

**CURRICULUM STRUCTURE
BACHELOR OF TECHNOLOGY IN WELDING WITH HONOUR**

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEM	FIRST	SECOND	FIRST	SECOND	FIRST	SECOND	SM	FIRST
COURSES	BVW1014 Safety in Welding	BVW1043 Product Design in Welding	BVW2074 Imperfection in Welding and Testing	BVW2154 Capstone Technopreneurship 1	BVW3154 Capstone Technopreneurship 2	BVW3204 Reclamation in Welding	BVW3286 Final Year Project 2	BVW4212 Industrial Training
	BVW1024 CAD and Welding Graphic	BVW1054 Welding Documentation	BVW2084 Material Behaviour in Welding	BVW2114 Computer Aided Analysis	BVW2124 Electrical Welding Equipment	BVW3214 Managing Production/Supervi sory		
	BVW1034 Metal Fabrication Process	BVW1064 Non-Conventional Welding Process	BVW2094 Safety Management	BVW2134 Non Destructive Test	BVW3114 Economic of Welding and Procurement	BVW3284 Final Year Project 1		
	UGE2022 Technopreneurshi p	UHF1111 Mandarin for Beginners	BVW2104 Welding Design Analysis	BVW3124 Welding Quality Assurance	BVW3193 Cyber Physical System in Welding			
	UHC1012 Falsafah dan Isu Semasa	UHL2442 Essential English	UHL2452 English for Vocational Purpose	UHS1022 Softskills	BVW3**4 Elective			
	UQB1**1 Cocurriculum 1	UQB2**1 Cocurriculum 2	UHF2111 Mandarin for Intermediate	UHC2022 Penghayatan Etika dan Peradaban				
TOTAL CREDIT	17	15	19	20	19	12	6	12
TOTAL CREDIT FOR GRADUATION	120							

**ELECTIVE COURSE TO BE OFFERED IN
BACHELOR OF TECHNOLOGY IN WELDING WITH HONOURS**

NO.	CODE	COURSE	CREDIT HOUR
1	BVW3314	Automotive Industry and Technology	4
2	BVW3**4	Welder Inspector (to be offered)	4
3	BVW3**4	Welder Specialist (to be offered)	4
4	BVW3**4	NDT Inspector (to be offered)	4
Total Minimum Credit of Elective Subjects for Graduation			4

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)	
PEO1	To produce welding technologist that perform related welding work including maintenance, fabricator, design, safety advisor and production manager.
PEO2	To produce technopreneurs in related welding technology.
PEO3	To produce relevant, respected and referred professionals in welding technology.

PROGRAMME OUTCOMES (PO)	
PO1	Knowledge Apply knowledge of technology fundamentals to broadly-defined procedures, processes, systems and methodologies in the field of automotive study
PO2	Practical Skills and High Technology Able to suggest and apply latest tools and techniques to solve broadly- defined problems
PO3	Analytical and Critical Thinking and Scientific Approach Demonstrate strong analytical and critical thinking skills to solve broadly- defined problems in the field of automotive study
PO4	Communication Skills Able to communicate and articulate effectively in both verbal and written among technologist communities and society at large.
PO5	Social and Responsibility in Society and Technologist Community Demonstrate understanding of the societal related issues and the consequent responsibilities relevant to broadly-defined technology practices.
PO6	Lifelong learning and information management Recognize the needs for professional development and to engage independent lifelong learning in specialist technologists.
PO7	Entrepreneurs and Management Skills Demonstrate an awareness of management and technopreneurship practices in real perspective.
PO8	Ethics and Professionalism Demonstrate professionalism and social and ethical consideration
PO9	Teamwork and Leadership Demonstrate leadership quality, mentoring and work effectively in diverse teams

**COURSE SYNOPSIS FOR DEGREE
TECHNOLOGY PROGRAMME
2022/2023**

WELDING TECHNOLOGY

BVW1014
Safety in Welding
Credit Hour: 4
Prerequisite: None

Synopsis

The aim of this course is to expose students on safety practices and procedures. The students are required to identify types of hazards that may incur in industries especially related to welding processes. The students are required to understand equipment, instruction and carefully review the material safety data sheets.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Identify welding hazards that impact the safety, health, and environment at working area.

CLO2: Explain the welding risk control by various procedures in the working environment.

CLO3: Control method or procedure to minimize or remove the impact of possible hazard in the working environment.

BVW1024
CAD and Welding Graphic
Credit Hour: 4
Prerequisite: None

Synopsis

The course will provide students with an understanding of the importance of engineering graphics as a communication tool specially for welding application. Student will be exposed to geometry drawing, orthographic drawing, section view, isometric drawing, assembly drawing, dimension, tolerance, welding symbol and standard codes using manual sketches and computer aided design (CAD) software.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Explain the engineering drawings include welding symbol and standard codes.

CLO2: Construct technical drawing using manual sketching and computer aided design.

CLO3: Communicate by using engineering drawings for welding application.

BVW1034
Metal Fabrication Process
Credit Hour: 4
Prerequisite: None

Synopsis

This course is to equip students with the knowledge of metal fabrication and welding technology to improve manufacturing expertise in providing human capital development at par with global technological developments.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Organizing themselves either its individuals or in groups during project generating process.

CLO2: Manipulating the basic principles and scientific processes and materials to produce products with reasonable judgment.

CLO3: Demonstrate understanding of the concept and use of the terms contained in metal fabrication and welding technology.

BVW1043**Product Design in Welding****Credit Hour: 3****Prerequisite: None**Synopsis

This subject covers product design problems, formulating design problems, concept design, configuration design, parametric design, product costing, project and teamwork especially for welding product application.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Apply an appropriate design method of developing a practical solution of product design problem.

CLO2: Develop a practical design solution through a systematic investigation of the product design problem especially welding product application.

CLO3: Communicate effectively in written, oral and visual including teamwork.

BVW1054**Welding Documentation****Credit Hour: 4****Prerequisite: None**Synopsis

The job of welding inspection requires that the inspector possess or have access to a great deal of information and guidance. Welding inspectors cannot evaluate a welded structure without information from the designer or the welding engineer regarding weld quality. The inspector also needs to know when and how to evaluate the welding. To satisfy this need, there are documents available to be performed. Many of these documents also include acceptance criteria with codes and standards. The course identifies the competence required in welding design, welding joint detail and welding symbol according to AWS/BS/ISO standard.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Apply welding procedure qualification and welder qualification Interpret various type of drawing design and symbol in welding according to related standard.

CLO2: Construct various type of drawing design and symbol in welding according to related standard.

CLO3: Demonstrate type of drawing design and symbol in welding as required according to related standard.

BVW1064**Non-conventional Welding Process****Credit Hour: 4****Prerequisite: None**Synopsis

This subject is to provide student with welding processes that are not commonly used in the current industries that can be categories as new or advanced welding technology. Students will be exposed all welding processes and required should be able to perform process selection when deal with the special and complex demand of welding work.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Identify types of joining processes applied in manufacturing sector.

CLO2: Explain the characteristics of joining in terms of process, equipment and setup.

CLO3: Practice the joining processes using certain equipment to make variety of joints.

BVW2074
Imperfection in Welding and Testing
Credit Hour: 4
Prerequisite: None

Synopsis

The course will provide students with knowledge of identifying types of defects and the strategy of controlling the imperfection. The students will also require to perform mechanical destructive test that is tensile, bending, copy and hardness test. The competence required for checking fabrication materials, structural alignment & dimensions, checking welding quality (welding defect/distortion and weld repair).

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Apply welding inspection method.
CLO2: Implement the characteristics of metal properties and destructive testing.
CLO3: Analyse the inspection and other NDE methods.

BVW2084
Material Behaviour in Welding
Credit Hour: 4
Prerequisite: None

Synopsis

This course describes the materials used in engineering. Scope covers Materials introduction; latest developments in materials, introduction to metal, metal forging. Metal structure; scale relationship with nature, and phase diagram. This course also will provide the students with understanding of the Microstructure development with heat treatment and mechanical properties. The students will be exposed to light alloy processing and diffusion process with microstructural appearance on thermal and mechanical properties. This course also covers the knowledge of the ceramic classification, polymer classification and composite on microstructure relationship and mechanical properties.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Ability to classify metals based on generic properties, structural relationships with properties, especially the emergence of microstructures by heat treatment methods for the metal class.
CLO2: Understand the behavior of structural in fusion welding and testing of materials welded joints.
CLO3: Identifying the classification of composite and ceramic based on the testing and the microstructure.

BVW2094
Safety Management
Credit Hour: 4
Prerequisite: None

Synopsis

Safety management is a course that design to provide knowledge for managing activities in the business workplace that apply comprehensive management system designed to manage safety elements in the workplace. It includes acts, policy, objectives, plans, risk assessment, procedures, organisation, responsibilities and other measures. This is important to prevent accidents, injuries and other impact to the organisation that shows the role of management that focus to deter such catastrophic.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Explain the different requirements and regulations of Factory and Machinery Act, Occupational Safety and Health Act.
CLO2: Conduct hazard identification and risk assessment in workplace.
CLO3: Construct preventive and control technique according to the acts pertinent to the Occupational Safety and Health.

BVM2104
Welding Design Analysis
Credit Hour: 4
Prerequisite: None

Synopsis

The subject covers: Static: General principle, Force vector and Equilibrium of Particle; Mechanics: Principle of Stress & Strain, Torsion; Mechanics: Pure Bending and analysis and design of beams for bending; Welded design Program; Design Equations; Welded design Considerations; Design for welded joint; Weld joint design.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Describe basic concepts and fundamental principles of mechanical applications.

CLO2: Apply basic concepts and fundamental principles to solve design for welding application.

CLO3: Analyze basic problems in design considerations for welding.

BVW2114
Computer Aided Analysis
Credit Hour: 4
Prerequisite: None

Synopsis

This course will empower the students with fundamental knowledge and technical skills of 3D solid modeling skills using industry-proven 3D mechanical CAD software. The students will learn about the different techniques for creating solid models and surface with emphasis on design intent. The students also will expose to the introduction to FEA structure/stress analysis, FEA application for weld product (welding connection analysis). The course includes hands-on exercises and best practice methods for students during drafting stage, part, assembly (weld product) and Finite Element Analysis (weld product).

Course Learning Outcomes

By the end of semester, students should be

able to:

CLO1: Apply fundamental sketching and feature modeling, build feature based models of parts and assemblies for easy editing.

CLO2: Produce document design intent of parts and assemblies (include weld design) in manufacturing drawings.

CLO3: Analyse basic stress analysis for welding connection.

BVW2124
Electrical Welding Equipment
Credit Hour: 4
Prerequisite: None

Synopsis

This subject is aimed to provide the students with the understanding of static and dynamic characteristics of the electric arc and its associated power characteristics. Students will learn the basic principles, methods and circuit components that control operating power and the volt-ampere characteristics in electrical resistance and arc welding. Through that students will gain knowledge of the operating principles of Alternators, D.C. generators and motors used for welding.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Explain the physical phenomenon occurring in the arc and the types of forces and metal transfer in the arc based on measurements of power source characteristics.

CLO2: Select the right choice of diode material, thyristors and inverters based on the understanding of the basic principles and methods for controlling the volt-ampere characteristics of the electric welding machines.

CLO3: Measure the welding current, voltage, temperature, load and displacement using equipment's such as clamp meter, LVDT, arc welding analyzer and resistance welding monitors.

BVW2134
Non Destructive Test
Credit Hour: 4
Prerequisite: None

Synopsis

This course introduces the basic principles of non-destructive testing and the methods of non-destructive testing that are widely used in the industry, which are Visual Inspection, Penetrant Test, Magnetic Particle Testing, Eddy Current Testing, Ultrasonic Testing and Radiographic Testing. This course also covers the execution, evaluation and interpretation of each NDT techniques. The advantages, limitations and main application of each NDT techniques are also provided.

Course Learning Outcomes

By the end of semester, students should be able to:

- CLO1: Explain the current basic and some advanced principles of Non-Destructive Testing (NDT) techniques to satisfy complex engineering problems.
CLO2: Select and propose suitable NDT techniques based on their analysis on engineering problems that fulfill the standard practice.
CLO3: Develop the ability to communicate effectively using available resources to disseminate knowledge of NDT techniques in relation with industrial problem.
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BVW2154
Capstone Technopreneurship 1
Credit Hour: 4
Prerequisite: None

Synopsis

Entrepreneurs need money to start and to grow their business. It is important to understand how revenue is generated, how to source for funds, how to control cash flow, how to assess the success of the company in monetary terms, and how to value a company for various purposes. The course exposes students to the various financial aspects relating to new

ventures. These include approaches to secure start-up capital and venture financing. Students learn about the basic accounting, essential financial indicators, the funds available, the different categories of investors, the importance of intellectual property in securing finance, the financial details to be included in a business plan required for investment purpose, valuation of company and the art of negotiation with investors.

Course Learning Outcomes

By the end of semester, students should be able to:

- CLO1: Apply various financial indicators & tools to prepare for financial information for a new business venture.
CLO2: Acquire skills to analyze financial statements.
CLO3: Present financial information for new business.
CLO4: Display the art of negotiation with investors.
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BVW3114
Economic of Welding and Procurement
Credit Hour: 4
Prerequisite: None

Synopsis

The aim of this course is to provide participants with a clear understanding of the principles of effective procurement by utilising the capabilities to plan, implement, and evaluate a sourcing process appropriate to the value/ risk of the joining technology, materials/ part/ equipment being procured, communication and negotiation skills, and capacity to manage strategic supply, services and consultancy contracts. Besides is to acquire knowledge in welding economics in the selection of process, consumables and workpiece materials.

Course Learning Outcomes

By the end of semester, students should be able to:

- CLO1: Explain the importance of effective costing and the factors influencing welding

costs.

CLO2: Calculate welding costs that include machine, material and labour.

CLO3: Record of transactions in journal and ledgers, trial-balance and preparation of final account. use

BVW3124

Welding Quality Assurance

Credit Hour: 4

Prerequisite: None

Synopsis

This subject provides students with knowledge related with welding quality assurance. They will be taught with various topics covering Introduction to Welding Quality Assurance, Quality System Management and Responsibilities, Quality Assurance Planning, Welding Quality Standards, Inspections and Tests, Statistical Process Control, Nonconformances and Corrective Actions, Preventive Actions, Quality Audits, Records and Documents Control.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Design a plan for quality assurance and control in welding manufacturing process using according specifications and standards.

CLO2: Demonstrate the procedure and inspection techniques related to welding assurance and control.

CLO3: Apply creative thinking in problem solving to solve the problems associated with welding assurance and control.

BVW3154

Capstone Technopreneurship 2

Credit Hour: 4

Prerequisite: None

Synopsis

This course comprises two parts: in the first part, organization and human resource management are introduced; in the second part, the focus is on writing a convincing business plan to attract venture

capital investment. When enterprise company takes shape and grow, more people will be hired, proper organization, team building and human resource management will become important issues. In this course, students will be exposed to the various organizational aspects relevant to new ventures and established companies. These include the pros and cons of the unique organization structures, conflicts that may arise among employees, and approaches to building powerful teams. Human resource management techniques will also be introduced and discussed. In the second part of the course, the business model canvas will be described listing the connections among the different components of a business. The value of a business plan and the techniques of writing a business plan will be introduced.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Apply the business model canvas incorporating human and financial elements.

CLO2: Acquire skills to resolve organizational conflicts.

CLO3: Write a convincing business plan.

CLO4: Evaluate vital organizational behaviours necessary to grow a new venture.

CLO5: Motivate all stakeholders and build a cohesive venture team.

BVW3193

Cyber Physical System in Welding

Credit Hour: 3

Prerequisite: None

Synopsis

The aim of this course is to provide participants with a clear understanding of the potential application of cyber-physical systems (CPS) in welding industry. Competency in applying CPS technology, both with standalone and built-in CPS in analysis of welding parameters (e.g. current, temperature) and welding outputs (e.g. fume composition, welding bead) is

thought for improving the marketability of the graduates in the era industrial revolution 4.0.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Explain the added value that can be achieved through application of CPS in welding process.

CLO2: Demonstrate effectively the appropriate CPS tools in acquiring process variables in real time.

CLO3: Criticise the logged data acquired from conventional and non-conventional welding techniques.

BVW3204
Reclamation in Welding
Credit Hour: 4
Prerequisite: None

Synopsis

The aim of this subject is to acquire knowledge and to solve problems associated with failure and to update personal on the latest technology to ensure welded subject would be maintained in good operating condition and at low maintenance cost.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Repair quality of welding which will benefit the industry in term of productivity and savings.

CLO2: Develop the skills to carry out practical feasible repair techniques maintaining low cost.

CLO3: Selection of repair welding and apply techno-economics for practical problems.

BVW3214
Managing Production/ Supervisory
Credit Hour: 4
Prerequisite: None

Synopsis

Welding production planning is another very important element in manager's responsibility to allocate the resources required to achieve cost-effectiveness in welding processes. Furthermore, this subject shall cover managers' responsibility to maintain equipment and consistently meet throughput requirements with a level of quality that conforms to the required standards.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Identify the standardize the welding procedure.

CLO2: Identify required maintenance of equipment and record.

CLO3: Explain supervisor scope to minimize reject, scrap and rework reduce rework analyze the quality management system.

BVW3284
Final Year Project 1
Credit Hour: 4
Prerequisite: None

Synopsis

The student needs to plan and implement the project individually that related to the respective engineering technology field. The student should implement a project, do the analysis and apply the theory to solve the problems related to topic. At the end, the student should write a problem based learning report that covers problem statement, literature review, methodology to overcome the problem. The student needs to achieve the objectives of the project and presented it in the report.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Explain the problem, objectives and scope of project associated to the industrial or community needs.

CLO2: Use relevant theory to produce solution.

CLO3: Choose a proper methodology.

CLO4: Present the preliminary findings in the oral and written forms effectively.

BVW3286
Final Year Project 2
Credit Hour: 6
Prerequisite: None

Synopsis

This is the second part of the Bachelor Degree Project. Students are expected to continue the project performed in Bachelor Degree Project until completion. At the end of the semester, students are required to submit the Bachelor Degree Project report and present their projects for assessment.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Perform project implementation.

CLO2: Interpret data in a meaningful form

using relevant tools.

CLO3: Work independently and ethically.

CLO4: Present the results in the oral and written forms effectively.

BVW3212
Industrial Training
Credit Hour: 12
Prerequisite: None

Synopsis

Industrial training is a compulsory component for degree program students at Universiti Malaysia Pahang (UMP). The experience and skills gained 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 to achieve the underlying objectives: Manufacturing, production process and/or its optimization process, mechanical design and production, maintenance and repair of equipment, product testing and quality control.

Course Learning Outcomes

By the end of semester, students should be able to:

CLO1: Solve technology related problems using methods, tools and techniques learnt throughout the training.

CLO2: Explain effectively with the technical community and produce technical reports and presentations.

CLO3: Demonstrate social ethics and professionalism in technology practice.