engineering (Univ. of Warwick, UK)
Ph.D. Manufacturing Engineering and Operation Management (Nottingham University, UK)

Research interests: Welding and Near Net Shape Manufacturing Processes

Associate Professor Dr. Raja Izamshah bin Raja Abdullah, CEng
izamshah@utem.edu.my

Cert. Computer Eng. (South Kent College, UK)
Dip. Mechanical Eng. (UTM)
B.Eng. Mechanical Eng. (UiTM) M.Sc. Manufacturing Eng. (Univ. of Birmingham, UK)
Ph.D. Manufacturing Eng. (RMIT University, Australia)

Research interests: CAD/CAM & CNC Machining

Associate Professor Dr. Seri Rahayu binti Kamat, CEng
seri@utem.edu.my

B.Eng. Mechanical (Manufacturing) (UTM)
M.Eng. Mechanical (Manufacturing Technology) (UTM)
Ph.D. Mechanical Engineering (Biomechanics/ Ergonomic) (Sheffield Hallam University, UK)

Research interests: Industrial Engineering, Operation Management, Production Planning, Industrial Ergonomics, Occupational Safety and Health and Biomechanics.

Associate Professor Dr. Shajahan bin Maidin, CEng
shajahan@utem.edu.my

B.Eng. Manufacturing System Engineering (Univ. of Portsmouth, UK)
M.Sc. Manufacturing System Engineering (Univ. of Warwick, UK)
Ph.D. Design for Additive Manufacturing (Loughborough University, UK)

Research interests: Additive Manufacturing; Sustainable Product Development; Concurrent Engineering; Reverse Engineering; CAD; Product Design

Associate Professor Dr. Zaleha binti Mustafa, CEng.
zaleha@utem.edu.my

B.Eng. Materials Engineering (USM)
M.Sc. Biomaterials (Queen Mary, University of London, UK)
Ph.D. Mechanical Engineering (University of Glasgow, UK)

Research interests: Biomaterials, Polymer Composite, Fatigue Analysis

Associate Professor Dr. Zuhriah binti Ebrahim, CEng.
zuhriah@utem.edu.my

B.Eng. Mechanical Engineering (UTM)
M.Sc. Engineering and Manufacturing Management (Coventry University, UK)
Ph.D. Manufacturing Engineering (Cardiff University, UK)

Research interests: Productivity Improvements, Performance Measures, Lean Six Sigma, Sustainable Manufacturing

Associate Professor Ir. Dr. Lokman bin Abdullah
lokman@utem.edu.my

B.Eng. Manufacturing Engineering (UIAM)
M.Sc Manufacturing System Engineering (Coventry University, UK)
Ph.D. Control Engineering (UTeM)

Research interests: Control System; Analytical Hierarchy Process (AHP), Energy Clustering, RFID; Automation

Associate Professor Ts. Dr. Jeefferie bin Abd Razak, CEng
jeefferie@utem.edu.my

B.Eng. Materials Engineering (USM)
M.Eng. Materials Science & Engineering (Polymer Nanocomposites) (UPM)
Ph.D. Materials Science (UKM)

Research interests: Polymer & Rubber, Polymer Composites Green Materials

SENIOR LECTURER

Ir. Dr.-Ing Azrul Azwan bin Abdul Rahman, CEng
azrulazwan@utem.edu.my

B.Eng. Mechanical (UKM)
M.Eng. Manufacturing Engineering (Technical Univ. of Berlin, Germany)
Dr. -Ing. Assembly Technology and Factory Management (Technische Universität Berlin, Germany)

Research interests: Operations Management, System Modelling, Automation and Robotics, Manufacturing Systems Integration

Ts. Dr. Al Amin bin Mohamed Sultan
alamin@utem.edu.my

B.Eng. Manufacturing (Manufacturing Management) (UTeM)
M.Eng. Industrial Engineering (UTM)
Ph.D. Mechanical Engineering (Sustainable Manufacturing) (University of Manchester, UK)

Research interests: Operations Managemen

Dr. Chang Siang Yee
changsy@utem.edu.my

B.Eng. Manufacturing Engineering (Material Engineering) (UTeM)
M.Sc. Materials Engineering (USM)
Ph.D in Mechanical Engineering (University of North Carolina at Charlotte, USA)

Research interests: 1D Nanostructures; Mechanical Testing; Microscopy Techniques

Dr. Fairul Azni bin Jafar
fairul@utem.edu.my

B.Eng. Mechanical Precision Engineering (Utsunomiya University, Japan)
B.A. Business Administration (Honors) Marketing (UiTM)
M.Sc. Mechanical Engineering (Utsunomiya University, Japan)
Ph.D. Production Information (Utsunomiya University, Japan)

Research interests: Kansei Robotic (Human- Robot Interface); Technology and Innovation Management; Mobile Robotics and Vision Automated Manufacturing

Dr. Mohammad Kamil bin Sued
kamil@utem.edu.my

B.Eng. Manufacturing Engineering with Management (USM)
M.Sc. Advance Manufacturing Technology & System Management (Manchester University, UK)
Ph.D. in Mechanical Engineering (University of Canterbury, New Zealand)

Research interests: Dimensional Metrology, 3D Laser Scanner, Manufacturing Technology & System

Dr. Intan Sharhida binti Othman
intan_sharhida@utem.edu.my

B.Eng. Mineral Resources Engineering (USM)
M.Sc. Materials Engineering (USM)
Ph.D. Materials Engineering (University Of Southampton, UK)

Research interests: Metal-Ceramic Composite Coating, Surface Pre Treatment on Metals, Tribological Testing

Ir. Dr. Mohamad Ridzuan bin Jamli
ridzuanjamli@utem.edu.my

B.Eng. Mechanical Engineering (UNITEN)
M.Sc. Manufacturing System Engineering (Coventry University, UK)
Ph.D. Mechanical & Materials Engineering (UKM)

Research interests: New Product Development

Dr. Isa bin Halim
isa@utem.edu.my

B.Eng. Mechanical Engineering (UiTM)
M.Sc. Mechanical Engineering (UiTM)
Ph.D. in Mechanical Engineering (UiTM)

Research interests: Industrial Ergonomics, Occupational Safety & Health

Dr. Mohd Edeerozey bin Abd Manaf
edee@utem.edu.my

B.Eng. Electronics Engineering (University Of Kyoto, Japan)
M. Sc. Advanced Materials, Process & Manufacturing (University Of Hull, UK)
Ph.D. Materials Science (JAIST, Japan)

Research interests: Functional Polymers, Polymer Composites, Green Materials

Mohamad Nizam bin Ayof
nizam@utem.edu.my

B.Sc. Industrial Physics (UTM)
M.Sc. Physics (UTM)

Research interests: Physics

Mohd Fairuz bin Dimin @ Mohd. Amin
fairuz@utem.edu.my

B.Sc. Physics (UM)
M.Sc. Material Science (UM)

Research interests: Physics, Mathematics

Dr. Mohd Najib bin Ali Mokhtar
najibali@utem.edu.my

Dipl.Ing. (FH) Mechanical Engineering (Albstadt-Sigmaringen University, Germany)
M.Sc. Mechatronics (Aachen University, Germany)
Ph.D. Packaging Electronic (Mechanical) (USM)

Research interests: Electronic Packaging; Applied CFD; Green Energy System; Mechatronic Design

Dr. Mohd Nazmin bin Maslan
nazmin@utem.edu.my

B.Eng. Mechanical Engineering (Universiti Teknologi Petronas)
M.Eng. Mechanical Engineering (UTM)
Ph.D. Mechano-Micro Engineering (Tokyo Institute of Technology)

Research interests: Control system

Dr. Mohd Nazrin bin Muhammad
nazrin@utem.edu.my

B.Eng. Mechatronics (UIAM)
M.Sc. Mechatronics (University of Siegen, Germany)
Ph.D. Electrical & Electronic Engineering (University of Auckland, New Zealand)

Research interests: Indoor Navigation; Automated Guided Vehicle; Internet of Things

Dr. Nik Mohd Farid bin Che Zainal Abidin
nmfarid@utem.edu.my

B.Sc. Industrial Engineering (New Mexico State University, USA)
M.Eng. Advanced Manufacturing Technology (UTM)
Ph.D. Mechanical Engineering (University of Birmingham, UK)

Research interests: Industrial Engineering, Design for Manufacture and Assembly, Product Design and Development

Ir. Dr. Mohd Rayme bin Anang Masuri
rayme@utem.edu.my

B.Sc. Civil Engineering (UTM)
M.Eng. (Civil-Structure) (UTM)
Ph.D. Facilities Management (Liverpool John Moores University, UK)

Research interests: Project Management, Facilities Management

Dr. Mohd Sanusi bin Abdul Aziz
mohdsanusi@utem.edu.my

B.Eng. Mechanical Systems Engineering (Kanazawa University, Japan)
M.Eng. Mechanical Science and Engineering (Kanazawa University, Japan)
Ph.D. Innovative Technology and Science (Kanazawa University, Japan)

Research interests: Mechanical System Engineering

Dr. Mohd Shahadan bin Mohd Suan
mohdshahadan@utem.edu.my

B.Eng. Materials Engineering (USM)
M.Sc. Materials Engineering (USM)
Ph.D. Materials Engineering (UM)

Research interests: Superconductor, Nanomaterials,Electroceramics, Advanced Materials

Nor Akramin bin Mohamad
akramin@utem.edu.my

B.Eng. Mechanical Engineering (Industrial) (UTM)
M.Eng. Mechanical Engineering (Advanced Manufacturing Technology) (UTM)

Research interests: Quality and Reliability, Operations Management

Dr. Muhammad Zaimi bin Zainal Abidin
mdzaimi@utem.edu.my

B.Eng. Material Science Engineering (Yamaguchi University, Japan)
M. Eng. Materials Science & Engineering (Shibaura Institute of Technology, Japan)
Ph.D. Regional Environment Systems (Shibaura Institute of Technology, Japan)

Research interests: Material Science Engineering; Electrochemistry; Corrosion; Degradation Coating

Dr. Nur Aidawaty binti Rafan
aidawaty@utem.edu.my

B.Eng. Mechanical Engineering (Universiti Teknologi Petronas)
M.Eng. Manufacturing Engineering (UM)
Ph.D. Control Engineering (UTeM)

Research interests: Systems and Control; Mechatronics; Industrial Automation

Dr. Nadiah binti Ahmad
nadiaha@utem.edu.my

B.Sc. Industrial Engineering
(University of Wisconsin – Madison, USA)
M.Sc. Industrial and Systems Engineering (The Ohio State University, USA)
Ph.D. Industrial and Systems Engineering (The Ohio State University, USA)

Research interests: Operations Management, Productivity Improvement, Industrial Ergonomics

Ts. Dr. Rose Farahiyan binti Munawar
rosefarahiyan@utem.edu.my

B.Tech. Industrial Technology (USM)
M.Sc. Industrial Technology (USM)
Ph.D. Material Science (UKM)

Research interests: Nanotechnology (Nanomaterials & Nanocomposite), Green Materials, Materials Characterization

Ts. Dr. Saifudin Hafiz bin Yahaya
saifudin@utem.edu.my

B.Sc. Applied Mathematics Modeling (USM)
M.Sc. Mathematics (USM)
Ph.D. Computer Aided Geometric Design
(USM)

Research interests: Computer Aided Geometric Design; CAD/CAE; Bio-Inspired Design; Ecological and Environmental Modeling; Mathematical and Computer Modeling

Dr. Radin Zaid bin Radin Umar, CEng
radinzaid@utem.edu.my

B.Sc. Mechanical Engineering
(University of Wisconsin – Madison, USA)
M.Sc. Integrated Systems Engineering
(The Ohio State University, Columbus, USA)
Ph.D. Integrated Systems Engineering (The Ohio State University, Columbus, USA)

Research interests: Ergonomic Design

Dr. Syahriza binti Ismail
syahriza@utem.edu.my

B.Eng. Materials Engineering (USM)
M.Sc. Materials Engineering (USM)
Ph.D. Advanced Materials (USM)

Research interests: Electroceramics & Materials, Nanomaterials, Funtional Metal Oxide

Dr. Rahimah binti Abdul Hamid
rahimah.hamid@utem.edu.my

B.Eng. Mechanical Engineering (KUiTTHO)
M.Sc. Production Systems Engineering (RWTH Aachen, Germany)
Ph.D. Intelligent Structures and Mechanics Systems Engineering (Tokushima University)

Research interests: Product Design; Production Engineering

Dr. Syamimi binti Shamsuddin, CEng
syamimi@utem.edu.my

B.Eng. Manufacturing Engineering (UKM)
M.Sc. Mechatronics (Loughborough Univ., UK)
Ph.D. Mechanical Engineering (UiTM)

Research interests: Human-Robot Interaction (HRI); Humanoid Robot; Rehabilitation Robotics; Autism Rehabilitation; Kansei Engineering

Dr. Ruzaidi bin Zamri
ruzaidi@utem.edu.my

B.Eng. Mechanical Engineering (UTM)
M.Eng. Mechanical (Advanced Manufacturing Technology) (UTM)
Master of Education (UTM)
Ph.D. Manufacturing System Engineering (UPM)

Research interests: Image Processing; Optimization; Artificial Intelligence

Dr. Toibah binti Abd Rahim
toibah@utem.edu.my

B.Eng. Material (International Islamic University Malaysia)
M.Eng. Material (International Islamic University Malaysia)
Ph.D. in Mechanical Engineering (Toyohashi University of Technology, Japan)

Research interests: Ceramic, Biomaterials, Thermal Spray Coating, Materials Characterization

Ts. Dr. Zulkeflee bin Abdullah
zulkeflee@utem.edu.my

B.Sc. Mechanical Eng. Manufacturing (University of Western Ontario, Canada)
M.Eng. Mechanical – Advanced Manufacturing Technology (UTM)
Ph.D. Mechanical Engineering (University of Melbourne, Australia)

Research interests: Additive manufacturing, 3D Printing, Design for Manufacture Assembly, Spatial Visualisation, Reading Interpreting Engineering

Dr. Zurina binti Shamsudin
zurina.shamsudin@utem.edu.my

B.Eng. Mechanical and Material Engineering (UKM)
M.Sc. Mechanical Engineering (UKM)
Ph.D. Mechanical Engineering (University of Sheffield, UK)

Research interests: Composite Materials (Polymer, Ceramic), Green Materials, Non -Metal Processing, Single Fiber Testing

Dr. Khairul Fadzli bin Samat
khairul.fadzli@utem.edu.my

B.Eng. Mechanical Engineering (UTM)
M.Eng. Mechanical (UTM)
Ph.D. Mechanical Engineering (Tohoku University, Japan)

Research interests: Product Design; Engineering Design; Syntheses and Analysis; Vibration and Noise

LECTURER

Adibah Haneem binti Mohamad Dom
adibah@utem.edu.my

B.Eng. Materials (UM)
M.Sc. Materials Engineering (UM)

Research interests: Biomaterials Coating

Ammar bin Abd. Rahman
ammar@utem.edu.my

B.Eng. Mechanical Engineering (UNITEN)
M.Eng. Global Production Manufacturing (Technical University of Berlin, Germany)

Research interests: Production Engineering & Operations Management

Fatimah binti Md Radzai
fatimahradzai@utem.edu.my

B. Eng(Hons) Mechanical Engineering (UTP)
M.Eng Manufacturing Engineering (Industrial Engineering), UTeM

Research interests: Industrial Engineering, Manufacturing Management

Hazman bin Hasib
hazman@utem.edu.my

B. Eng. Manufacturing Engineering (Manufacturing Process) (UTeM)
M.Sc. Industrial Engineering (North Carolina State University, USA)

Research interests: Rapid Manufacturing; 3D Modeling, FEA; CAD; Product Design

Mahasan bin Mat Ali
mahasan@utem.edu.my

B.Eng. Manufacturing Engineering (Robotics & Automation) (UTeM)
M.Eng. Manufacturing System (UPM)

Research interests: Automation; Green Technology; Mobile Robot

Dr. Masni-Azian binti Akiah
masni.azian@utem.edu.my

B.Eng. Engineering/CADCAM (UM)
M.Eng. Manufacturing (UM)
Ph.D. Mechanical Science and Bioengineering (Osaka University, Japan)

Research interests: Bioengineering; Computational Modeling and Simulation

Mohd Shahrizan bin Othman
mshahrizan@utem.edu.my

B.Sc. Applied Science (Mathematics & Economy) (USM)
M.Sc. Statistics (USM)

Research interests: Mathematics, Operational Research

Dr. Muhammad Syafiq bin Syed Mohamed
syafiq@utem.edu.my

B.Eng. Engineering Industry Ergonomics (Univ. of Wisconsin Madison, USA)
M.Sc. Industrial Engineering (Ergonomics) (University of Wisconsin Madison, USA)
Ph.D. Occupational Safety and Health (UPM)

Research interests: Industrial Ergonomics, Occupational Safety & Health

Dr. Nurazua binti Mohd. Yusop
nurazua@utem.edu.my

B.Eng. Production System Engineering (Toyohashi University of Technology, Japan)
M.Sc. Mechanical Engineering (Utsunomiya University, Japan)
Ph.D. Mechanical and Materials Engineering (UKM)

Research interests: Product Design; Green Manufacturing

Nurul Wirdah binti Mafazi
nurulwirdah@utem.edu.my

B.Sc. Mathematics (USM)
M.Sc. Mathematics (USM)

Research interests: Mathematics

Ruzy Haryati binti Hambali
ruzy@utem.edu.my

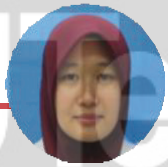
B.Sc Manufacturing Engineering (UIA)
M.Sc. Advance Manufacturing Technology (University of Portsmouth, UK)

Research interests: Rapid Product Development

Dr. Shariman bin Abdullah
shariman@utem.edu.my

B.Eng. Manufacturing System (Fluid Flow) (University Of Tokushima, Japan)
M.Sc. Mechatronics (Loughborough Univ., UK)
Ph.D. Mechanical Engineering (Mobile Robotic) (UTM)

Research interests: Robotic; Mobile Robot; Mobile Manipulator; Active Force Control



Dr. Silah Hayati binti Kamsani
silah_hayati@utem.edu.my

B.Eng. Manufacturing Engineering with Management (USM)
M.Eng. Manufacturing Engineering (UNSW, Australia)
Ph.D. Mechanical Engineering (University of Birmingham, UK)

Research interests: Continuous optimization; Industrial automation

Siti Rahmah binti Shamsuri
rahmah@utem.edu.my

B.Eng. Material Engineering (USM)
M.Eng. Mechanical (Materials) (UTM)

Research interests: Corrosion, Metallic material

STAFF DIRECTORY

Technical Staff

Laboratory Coordinator

Dr. Mohd Shahadan bin Mohd Suan
mohdshahadan @utem.edu.my
B.Eng. Materials Engineering (USM)
M.Eng.Materials Engineering (USM)
Ph.D. Materials Engineering (UM)

Head of Assistant Engineer (Performing as function)

Mohd Remy bin Ab Karim
remy@utem.edu.my
Diploma of Mechanical Engineering (Marin Technology) (UTM)
Bachelor in Manufacturing Management, OUM

Senior Assistant Engineer

Azhar Shah bin Abu Hassan
azharshah@utem.edu.my
Certificate of Mechanical Engineering – Manufacturing (Port Dickson Polytechnic)

Mohd Hanafiah bin Mohd Isa
hanafiah@utem.edu.my
Diploma of Mechanical-Product (Pusat Latihan Teknologi Tinggi-Batu Pahat)

Muhamad Asari bin Abdul Rahim
asari@utem.edu.my
Certificate of Mechanical Engineering – Manufacturing (Port Dickson Polytechnic)

Assistant Engineer

Ahmad Faizul bin Ahmad Tajudin
ahmadfaizul@utem.edu.my
Certificate of Mechanical Engineering - Materials (Johor Baharu Polytechnic)

Bahatiar bin Zaid
bahatiar@utem.edu.my
Certificate of Manufacturing Engineering (Port Dickson Polytechnic)

Hairulhisham bin Rosnan
hairulhisham@utem.edu.my
Bachelor in Manufacturing Management with Honour, (OUM)
Master of Manufacturing Engineering (System Manufacturing), UTeM

Hasnorizal bin Hairuddin
hasnorizal@utem.edu.my
Certificate of Manufacturing Engineering (Sultan Haji Ahmad Shah Polytechnic)

Mazlan bin Mamat@Awang Mat
mazlanmamat@utem.edu.my
Certificate of Manufacturing Engineering (Johor Baharu Polytechnic)

Mohd Farihan bin Mohammad Sabtu
farihan@utem.edu.my
Diploma of Mechanical Engineering - Manufacturing (Sultan Mizan Zainal Abidin Polytechnic)

Mohd Ghazalan bin Mohd Ghazi
ghazalan@utem.edu.my
Certificate of Mechanical Engineering (Automotive)(Dungun Polytechnic)
Diploma of Mechanical (Automotive) (Kota Baharu Polytechnic)

Mohd. Nazri bin Abd Mokte
mohdnazri@utem.my
Diploma of Engineering (UTM)

Mohd Taufik bin Abd. Aziz
mohdtaufik@utem.edu.my
Diploma Kemahiran Malaysia
- Production (Batu Pahat, ADTEC)

Mohd Zahar bin Sariman @ Sarman
zahar@utem.edu.my
Certificate of Mechanical Engineering
- Manufacturing (Johor Baharu Polytechnic)

Muhammad Azwan bin Abdul Kadir
azwan@utem.edu.my
Diploma Pengajar Vokasional Kebangsaan (CIAST)

Muhammad Helmi bin Kahar
helmi@utem.edu.my
Diploma of Mechanical Engineering
- Technology Manufacturing (Johor Baharu Polytechnic)

Nizamul Ikbal bin Khaeruddin
nizamul@utem.edu.my
Certificate of Mechanical Engineering
– Manufacturing (Port Dickson Polytechnic)

Norzuriyahni binti Abu Bakar
zuriyahni@utem.edu.my
Diploma of Technology Manufacturing (Batu Pahat ADTEC)

Shamsiah Hasita binti Shafie
hasita@utem.edu.my
Certificate of Technology Manufacturing (Port Dickson Polytechnic)

Siti Aisah binti Khadisah
sitiaisah@utem.edu.my
Diploma Kemahiran Malaysia
- Production (Batu Pahat ADTEC)

Amran Bin Ab. Sani
amran@utem.edu.my
Electronic Certificate (Giatmara)
AOChargemanCertificate(Energy Commission)
SHO (Niosh) Course certificate


STAFF
DIRECTORY
Administrative
Staff

Senior Assistant Registrar

Noor Asyikin binti Sulaiman
asyikin@utem.edu.my
Bachelor of Management (Honours) (USM)

Assistant Registrar

Fadzlin binti Amzah
fadzlin@utem.edu.my
Bachelor of Human Sciences (Political Science), IIUM
MBA (Technology & Innovation Management), UTeM

Senior Assistant Administrative Officer

Masuriya Hani binti Ab Wahid
masuriya@utem.edu.my
Bachelor of Applied Arts with Honour - Art Management (UNIMAS)
M.A. Malay Letters (UKM)

Assistant Administrative Officer

Khairul Faiz bin Zainal
khairul.faiz@utem.edu.my
Diploma in Accounting (Polytechnic Merlimau)

Administrative Assistant (Secretarial)

Nurhayati binti Mohd Shariff
nurhayatim@utem.edu.my
Diploma in Secretarial Science (UiTM)

Chief Administrative Assistant

Abdul Rahman Rosli bin Mahmood
roslimahmood@utem.edu.my
Sijil Tinggi Pelajaran Malaysia

Senior Administrative Assistant (Clerical)

Amiza binti Hj Talib
amiza@utem.edu.my
Diploma In Public Admin (UiTM)

Norlizawati binti Ab Rahaman
norlizawati@utem.edu.my
Diploma Pengurusan Teknologi, (UTM)

Siti Rohani binti Manan
sitirohani@utem.edu.my
Sijil Pelajaran Malaysia

Operation Assistant

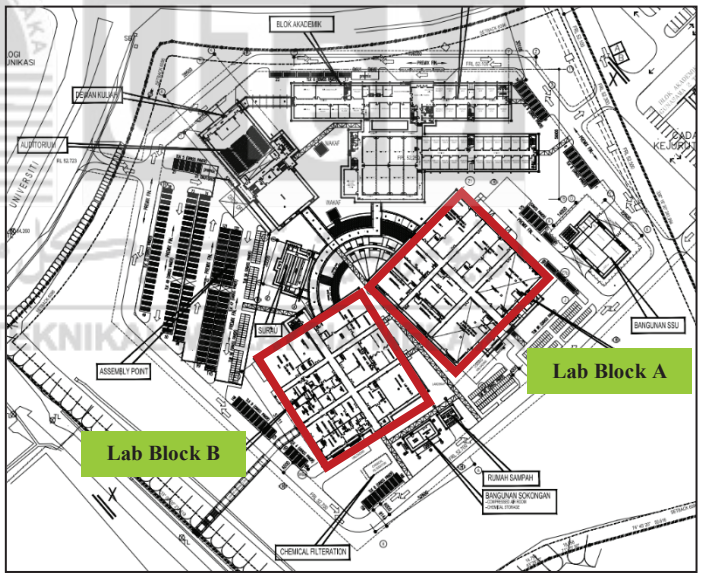
Mohamad Akhir bin Yawah
mohamad.akhir@utem.edu.my
Sijil Pelajaran Malaysia

LABORATORIES AND FACILITIES

Laboratories

The Faculty has developed the laboratories suitable with subjects offered for the courses. Through these laboratories, students are exposed to related machine usage experience as well as practical exposure on processes involved in production in effort to prepare themselves to become not only a knowledgeable engineer but also highly competitive in application and technical aspects. In total, the faculty is equipped with 14 laboratories and workshops.

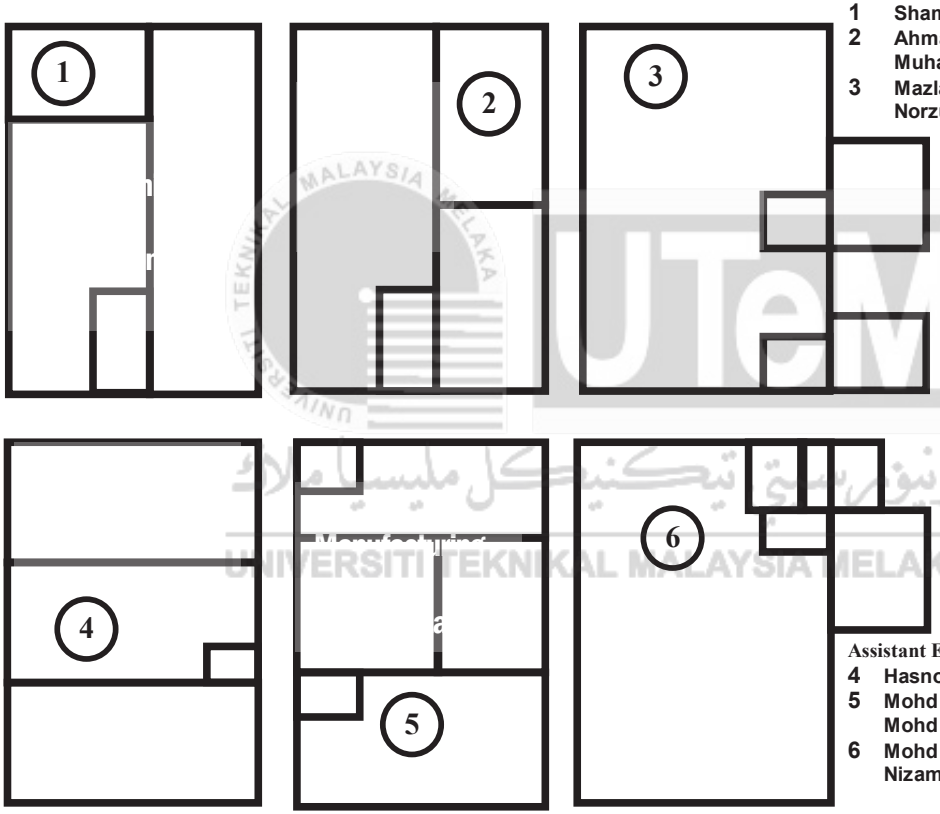
Each laboratory is advised by an academic staff lab advisor. The lab management is also supported by technical support staff led by an assistant engineer. The tools, machines and equipment of each laboratory are developed by the departments. The lab management is responsible to the daily usage, consumables and maintenance of the labs.



Aerial view of lab location at Fakulti Kejuruteraan Pembuatan

Location of Laboratories

Venue: Block A



Assistant Engineer

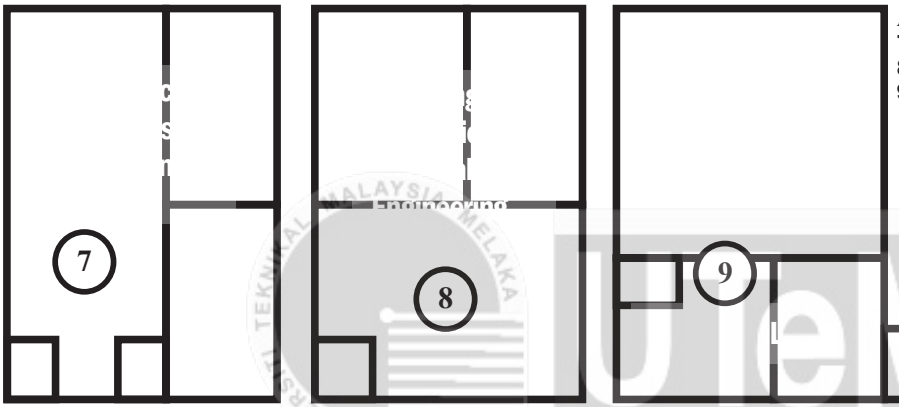
1 Shamsiah Hasita Shafie
2 Ahmad Faizul Ahmad Tajudin
Muhammad Azwan Abdul Kadir
3 Mazlan Mamat @ Awang Mat
Norzuriyahni Abu Bakar

Assistant Engineer

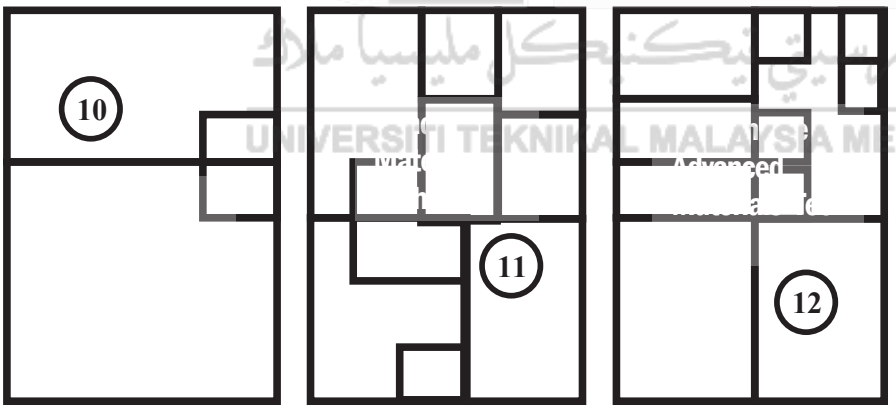
4 Hasnorizal Hairuddin
5 Mohd Hairrudin Kanan
Mohd Zahar Samiran @ Sarman
6 Mohd Ghazalan Mohd Ghazi
Nizamul Ikbal Khaeruddin

Location of Laboratories

Venue: Block B



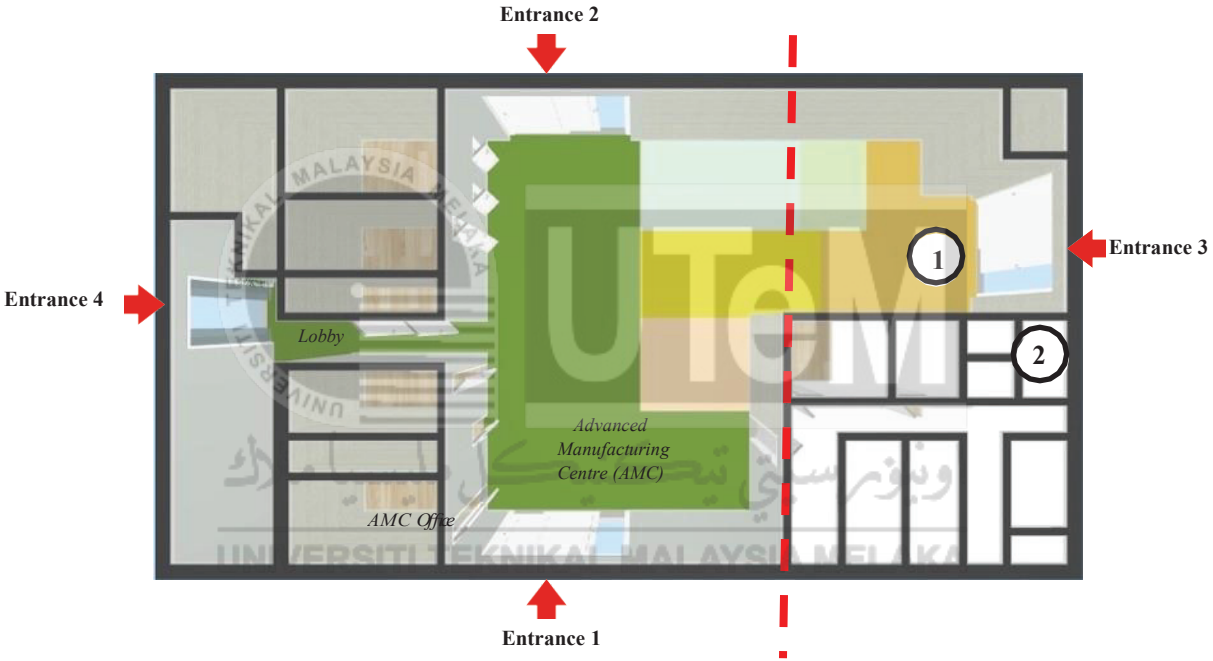
Assistant Engineer
7 Mohd Remy Ab Karim
8 Mohd Nazri Abd Mokte
9 Siti Aisah Khadisah



Assistant Engineer
10 Mohd Hanafiah Mohd Isa
Mohd Taufik Abdul Aziz
11 Azhar Shah Abu Hassan
Mohd Farihan Mohamad Sabtu
12 Bahatiar Zaid
Muhammad Helmi Kahar

Location of Laboratories

Venue: PFI B



Laboratories	Assistant Engineer
① Welding and Project Lab	Muhamad Asari Abdul Rahim
② XRD, Polymer and Project Lab	Hairulhisham Rosnan

List of Machines/Equipments

	Lab Name	Location	Machine/Equipment	Software
1	Machine Shops Lab	FKP Block A	· Turret Milling (Bridgeport)	
			· Boring machine (Gate)	
			· Universal Milling Machine (Holke)	
			· Lathe machine (Momac)	
			· Surface Grinding (Gate)	
			· EDM Die Sinking (SODDICK)	
			· CNC Turning Center (HAAS)	
			· CNC Milling (DMG)	
			· General equipment	
			· Pedestal Drilling Machine	
			· Belt Sander Machine	
2	Metal Sheet and Joining Lab	FKP Block A	· Welding fume system	Weld trainer
			· Spot welding (belum install)	
			· Arc, MIG, &TIG Welding	
			· Robotic Welding (OTC& KUKA)	
			· CNC Press Brake (AMADA)	CADMAN-B
			· Hydraulic Shearing Machine (VIKING)	CADMAN-P
			· Profile Bending	CADMAN-L
			· Rolling Machine (LVD)	
			· Laser Cutting Machine (LVD)	
3	Manufacturing Design and	FKP Block A	· Multimedia computer set	SolidWork2017
			· UPS for PC	Inventor 2017

	Innovation Lab		· General equipment	Autocad 2017
			· Multimedia computer	SolidWork2017
			· UPS for PC	Inventor 2017
			· General Equipment	Autocad 2017
			· PC Workstation	ANSYS
			· General equipment	
4	Computer Aided and Process Planning Lab	FKP Block A	· HP Colourlaserjet 5500	Catia V5R19
			· HP Designjet 800	- 40 licenses
			· Multimedia computer set	
			· General equipment	
			· PC Workstation	DFMA
			· Z-Corp 3D Printer	Sima Pro
			· 3D Printers	
			· Vacuum Casting System General equipment	
5	Robotics and Control Lab	FKP Block A	· Computers	MATLAB
			· UPS	
			· General equipment	
			· ABB Rhino Robot	
			· ABB Parallel Robot	
			· MTAB Robot	
			· COMAU Robot System	
			· Senes Robot System	

6	Advanced Mechatronic and Automation Lab	FKP Block A	· Pneumatic Equipment	Omron CP1E
			· Pneumatic workbench	
			· PLC Siemens	Workspace, Industrial Automation
			· Conveyor	
			· Xy table	
			· Mechatronic related machines	
7	Metrology Lab	FKP Block B	· CMM Inclusive PC and Printer (WENZEL)	
			· Horizontal Comparator	
			· Vertical Comparator	
			· Digital Height Measuring Station	
			· CNC Roundness Measuring System (MAHR)	
			· Universal Measuring Machine (MAHR)	
			· Dehumidifier unit	
			· Mitutoyo granite surface table	
8	Advanced Precision Machining Lab	FKP Block B	· CNC Milling (HAAS)	CNC Train (Cutting Tool Path Simulator)
			· CNC Wirecut (MITSUBISHI)	
			· General equipment	
			· Gear Train Apparatus	
			· Static Experiments Apparatus	
			· Static &Dinamic Balancing Apparatus	

9	Modelling Simulation and Quality Control Lab	FKP Block B	· 30 computers	- Minitab Software for statistical analysis, quality control and design of experiment.
			· 40 computers	- Witness simulation software
			· 30 computers	- Minitab Software for statistical analysis, quality control and design of experiment.
10	Nano Material Tech Lab	FKP Block B	· Equipment For Experiment On Viscosity For Newtonian & Non Newtonian Liquids	
			· Equipment For Experiment On Dielectric Constant Of Different Materials	
			· Equipment For Experiment On RLC Measuring Bridge	
			· Equipment For Experiment On Torsional Vibrations And Torsion Modulus	
			· Equipment For Experiment To Measure The Velocity Of Light	
			· Equipment For Experiment To Determine Surface Tension Using The Ring Method (Du Nouy Method)	
			· FTiR machine (JASCO)	
			· UV-Vis	
			· Mini Sputter Coater SC 7620	
			· "Water Deionizers L-Series Model : L-20"	
			· Horizontal tube furnace	

			· Digital gas flow meter for nitrogen gas	
			· "Water Distiller Favorit W4L"	
			· "Memmert Oven, Germany Model : UF110	
			· Waterbath WNB22 C/W Sloping Cover 22L	
			· Stirring mantel 500ml	
			· "Tablet Hardness Tester (Portable)	
			· General equipment	
			· Chemstore Ducted Chemical Storage	
			· Fume Cupboard	
			· Microscope Axioscope 2 MAT (ZEISS)	
			· Reflected Light Optical Microscope (LEICA)	
			· Universal Testing Machine	
			· Scanning Electron Microscope	
			· Rockwell Hardness Tester: (Mitutoyo Japan, Wizhard-HR 500/523)	
			· Stiffness Apparatus:(TE 16)	
			· Particle Size Analyzer	
11	Sustainable Advanced Materials Tech Lab	FKP Block B	· Hydraulic Hot Press	
			· General equipment	
			· Differential Scanning Calorimeter	
			· PVD Coating VAC-TEC	
			· Lab Station with Measuring Extruder and Internal Mixer	
			· Laboratory Hydraulic Hot Moulding	

12	Ergonomic and Industrial Engineering Lab	FKP Block B	· Prototype Assembly Line	
			· Digital Stop Watch	
			· General equipment	
			· Surface Electromyography	
			· Motion Capture System	
			· Classic Human Eye Model	
			· Digital Sound Level Meter	
			· Flicker Fusion	
			· General equipment	
			Production assembly simulation	
13	Project Laboratory 1	PFI B - TP	· X-Ray Difractometer	
14	Project Laboratory 2	PFI B - TP	· Arc, MIG, &TIG Welding	
			· Casting Furnace	
			· Casting training kits	
			Lathe	
			Milling	

LAB SAFETY GUIDELINES

Students shall abide to the laboratory guidelines at **ALL** times.

General Laboratory Procedures

1. All procedures at FKP laboratory are according to FKP Lab Quality Management System (SPKM) available at the labs. Students are also to abide all other UTeM student regulations.
2. No person should work in the laboratory area alone.
3. Do not operate any item of equipment unless you are familiar with its operation and have been authorized to operate it. If you have any questions regarding the use of equipment ask any FKP staff.
4. Think through the entire job before starting. Before starting a machine, always check it for correct setup and always check to see if machine is clear by operating it manually, if possible.
5. No work may be performed using power tools unless at least two people are in the shop area and can see each other.
6. All machines must be operated with all required guards and shields in place.
7. A brush, hook, or special tool is preferred for removal of chips, shavings, etc. from the work area. Never use the hands.
8. Avoid excessive use of compressed air to blow dirt or chips from machinery to avoid scattering chips. Never use compressed air guns to clean clothing, hair, or aim at another person.
9. Machines must be shut off when cleaning, repairing, or oiling.
10. Heavy sanding and painting should only be done in well-ventilated areas, preferably on the patio.
11. Do not drink beverages before or during work in the machine shop area. Do not bring food/snacks into the laboratory.
12. Hand phones are not allowed to be use in the laboratories
13. Do not work in the shop if tired, or in a hurry.
14. Don't rush or take chances. Obey all safety rules.

Dress Safely

① All students are required to wear their FKP Lab Jackets at all times while working in the labs. In the case of not having one, students are advice to wear close fitting clothing made of hard, smooth finished fabric. Such fabric will not catch easily on sharp edge or to be wrapped around drills or other rotating tools.

② Do not wear ties, loose clothing and clothes that expose body parts. Long hair must be tied back or covered to keep it away from moving machinery. Hand protection in the form of suitable gloves should be used for handling of hot objects, glass or sharp-edged items.

③ Wear clean, properly fitted eye protection. Always wear personal protective equipment such as safety glasses, goggles, or face shields where required.

④ Shoes must be worn in all FKP laboratories. Soft canvas shoes and open toe sandals offer no protection. Students wearing this will NOT be allowed to enter any laboratory. The minimum footwear must cover the entire foot. This will protect your feet against hot, hard chips and sharp or heavy falling objects. Safety shoes offer the best protection, but ordinary leather shoes also provide considerable protection.

⑤ Ring, wrist watches, bracelets can get caught on equipment and cause serious injury.

⑥ Never wear gloves while operating rotating machines. They are easily caught in moving parts, which can cause serious injury on the hand; suitable gloves should be used for handling hot objects, glass or sharp-edged items.

Housekeeping

(1) Practice cleanliness and orderliness in the shop areas.
(2) Floors, machines, and other surfaces must be kept free of dirt and debris.
(3) Wood, plastics and metal chips, sawdust, and other debris must be routinely cleaned if collection systems are not in place and operating.
(4) A brush, hook, or special tool is preferred for removal of chips, shavings, etc. from the work area. Never use bare hands.
(5) Keep the floor around machines clean, dry and free from trip hazards. Do not allow chips to accumulate.
(6) If floor surfaces are wet or become wet during work activities, they should be protected with a non-slip coating or covering. A wet floor signage must be put up immediately. Immediately inform the FKP staff.

Material Storage & Handling

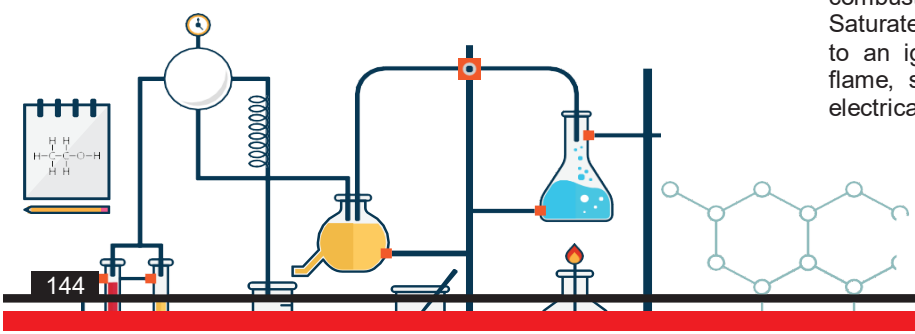
(1) Materials which are used are to be taken and return to storage area.
(2) Material should not be put on the floor, and may not be stored where they will obstruct way out from the area. Use shelves or cabinets as appropriate to store materials.
(3) Stock materials must be stored in such a manner as to prevent falling, slipping, or rolling.

Chemicals

(1) Chemicals must be stored in cabinets approved for that use, as appropriate.
(2) Do not store incompatible chemicals together. Chemicals reactions will cause fire.

Flammable and Combustible Liquids

(1) Flammable and combustible liquids include, but are not limited to, materials such as gasoline, oils, some paints, lacquers, thinners, cleaners, and solvents.
(2) To determine if a material or product is flammable or combustible, read the manufacturers label on the product.
(3) Only approved containers and portable tanks may be used for the storage and handling of flammable and combustible liquids.
(4) Flammable liquids must be kept in closed containers when not actually in use.
(5) Keep flammable liquids away from all sources of heat. An empty container can hold enough liquid or vapors to support an explosion.
(6) Clean up spills immediately; the longer the liquid vaporizes the more hazardous the area becomes.
(7) All flammable and combustible liquid containers must be properly labeled.
(8) Cloth, paper rags, or material that has been saturated with flammable or combustible liquids must be disposed at an approved storage location.
(9) Always remove/replace clothing that has become saturated with a flammable or combustible liquid even if it is just a little. Saturated clothing can easily ignite if exposed to an ignition source, such as radiant heat, flame, sparks or slag from hot work, or an electrical arc.



Fire Prevention

(1) Learn the location of the nearest fire alarm as well as the nearest fire exit.
(2) Learn the location and use of fire protection equipment in the building. Fire extinguisher which use a dry chemical or carbon dioxide should be readily available at all times.
(3) Place oily rags or waste in proper metal containers.
(4) Always close containers of inflammable materials such as paints or oils after used. Return them to their proper storage containers.

First Aid

(1) Always inform FKP staff immediately when you or another student are injured, no matter how slight the injury.
(2) Get first aid kit as soon as possible. It is a good practice to let slight or moderate cuts bleed for a few moments before stopping the flow of blood. Severe cuts or bruises should receive the immediate attention of a doctor.
(3) Burns should also be treated promptly. Severe burns should receive a doctor's attention immediately. In case of Emergency students must be taken to the nearest General Hospital.

Environment

(1) Ensure that the laboratory areas have adequate lighting to perform the work safely
(2) Sufficient ventilation and noise control are needed to control exposures to harmful dusts, mists, fumes, chemicals, or noise.

Near Misses, Accidents and Emergencies

(1) Should any near misses, accidents, or emergencies occur, please notify the person in charge of the lab.
(2) Details such as time, place and how it happened must be described properly for further action by FKP management.

Emergency Contacts

The following contact numbers are useful in the case of emergency:

UTeM's clinic (Main campus)	06-555 2076
Melaka Hospital	06-289 2543
Pejabat Keselamatan	06-2702857
Rakan Keselamatan Universiti (RKU)	06-3316020 012-294 6020
Ayer Keroh Police Station	06-2321222
Ayer Keroh Fire and Rescue Brigade	06-2319154
Emergency (police / fire / brigade / hospital)	999

QUALITY ASSURANCE SYSTEM

The university has obtained the MS ISO 9001:2000 Quality System Certificate on 4th February 2005. The latest Quality Management System is based on ISO 9001:2015. The certificate is for the scope of Provision of Education Services at Undergraduate & Postgraduate and Activities of Research Management as well as Provision of Education Support Services as an effort to deliver a high-quality education services. The ISO 9001:2015 certificate acknowledges the standards of operations in UTeM.

EXTERNAL EXAMINERS

BMFG (2021-2023):

Professor Ir. Dr. Muhammad Azmi bin Ayub
College of Engineering, UiTM
- PhD in Mechatronics -Loughborough University, United Kingdom (2004).
- Master of Science (Mechatronics and Optics)- Loughborough University, United Kingdom (1996).
- Bachelor in Engineering (Mechanical)- UNSW, Sydney Australia (1989).

BMFI (2021-2023):

Professor Dr. Abdul Talib bin Bon
Department of Production and Management,
Professor of Technology Management and Business, UTHM.
- PhD in Computer Science -Universite de La Rochelle, France (2008)
- Master of Business Administration (Quality Management)- UKM (1998)
- B (Hons) (Mechanical Engineering)- UTM (1991)

DMF (2021-2023) :

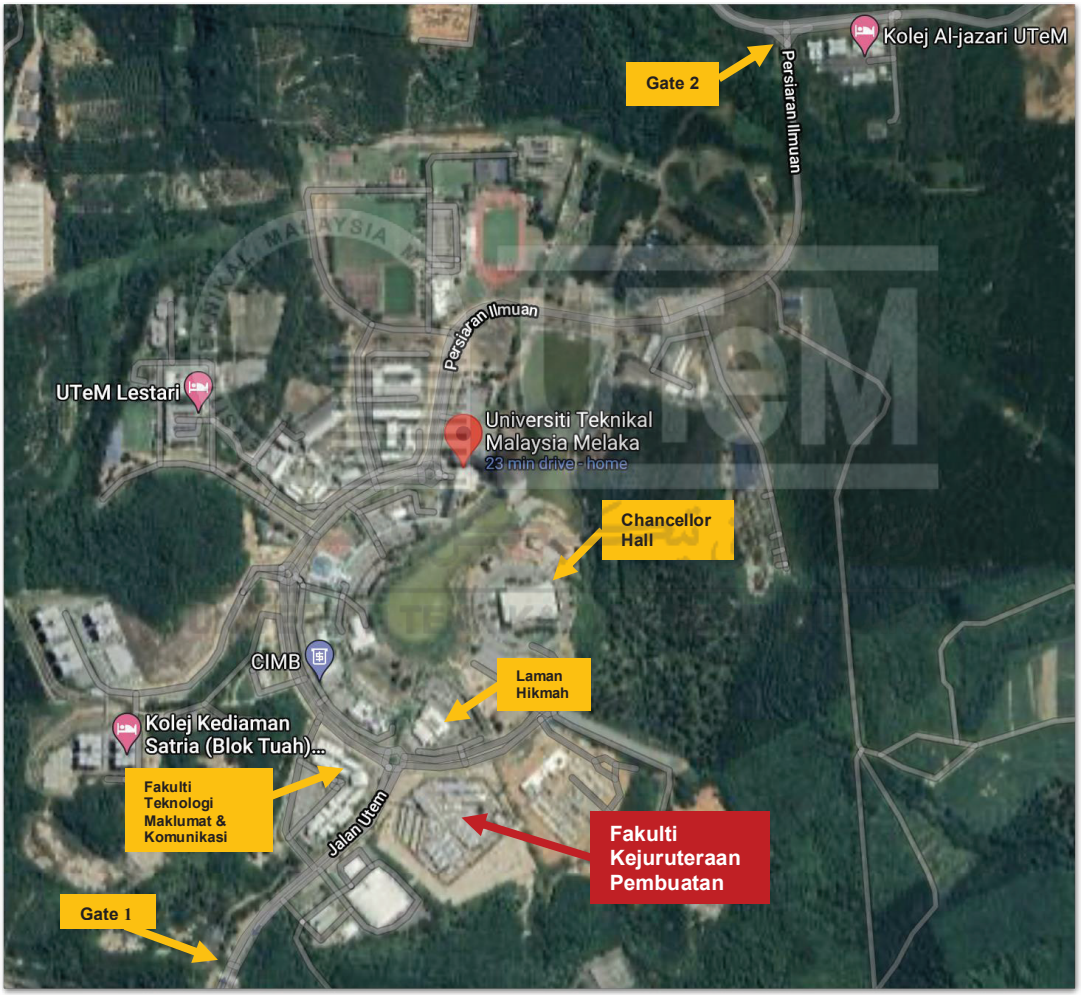
Professor Ir. Dr. Khairol Anuar bin Mohd Ariffin
Department of Mechanical and Manufacturing Engineering,
Faculty of Engineering, UPM.

- PhD in Mechanical Engineering -University of Sheffield,UK (2006)
- Master of Science (Manufacturing System Engineering)-UPM (2001)
- Degree in Manufacturing System Engineering (Hons)-University of Northumbria at Newcastle (1998)

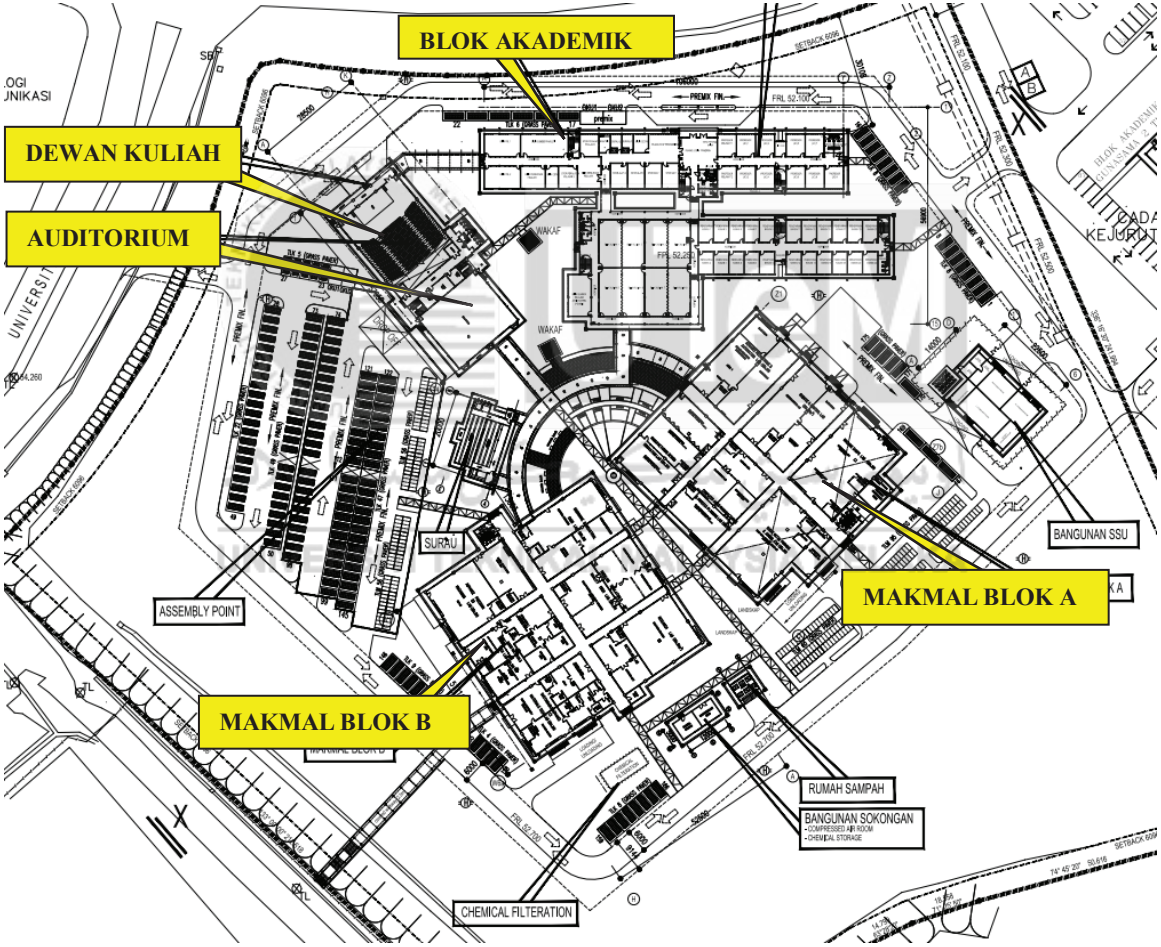
INDUSTRIAL ADVISORY PANEL

- **Ir. Hanizan bin Mohd Husin**
  Malaysian Refining Company Sdn Bhd (MRCSB)
- **En. Ku Azrin Ku Mohamad**
  PETRONAS Lubricants International Sdn. Bhd
- **Tn. Hj Ibrahim bin Hamzah**
  Metrology Corporation
- **En. Nazrul Hisham bin Nawi**
  G7 Aerospace Sdn. Bhd.
- **Ir. Mohd Hazwan Mohamed Haniffa**
  SIRIM Berhad
- **Pn. Siti Norhana Bt Elian**
  ST Microelectronics Sdn Bhd.
- **Ir. Dr. Abdul Azim bin Abdul Rahman**
  Steelcase Office Solutions (M) Sdn. Bhd
- **En. Mohd Izzad bin Ismail**
  Hospital Pantai Sungai Petani
- **En. Abdul Rahim Bin Haji Hitam**
  Ingress Technologies Sdn. Bhd.
- **En. Ahmad Sophien Bin Abu Kassim**
  Honda Malaysia Sdn. Bhd

UTeM CAMPUS MAP



FKP MAP


BLOK AKADEMIK
DEWAN KULIAH
AUDITORIUM
ASSEMBLY POINT
MAKMAL BLOK A
MAKMAL BLOK B
BANGUNAN SSU
RUMAH SAMPAH
BANGUNAN SOKONGAN
CHEMICAL FILTERATION
SURAU

FAKULTI KEJURUTERAAN PEMBUATAN
FACULTY OF MANUFACTURING ENGINEERING

For further enquiries, kindly refer to;

Dean,
Faculty of Manufacturing Engineering,
Universiti Teknikal Malaysia Melaka,
Hang Tuah Jaya,
76100 Durian Tunggal,
Melaka, Malaysia.
Website: https://fkp.utem.edu.my