

Bachelor of Bioresource Technology with Honours ACADEMIC HANDBOOK



School of Industrial Technology
Universiti Sains Malaysia
www.indtech.usm.my

Academic Handbook
Bachelor of Bioresource Technology with Honours
Academic Calendar 2024/2025

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Full version of the Academic Handbook

Vision and Mission

Universiti Sains Malaysia

Vision

Transforming Higher Education for a Sustainable Tomorrow

Mission

USM is a pioneering, transdisciplinary research intensive university that empowers future talents and enables the bottom billions to transform their socio-economic well-being

Vision and Mission

School of Industrial Technology

Vision

World class centre in technological innovation for a sustainable tomorrow

Mission

1. To be the prime education provider of technologists who are competent, capable of independent thinking, possess communication and analytical skills, and able to fulfil the needs in various industries and socio-economic development.
2. To pursue cutting-edge research in the fields of Food Technology, Bioresource Technology, Environmental Technology, and Bioprocess Engineering Technology.
3. To contribute to the well-being of the community through sustainability-led dynamic transdisciplinary academic programmes, research innovation, teamwork, and continuous improvement.

Niche Research Area

School of Industrial Technology

Sustainable Materials, Processing, and Energy Technologies

History

School of Industrial Technology

1973

The School of Industrial Technology commenced with the establishment of the School of Applied Sciences. The School offered the Bachelor of Applied Science programmes in Electronic Science and Technology, Food Science and Technology, and Polymer Science and Technology.

1984

The name of the School was changed to the School of Engineering Sciences and Industrial Technology. Hence, the curricula were amended to Bachelor of Engineering (B. Eng) and Bachelor of Technology (B. Tech) to meet the requirement of engineering and industrial technology courses.

1986

The School was split into :

- School of Electrical and Electronic Engineering
- School of Materials and Mineral Resources Engineering
- School of Industrial Technology

School of Industrial Technology offered Bachelor of Technology programmes in Food Technology, Polymer Science and Technology, Quality Control & Instrumentation, and Wood, Paper and Coatings Technology.

2001

Polymer Technology and Quality Control & Instrumentation programmes were upgraded into:

- Polymer Engineering programme
- Mechatronic Engineering programme

1999

Environmental Technology programme was introduced by School of Industrial Technology.

2002

Wood, Paper and Coatings Technology programme was renamed Bioresource, Paper and Coatings Technology programme.

2008

Bioprocess Technology programme was introduced by School of Industrial Technology.

2018

Master of Science (Environmental Science) programme was introduced by School of Industrial Technology.

2020

Bioresource, Paper and Coatings Technology programme was renamed Bioresource Technology programme.

2022

Bioprocess Technology programme was changed to Bioprocess Engineering Technology programme.

Management

School of Industrial Technology



- | | |
|--|--|
| 1 Dean | Assoc. Prof. Dr. Mardiana Idayu Ahmad |
| 2 Deputy Dean (Academic, Career & International) | Dr. Nurul Fazita Mohammad Rawi |
| 3 Deputy Dean (Research, Innovation & Industrial - Community Engagement) | Assoc. Prof. Dr. Japareng Lalung |
| 4 Programme Chairman (Food Technology) | Assoc. Prof. Dr. Uthumporn Ultra @ Sapina Abdullah |
| 5 Programme Chairman (Environmental Technology) | Assoc. Prof. Dr. Yusri Yusup |
| 6 Programme Chairman (Bioresource Technology) | Ts. Dr. Azniwati Abd Aziz |
| 7 Programme Chairman (Bioprocess Technology) | Dr. Mohamad Hafizi Abu Bakar |
| 8 Deputy Registrar (Postgraduate & Human Resource) | Mdm. Nooraida Mad Naser |
| 9 Senior Assistant Registrar (Academic & Administration) | Mdm. Rasslene Rass Rasalingam |

Academic Programme

The School of Industrial Technology offers the following bachelor degrees:

- Bachelor of Food Technology with Honours
- Bachelor of Bioresource Technology with Honours
- Bachelor of Environment Technology with Honours
- Bachelor of Bioprocess Engineering Technology with Honours

Acceptance to any of the above programmes is subjected to selection and entry qualification. Most of the first year courses consist of basic science courses in Chemistry, Mathematics, Physics, and Computer. From level 200, all students are required to enrol for courses relevant to their respective programmes up to level 300 (Bioresource and Environmental Technologies) or 400 (Food and Bioprocess Engineering Technologies), whereby they are required to conduct one final year research project.

Students are also required to undergo industrial training in various industries relevant to their study programme for 12 (Food, Bioresource, and Environment Technologies) or 24 (Bioprocess Engineering Technology) weeks. This training is aimed at exposing the students to actual working practice and atmosphere of the industry.

Bioresource Technology

This programme offers a comprehensive curriculum, which covers the basic and applied aspects of bioresource (wood and non-wood biomass) in the production of various bio-based products. Coatings technology for bioresource-based products is also highly emphasized. Students will learn about macro to nano scales fibre science and technology, bioplastic, pulp and paper production and testing, paper recycling, fundamentals of resins and biocomposites, paint, and product design while gain practical skills through hands-on classes and internship programme. The program is also designed to equip graduates with soft skills such as effective communication, interpersonal relation skills and critical thinking to help them actualize their intellectual capacity, which would in turn enhance their employability in a variety of related industries.

The curriculum of Bioresource Technology covers three stages of study, which emphasize on relevant course sequence, besides ensuring that teaching learning is distributed evenly throughout the whole period of study.

Programme Educational Goal & Objectives

The goal of the Bachelor of Bioresource Technology with Honours degree programme is to produce graduates who have specialised expertise, solid knowledge, critical thinking, creative, research skills in the field of Bioresource Technology to meet the employable needs of the country in various related industries or agencies and graduates and able to lead the community for sustainable national development.

Therefore, the Bachelor of Bioresource Technology with Honours degree programme is designed to produce graduates:

- who are competent, creative, innovative and capable of solving problems in Bioresource Technology on the global and society level for sustainable development.
- who can communicate and work in interdisciplinary teams effectively in the Bioresource Technology field.
- who have leadership skills, a positive attitude, and professional ethics in the Bioresource Technology field.
- who can contribute to society's well-being and the sustainability of the environment.
- who have an interest in entrepreneurship and constantly strive to acquire new knowledge through research, continuing education and/or professional development activities.

Mentor-Mentee System & Counselling Service

The mentors are appointed among the academic staff of the school who provide assistance and guidance to students, mainly in academic matters. However, the school has established an open mentor system, whereby probation students are free to see any of the mentors. Nevertheless, probation students are recommended to discuss academic-related problems with mentors from their own programme.

The mentors appointed are as listed below:

No.	Name	Room No.	Phone Extension	E-mail Address
1.	Dr. Nur Izzaati Saharudin	343	5216	nurizzaati@usm.my
2.	Ts. Chm. Dr. Mohamad Shazeli Bin Che Zain	150	2214	shazeli@usm.my

Programme Learning Outcomes

At the end of the programme, students will be able to:

1. Acquire the advanced and comprehensive theoretical and technical knowledge and skills in the area of Bioresource Technology specialised (Knowledge).
2. Apply extensive technical skills in the area of Bioresource Technology specialisation (Practical Skills).
3. Identify and resolve issues and problems in a critical, creative, and innovative manner in the area of Bioresource Technology specialisation (Cognitive Skills).
4. Acquire the skill to communicate effectively in a well-structured manner to a diversity of audiences (Communication Skills).
5. Display a sense of responsibility and master social skills in diverse learning and working communities locally and internationally (Interpersonal Skills).
6. Understand and manage to make decision in a professional and ethical manner within the varied social and professional environment and practice (Ethics and Professionalism).
7. Manage current information and recognise the importance of lifelong learning (Personal Skills).
8. Acquire entrepreneurial knowledge base for career development (Entrepreneurship Skills).
9. Function effectively as an individual and in a team with the ability to lead within broad organisational scales. (Leadership, Autonomy and Responsibility).
10. Demonstrate basic digital skills and technological application for living, learning and working in a society (Digital Skills).
11. Demonstrate numeracy skills in all aspects of life (Numeracy Skills).

Programme Requirements

Course Code Classification	Normal Programme	Min. Total Unit Requirements
T	72	120
E	30	
U	18	

Notes:

T (core courses) – compulsory courses for a particular area of specialisation that must be taken and passed.

E (elective courses) – courses must be taken by students with elective programme to strengthen their technology specialisation courses.

U (university requirements) – courses to fulfil the university requirements.

Details of Programme

Type of Programme	Structure of Programme
Bachelor of Bioresource Technology with Elective	Students choose several elective courses to widen their specialisation area and their knowledge in industrial technology.

Graduation Requirements

- ☑ Fulfil the minimum required (7 semesters) of the residential requirement for the programme of study and has not exceeded the maximum period of study (12 semesters).
- ☑ Fulfil all credit requirements of the courses for the programme of study required units such as the requirements for each component (core, elective, and university courses or option).
- ☑ Obtained a CGPA of 2.00 and above for core courses.
- ☑ Obtained a CGPA of 2.00 and above for the programme.
- ☑ Achieved a minimum of 'C' or a grade point of 2.00 for Bahasa Malaysia, English (4 units), Appreciation of Ethics and Civilisations, Philosophy and Current Issues, and Core Entrepreneurship courses.

University Requirements for Graduation

LOCAL STUDENTS		INTERNATIONAL STUDENTS	
Compulsory Courses	Units	Compulsory Courses	Units
❖ LKM400/2 Bahasa Malaysia IV	2	❖ LKM100/2 Bahasa Malaysia I	2
English Language (MUET Band 5+)		❖ English Language courses	4
❖ LHP410/2, LHP411/2, or LHP412/2 and/or		* Students may obtain advice from the School of Languages, Literacies and Translation if they have different English Language Qualification.	
❖ Foreign language courses			
English Language (MUET Band 5)			
❖ LSP301/2 General English 2 and			
❖ LHP410/2, LHP411/2, or LHP412/2			
English Language (MUET Band 4.0 & 4.5)	4		
❖ LSP201/2 General English 1 and			
❖ LSP301/2 General English 2			
English Language (MUET Band 3.5 and below)			
❖ LSP101/2 Progressive English*			
or			
❖ Re-sit MUET			
* Prerequisite for LSP201/2 General English 1			
❖ HFE224/2 Appreciation of Ethics and Civilisations	2	❖ HFF225/2 Philosophy and Current Issues	2
❖ HFF225/2 Philosophy and Current Issues	2	❖ SEA205E/4 Malaysian Studies	
❖ WUS101/2 Core Entrepreneurship	2	❖ Option/English Language	4
			2
❖ WAR122/2 Integrity and Anti-Corruption	2	❖ Co-curricular	2
Optional Courses	Units	Optional Courses	Units
❖ Co-curricular/Skills Courses/Foreign Language Courses/Options		❖ Co-curricular/Skills Courses/Foreign Language Courses/Options	
❖ WSU101/2 Sustainability: Issues, Challenges & Prospect	4	❖ WSU101/2 Sustainability: Issues, Challenges & Prospect	4
❖ HTV201/2 Thinking Techniques			
Minimum Requirements	18	Minimum Requirements	18

Note: Student must pass all University courses with the minimum grade of C.

Curriculum Structure

COURSE TYPE	LEVEL 100 (2024/2025)		LEVEL 200 (2025/2026)		LEVEL 300 (2026/2027)		LEVEL 400 (2027/2028)		TOTAL UNIT
	SEMESTER 1	SEMESTER 2	SEMESTER 1	SEMESTER 2	SEMESTER 1	SEMESTER 2	SEMESTER 1	SEMESTER 2	
CORE (T)	IUK102/3 IUK191/4 IWK100/2 IWK102/4	IWK101/4 IWK103/4 IWK105/4	IUK108/4 IWK201/4 IWK203/4 IWA284/2 IWA282/2	IWK205/3 IWA283/2	IWK301/3 IWA382/2 IWA383/2 IWA313/8**	IWK308/3 IWA381/2 IWA313/8**	IWA404/6*		72
	13	12	16	5	11	9	6		
ELECTIVE (E)	IUK107/4	IEK115/3 IUK291/4	IBK212/2	IEK108/3 IEK217/3 IUK208/3 IWK204/3 KAT245/4	IEK212/3 IWK304/3 IWK307/2	IWK305/2 IWK306/2			30
	4	7	2	16	8	4			
UNIVERSITY (U)	WUS101/2 LKM400/2 or Ko-K/1-2	WSU101/2 WAR112/2 LKM400/2 Ko-K/Skill Courses/ Foreign Languages Courses/Option/2	HFF225/2 HTV201/2	HFE224/2 LSP101/2 or LSP201/2	LSP201/2 or LSP301/2	LSP301/2			18
	3-4	8	4	4	2	2			
TOTAL MINIMUM CREDIT FOR GRADUATION									120

* Students must register for this course online during their internship.
 ** Course is offered in TWO (2) semesters (unit counted per semester is 4).

List and Synopsis of Courses

Level 100

1. IEK108/3 Process Fluid Mechanics

Course Prerequisites: s IUK101/3

This course introduces students to the concept of fluid statics, incompressible and compressible fluid flow, as well as flow across submerged bodies. Students will also be exposed to the topics of metering, separation, mixing, and pumping. Other topics include Fanning friction factor, pumping power and cost, as well as flow rate calculations.

2. IEK115/3 Environment, Safety and Health Legislation

This course exposes the student to the concept of environmental, occupational safety and health management based on two main acts, Environmental Quality Act 1974 and the Occupational Safety and Health Act 1994. This course uses a case study learning approach.

3. IUK102/3 Basic Chemical Process Calculations

This course is about general calculations involved in chemical processes. The students will be exposed to mass and energy balance and the steps needed to solve related problems. These topics will help the students solve problems effectively through the correct problem-solving methodology, relevant data collection and data analysis. This course also introduces the student to the properties and phase behaviour of steam, gases as well as basics of chemistry and physics.

4. IUK107/4 Chemistry for Technologist

This syllabus is aimed to be comprehensive in scope and mainly intended to strength the applied chemistry background of the students. Students will learn the basics of inorganic chemistry, nuclear and radiochemistry, organic chemistry, and instrumental analysis. Spectroscopy methods such as FT-IR, NMR, ICP, and AAS will be used for the characterisation of functional groups, hydrogen atoms characterisation, and analysis of inorganic elements.

5. IUK108/4 Statistic with Computer Applications

This course discusses on probability models for quality control of discrete random variation: random variation, cumulative distribution function, mean, variance and standard deviation. The course also discusses Discrete distribution: hypergeometric distribution, Binomial distribution, Poisson distribution, Continuous distribution, Normal distribution, exponential distribution and uses in reliability modelling.

6. IUK191/4 Mathematics I

This course introduces the concepts of functions and limits of single variable. Linear, polynomial, logarithmic, exponential and trigonometry functions will be discussed. The focus will be on the understanding of concept and solving of differentiation and integration with applications. Students are then introduced to differential equations focusing on separable differential equation and first-order linear equations. Matrices and determinants are taught in solving systems of linear equations by using Gauss and Cramer methods.

7. IWK100/2 Bioresource as Industrial Raw Materials

This course introduces students to the various types of lignocellulose materials. Main resources of raw materials from the forest and agricultural wastes will be discussed. Benefits to economy, national and international trade will also be discussed. The potential of lignocellulose as a source of energy will be introduced. Emphasis is also given on the resources from the non-wood, such as oil palm, bamboo, rattan, and other types of the lignocellulose fibres, as raw materials for pulp and paper, biocomposites (thermoplastic, thermoset and elastomer), and others applications. Various types of products and the importance of raw materials for products application derived from the bioresources will be highlighted.

8. IWK101/4 Basic Coatings Technology

This course comprises of the introduction to the basics of polymer science, chemistry of addition polymerisation by free radical initiators, ionic and etc. It also discusses on the chemistry for condensation polymerisation and copolymerisation. Industrial polymerisation techniques include bulk, solution, emulsion, suspension and etc. Polymer solution and dispersion rheology encompasses basic concept, rheology parameter measurement, basic concept on polymer structure; crystalline, semi-crystalline and amorphous polymer behaviour. Characterisation of polymer consists of molecular weight definition, molecular weight measurement and various polymer characterisation techniques.

9. IWK102/4 Basic Bioresource Science and Technology

This course is a basic introduction to structure of bioresource and organisation of wood anatomy – fibre, vessel, parenchyma. Wood cell ultrastructure – cell wall organisation, microfibril. Physical property of wood; moisture content, shrinkage and wood swelling, density. Mechanical property of wood; wood-flexural strength, compression, tension, shear, impact, MOR, MOE. Natural resistance of wood. Degradation and wood destructive agents – termites, fungi, insects, borer, parasite and control. Electrical and acoustic properties of wood. Preservation - chemicals (CCA, boric-borate, etc), preservation schedule. Wood drying - kiln and air-drying process, relationship of water vapour movement in wood drying, degradation resulting from drying and ways to reduce degradation. Production and machining of sawn timber.

10. IWK103/4 Pulp Production and Paper Recycling

This course emphasises on the principles of pulping, chemical recovery, pulp bleaching and paper recycling. The main topics include various types of raw material for pulping, effects of biomass components on pulping, principles and types of pulping and pulp bleaching, advantages and disadvantages of conventional and chlorine-free bleaching, paper types, resource and various types of secondary fibres, utilisation rate and waste paper procurements. The advantages and disadvantages of paper recycling in terms of economical and technical aspects are also included.

11. IWK105/4 Bioresource Based Products

Course Prerequisites: s IWK102/4

This course teaches the students on wood composites and wood chemical technologies. Wood composites technology deals with comparing the efficiency between wood composites and bulk wood. Students will be exposed to the technologies of producing ply woods, particle boards, fibre boards, laminated veneer woods, parallel strand woods, and other wood composites – properties, processing and utilisation. Wood chemical technology will include chemicals obtained from trees and lignocellulose; thermal modification; charcoal and activated carbon; wood gas, and chemical modification.

Level 200

12. IBK212/2 Renewable Biomass

This theoretical course will expose students to various type of renewable biomass materials that can be used as substrate in the production of different bioprocess products. Focus is emphasised on the importance of this renewable biomass in human life for decades to come. On the other hand, to various methods and technologies that involves in biomass conversion to value-added product, such as chemical, biochemical, and thermochemical method, will be introduced to the students.

13. IEK212/3 Process Heat Transfer

Course Prerequisites: s IUK102/3

This course introduces the student to the fundamental principles of heat transmission by conduction, convection, radiation, and evaporation. This course will also discuss on the applications of these principles to the solution of industrial heat transfer problems and the design calculations for industrial heat exchanger equipment.

14. IEK217/3 Environmental Management

This course exposes the students to the concept of planning, implementation and management of the environment through systematic methods. The methods mainly discussed in this course are the Environmental Management System in-line with the international standard ISO 14001 and Environmental Impact Assessment (EIA) along with Environmental Management Plan (EMP). Furthermore, students will learn other methods, such as environmental performance evaluation, environmental labelling and Life Cycle Assessment (LCA).

15. IUK208/3 Experimental Design with Computer Applications

This course discusses on the Replication, Randomisation, Blocking, and Definitions in Experimental Design (Experiment, Treatment, Factor, Level, Experimental unit, Experimental design, Random, Replicate).

Completely Randomised Design: Randomisation, Analysis of variance, equal replication and unequal replication, Estimation of the model Parameters, Comparison of Individual Treatment Means: Comparing of pair Treatment Means, Comparing with a control, orthogonal contrast.

Randomised Block Design: blocking, Randomised block design, Model and Assumptions, Missing values, Relative efficiency. Latin Square design Incomplete Block design: balanced incomplete block designs, Partially Balanced incomplete block designs.

Factorial Experiments (Designs): General factorial experiments, 2k Factorial experiment, 3k factorial experiment, Confounding, regression analysis, Response surface: Method of steepest ascent, Analysis of second-order model, Location of stationary point, Designs for fitting the first-Order and second-order models. Mixture experiments.

16. IUK291/4 Mathematics II

Course Prerequisites: s IUK191/4

This course expands the concepts of functions and limits to two variables. Linear, polynomial, logarithmic, exponential and trigonometry functions will be discussed. The focus will be on the understanding and solving partial derivatives of differentiation and solving double and triple integration with simple applications. Students are then introduced to differential equations focusing on separable differential equation and second-order linear equations. Infinite series, Taylor-MacLaurin series and Fourier series are taught with a view to examine the theory and properties of certain functions that can be represented as sums of series.

17. IWA281/2 Coatings Technology Laboratory I

Course Prerequisites: s IWK101/4

This course is a practical course which teaches students how to prepare polymeric resins for coating applications. The resins prepared are unsaturated polyester resin, epoxy resin, polyvinyl acetate and polymethyl methacrylate. Methods of preparation are systematically outlined. Basic resin properties are also studied. Students are familiarised with the application of each resin in the coating industry.

18. IWA282/2 Bioresource Technology Laboratory I

Course Prerequisites: s IWK102/4

This is a laboratory course that analyse bioresource structure and anatomical organisation of bioresource. Students will learn how to measure physical properties of bioresource such as moisture content, shrinkage and swelling and density. Student will be doing and measure the strength of the bioresource - bending, compression, tensile, shear, impact, MOR, and MOE. The students will determine the chemical composition of bioresource. This include the extractive, cellulose, hemicellulose, and lignin.

19. IWA283/2 Paper Technology Laboratory I

Course Prerequisites: s IWK103/4

This practical course will expose the students to various kinds of pulping methods such as craft, soda and chemi-mechanical. Students are also required to run the pulp beating and lab papermaking process; also pulp and paper testing.

20. IWK201/4 Raw Materials and Coatings Chemistry

Course Prerequisites: s IWK101/4

This course teaches the students on various material components that are required to prepare coating products such as paints, adhesives and printing inks. Specific raw materials used for each component are identified. The preparation, properties and functions of the raw materials are systematically discussed. The chemistry of coatings is also covered in this course in order to enhance the scientific knowledge in coatings.

21. IWK203/4 Stock Preparation and Papermaking

Course Prerequisites: s IWK103/4

This course covers general stock preparation and papermaking processes which are being practiced in the paper industry. Stock preparation part involves the pulp disintegration, pulp beating, wet-end additives addition, pulp blending, metering, and approach flow system. Including the stock preparation on secondary fibre (waste paper) processes, such as re-pulping, washing, cleaning, and de-inking. For papermaking part, its covers formation of paper, pressing, drying, calendaring and reeling processes.

22. IWK204/3 Bioresource, Paper and Coatings Product Development

In this course steps involved in developing a product are discussed. Product design is the main focus of this course. Students will be exposed to various types of materials, material properties and processing techniques used to make products. The technique to choose the most suitable material and processing technique to produce a selected product will also be taught.

23. IWK205/3 Chemical Additives and Paper Properties

Course Prerequisites: s IWK203/4

This course emphasises on the importance of fibre properties in papermaking; analyses and measurement techniques of paper properties, including physical properties, mechanical strength, and optical properties. Besides, this course also discusses various additives that are used in paper industry including sizing agents, dry and wet strength additives, fillers, retention aids, surface sizing, dyes and pigments and brightening agents.

24. KAT245/4 Analytical Chemistry I

Course Prerequisites: s KOT122/4 or s KTT122/4

Stoichiometry calculations, statistical data treatment, concepts of equilibrium, gravimetric analysis, acid-base equilibria, acid-base titrations, complexometric titrations, precipitation reactions and titrations, electrochemical cells, and redox titrations.

Level 300

25. IWA313/8 Research Project of Bioresource, Paper and Coatings Technology

****Course is offered in TWO (2) semesters**

Course Prerequisites:

- (i) Students must take all core courses of levels 100 and 200.
- (ii) Students must also collect at least 40 credit units of core courses.

This course will introduce the student problems relating to Bioresource, Paper and Coatings Technology fields. Through research, the student will be tasked to solve the problem. Lecturers will supervise the students in carrying out the literature search, laboratory work, and dissertation writing. The student will also attend a series of lectures on research philosophy, experimental design, scientific thinking, laboratory safety, thesis writing, viva voce presentation.

26. IWA381/2 Coatings Technology Laboratory II

Course Prerequisites: s IWA281/2

This course is related to the synthesis of alkyd resin and pigment for paint formulation, dyeing, and preparation of rubber-based adhesive. Students are taught to apply their theoretical knowledge to practical application. This course also trains students to analyse and discuss critically on the various experiments which they have performed.

27. IWA382/2 Bioresource Technology Laboratory II

Course Prerequisites: s IWA282/2

This practical course enables students to analyse and understand the mechanical, physical, thermal, and fundamental identification characterisation of fibres raw materials, include thermosets and thermoplastics matrices. Chemical modification of lignocellulosic (solid wood and plant fibres) will be prepared and analysed. Production of conventional biocomposites, thermoplastics, and thermosets (filled/reinforced) composites will be produced and characterised.

28. IWA383/2 Paper Technology Laboratory II

Course Prerequisites: s IWA283/2

This course exposes the students to the process of pulp bleaching including the calculation of chemical used and analyses of the resultant pulp and paper properties, determination of paper properties, and starch content of commercial paper products, and also the process of paper recycling. Experiments involved are determination of various commercial paper properties, bleaching of pulp, determination of starch content of commercial papers quantitatively, and effect of pH and beating toward re-pulping.

29. IWK301/3 Coatings Process and Equipment

Course Prerequisites: s IWK201/4

This course deals with coating, which covers paint technology in details. Individual component used in paints and formulation will be explained. Corrosion control and barrier coatings will be discussed in detail. Also, standard testing methods will be elaborated to evaluate the performance of the paints. Furthermore, colour systems will be classified by different methods.

30. IWK304/3 Furniture Manufacturing

Course Prerequisites: s IWK102/4

This course is a combination of theory and practical on basic knowledge related to the production of furniture. The focus will be on planning, designing, processing steps, different types of machines used in furniture production, various types of joints used in furniture making, finishing processes, and introducing some aspects of ergonomic pertaining to furniture manufacturing.

31. IWK305/2 Advanced Technology of Coatings

Course Prerequisites: s IWK201/4

This course covers the advanced technology related to coating in industry. The students are exposed to various aspects of coating technology. Particular emphasis is given to release coating, coating methods for pressure-sensitive adhesives, specialty rubber adhesives, and ultraviolet (UV) and electron beam (EB) radiation curing. The students are familiarised with the materials selection and applications for each coating technology.

32. IWK306/2 Fibre and Lignocellulosic Composite

This course is about the fundamental study of natural fibre, especially non-wood type from agriculture waste, such as rice husk and oil palm biomass, and the importance of in producing a composite. Natural adhesive source from lignocellulosic like tannin, lignin, furfural alcohol, and starch will be also included in this course. Students will learn about the preparation of lignocellulosic based composites, include polymer matrix composite by various types of process and moulding, such as extrusion, compression moulding, injection moulding, and resin transfer moulding. In addition, the interfacial properties of a composite, interaction between filler/fibre and polymer matrix, and surface treatment of natural fibre will be discussed.

33. IWK307/2 Advanced Paper Technology – Instrumental Analysis for Pulp and Paper

This course exposes students to the various instrumental techniques for analysis of biomass, pulp, paper and materials related to the papermaking industry. Emphasis is placed on the criteria, application and capacity of an instrumental technique to provide students the necessary problem-solving skill involving the application of solo and serial analysis using advanced and classic instrumental techniques. The course supports students' higher-order thinking skills through exposure to case studies as a way of simulating problem-solving situation.

34. IWK308/3 Mechanics of Structural Materials

Course Prerequisites: s IUK191/4

This course focuses on topics of material strength, mechanical testing, and fracture mechanics of a material. Particular emphasis is given to bending properties of various types of beam, such as straight beam and curved beam. These include the deflection of a beam, shearing force, and bending moment of a beam.

Level 400

35. IWA404/6 Bioresource, Paper and Coatings Technology Industrial Training

Course Prerequisites: Students have completed FOUR (4) semesters of study, regardless of the accumulated units.

This course involves placement of students to undertake internship at industries. During the internship, students are able to gain an insight into industrial practices and appreciate how principles of science, technology and management are applied in the actual workplace.

Academic Staff

Prof. Datuk Ts. Dr. Abdul Khalil Shawkataly

Prof. Dato' Dr. Azhar Mat Easa

Prof. Dr. Liong Min Tze

Prof. Dr. Norli Ismail

Assoc. Prof. Dr. Cheng Lai Hoong

Assoc. Prof. Dr. Husnul Azan Tajarudin

Assoc. Prof. Dr. Lee Chee Keong

Assoc. Prof. Dr. Japareng Lalung

Assoc. Prof. Dr. Leh Cheu Peng

Assoc. Prof. Dr. Mardiana Idayu Ahmad

Assoc. Prof. Ts. Dr. Mohamad Anuar Kamaruddin

Assoc. Prof. Dr. Mohamad Haafiz Mohamad Kassim

Assoc. Prof. Dr. Muhammad Izzuddin Syakir Ishak

Assoc. Prof. Dr. Tan Joo Shun

Assoc. Prof. Dr. Tay Guan Seng

Assoc. Prof. Dr. Uthumporn Utra @ Sapina Abdullah

Assoc. Prof. Dr. Yusri Yusup

Dr. Abdorreza Mohammadi Nafchi

Dr. Ana Masara Ahmad Mokhtar

Dr. Arniza Ghazali

Ts. Dr. Azniwati Abd Aziz

Dr. Effarizah Mohd Esah

Dr. Esam Bashir Abdulsalam Yahya

Dr. Harlina Ahmad

Dr. Hayati Samsudin

Dr. Khozema Ahmed Ali

Dr. Kushairi Mohd Salleh

Dr. Lee Lai Kuan

Dr. Maizura Murad

Dr. Mark Harris Zuknik

Dr. Mohamad Hafizi Abu Bakar

Ts. ChM. Dr. Mohamad Shazeli Che Zain

Dr. Mohd Asyraf Kassim

Dr. Mohd Hafidz Jaafar

Dr. Mohd Nurazzi Norizan

Dr. Mohd Saiful Samsudin

Dr. Muaz Mohd Zaini Makhtar

Dr. Musfirah Zulkurnain

Dr. Noor Aziah Serri

Dr. Nor Hawani Salikin

Dr. Nor Shariffa Yussof

Dr. Norazatul Hanim Mohd Rozalli

Dr. Noreen Suliani Mat Nanyan

Dr. Norhaniza Amil

Dr. Norlia Mahrer

Dr. Nur Izzaati Saharudin

Dr. Nurul Fazita Mohammad Rawi

Ts. Dr. Siti Baidurah Yusoff

Dr. Siti Balqis Zulfigar

Dr. Syahariza Zainul Abidin

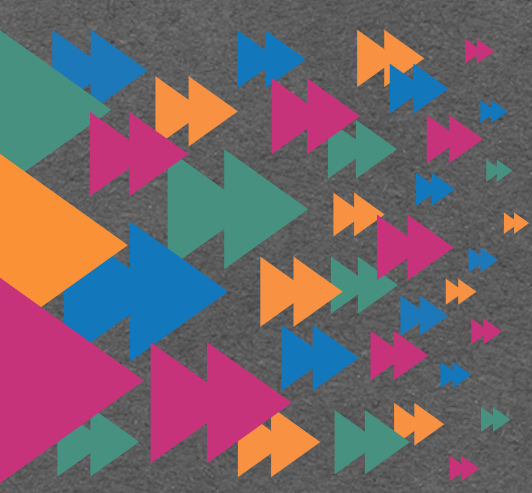
Dr. Sumarni Mansur

Dr. Syahidah Akmal Muhammad

Dr. Tan Thuan Chew

Dr. Widad Fadhullah

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