# Faculty of Technology

# FACULTY OF TECHNOLOGY

## INTRODUCTION

Faculty of Technology was established in 2011, formerly known as Faculty of Manufacturing Engineering and Technology Management. The aimed is to support local and global economic development through education, research, commercialization and consultation. The faculty educational objective is to produce highly competent executives, managers and engineering technologist that are equipped with the right competencies, knowledge and professional acumen strategically aligned and carefully positioned according to the current demandin industrial and commercial sectors.

Academic programmes of **Occupational Safety and Health (OSH), Project Management (PM) and Industrial Technology Management (ITM)** which are offered at Faculty of Technology are developed to enhance graduates capabilities to secure jobs in government or private sector employment in their corresponding field of specialization. Our new programmes which just launch on 2012 are focusing on the Engineering Technology area specializing in **Manufacturing**, **Electrical** and **Energy & Environmental** are offered to fulfil government vision to produce highly competence workforce in the rapidly evolving and high demand field of Engineering Technology.

All our academic programmes are accredited by Malaysian Qualifications Agency (MQA) and numerous universities locally and internationally for graduates opting to further their studies at higher degree level.

All programmes consist of three major elements:

(i) Humanity including subjects in communication, language and ethics;

(ii) Business and management; and

(iii) Technical

## VISION & MISSION

**Vision**
The establishment aspires to become a reputable centre for academic, research and consultation in the fields of Occupational Safety and Health, Industrial Technology Management, Project Management and Engineering Technology.

**Mission**
To produce and train professionals who are creative, innovative, competent and responsible through holistic academic programs.

## PROGRAMMES OFFERED

- Bachelor of Project Management with Honors
- Bachelor of Occupational Safety and Health with Honors
- Bachelor of Industrial Technology Management with Honors
- Bachelor of Engineering Technology (Electrical) with Honors
- Bachelor of Engineering Technology (Manufacturing) with Honors
- Bachelor of Engineering Technology (Energy and Environmental) with Honors

## LABORATORY FACILITIES

Teaching and research laboratory facilities of the Faculty of Technology are designed to meet current teaching & learning, research and industrial requirements. It is also designed to meet current safety guidelines and standards.Laboratories at the faculty comprises of all disciplines in Engineering Technology, Occupational Safety & Health, Project Management and Industrial technology Management. These laboratories are as follows:

- Industrial Hygiene Laboratory
- Ergonomics Laboratory
- Quality Laboratory
- Studio Laboratory
- Safety Simulation Laboratory
- Project Management Laboratory
- Product Development Laboratory
- CAM Laboratory
- Industrial Safety Laboratory
- Fire Safety Laboratory
- Sprinkler Testing Chamber
- Ventilation And Environmental Engineering Laboratory
- CAD Laboratory
- Audiometry & Spirometry Laboratory
- Industrial System Laboratory
- Technology Index Research Room
- PPE Storage Room
- Toxicology Laboratory

## FACULTY MANAGEMENT

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## CURRICULUM STRUCTURE
## Bachelor of Project Management with Honors

| YEAR | FIRST | SECOND | THIRD | FOURTH |
|---|---|---|---|---|
| FACULTY AND PROGRAM COURSES | BPS1113<br>OSH Fundamentals | BPF2413 Management Information System | BUM2413<br>Applied Statistics | BPP4113<br>Project Communication & Negotiation |
| | BUM1123<br>Mathematics for Management | BPF2213<br>Introduction to Finance | BPP3413<br>Project Management Tools | BPP4123<br>Contract Law |
| | BPF1113<br>Principles of Management | BPP2113<br>Project Planning and Control | BPP3213 Estimating & Scheduling | BPP4133<br>Strategic Management |
| | BPF1213 Principles of Economics | BPS2113<br>OSH Management System | BPP3113<br>Change Management | BPP4524<br>Final Year Project II |
| | BPF1223<br>Introduction to Cost Accounting | BPF2113 Research Methodology | BPT3113 Management of Technology | BPP4538<br>Industrial Training |
| | BPF1123 Industrial Psychology | BPF2123<br>Quality Management System | BPF3113 Managing Human Capital | BPP4534<br>Industrial Training Report |
| | BPP1113<br>Project Management | BPP2223<br>Project Cost & Budget Management | BPP3133<br>Contract and Procurement Management | |
| | | BPP2123<br>Project Portfolio Management | BPP3143<br>Project Risk Management | |
| | | *# Elective Course* | BPP3522<br>Final Year Project I | |
| | | | *# Elective Course* | |
| **102** | **21** | **27** | **29** | **25** |
| **18** | **University Courses :** Co-Curriculum I, Co-Curriculum II, Technopreneurship, Islamic & Asean Civilization, Ethnic Relations, Islamic Institutions, Foreign Language, Foreign Language 2, Technical English, Technical Writing, Academic Report Writing, Softskill I, Softskill II | | | |
| **120** | **Total Unit for Graduation** | | | |
| **# Elective Subjects:** Environmental Management and Sustainability (BPP2613), Stakeholder Management (BPP3613), Technology Assessment (BPT3613) | | | | |

**Elective course to be offer in Bachelor of Applied Science (Honours) – Industrial Chemistry**

| NO. | CODE | COURSE | CREDIT HOUR |
|---|---|---|---|
| 1 | BPP2613 | Environmental Management and Sustainability | 3 |
| 2 | BPP3613 | Stakeholder Management | 3 |
| 3 | BPT3613 | Technology Assessment | 3 |

**COURSE STRUCTURE**

**CORE FACULTY COURSES**

**BUM1123**
**Mathematics for Management**
**Credit : 3**
**Prerequisite: None**

**Synopsis**
This course introduces the use of mathematical technique in the field of business administration and management. The topics introduce the inequality, matrices, functions and the key business topics such as simple interest, compound interest, annuity, notes and bank discount, mathematics of buying, markup and markdown.

**Course Outcomes**

CO 1 Use the basic principle and methodologies of mathematics to solve the mathematical analysis problems.

CO 2 Use scientific calculator to solve the exponential and logarithmic functions.

CO 3 Apply the mathematical concepts and the usage of the mathematical technique in business administration and management.

**BPF1113**
**Principles of Management**
**Credit : 3**
**Prerequisite: None**

**Synopsis**

This course aims to provide students with information and knowledge on theoretical management and applied practiced in managing a successful organization. Students will discuss the major principles of management known as POLC: Planning, Organizing, Leading and Controlling. Contemporary issues and global challenges for future managers will also be discussed to equip students with current trends and best practicesin managing a successful organization.

**Course Outcomes**

CO 1 Explain the basic principles of management.

CO 2 Identify the best practices in management.

CO 3 Apply the basic principles of management in solving contemporary issues and global challenges in business management.

**BPF1213**
**Principles of Economics**
**Credit : 3**
**Prerequisite: None**

**Synopsis**

This course is designed to introduce students to key concepts used in microeconomics and macroeconomics, and to facilitate a basic understanding of economic phenomena. The goals will help students to understand fundamental concepts and tools so that students can use them to analyse various economic issues at the national and international levels. This course is primarily concerned with Malaysian economy and will help them understand how economy works.

**Course Outcomes**

CO 1 Understand the basic microeconomics and macroeconomics concepts.

CO 2 Explain the usage of economics concept for business management.

CO 3 Interpret the economics data and graphs to explain the business trend.

**BPF1223**
**Introduction to Cost Accounting**
**Credit : 3**
**Prerequisite: None**

**Synopsis**

This course is to introduce students to the concepts and terminology of accounting and financial reporting for modern business enterprises. They will also learn to use accounting information to make conclusions about business activities and to communicate these conclusions to others, basic accounting concepts, how accounting information reflects basic activities of businesses and organizations and how accounting information is used to make decisions about these entities.

**Course Outcomes**

CO 1 Explain the principles of accounting and identify the four basic financial statements.

CO 2 Calculate cost for business using the principles of costing systems.

CO 3 Solve accounting problem by applying the accounting method in a business setting.

**BPF1123**
**Industrial Psychology**
**Credit : 3**
**Prerequisite: None**

**Synopsis**

This course introduces students to the principles of behaviors as it exists at the workplace: attitudes of employees and employers, organizational behavior, workplace environment and its effects. It focuses on three parts concerning personnel issues, organizational issues and work environment issues investigated in industrial/organizational psychology. Specifically, the course explains the major applications of industrial psychology; describes the importance of relationship of selecting, training and evaluating employees; discusses the issues facing industrial psychology today and how these issues affect workers, organizations and society; and illustrates how the principles of industrial psychology can be applied to day-to-day experiences as an organizational member and to help students develop as an effective organizational member or manager.

**Course Outcomes**

CO 1 Know major applications of industrial psychology.

CO 2 Describe the importance of relationship of selecting, training and evaluating employees.

CO 3 Relate the issues affecting workers, organizations and society.

CO 4 Illustrate how the principles of industrial psychology can be applied in organization.

**BPF2413**
**Management Information System**
**Credit : 3**
**Prerequisite: None**

**Synopsis**

This course aims to provide firm understanding on the significant role of information systems in today's organization particularly in managing organizational most valuable assets - its data and information. The discussion sessions shall cover four major topics; information systems and its applicability in modern enterprise and organization including its strategic competitive advantage as well as ethical issues involved; information technology infrastructure and security issues; information system applicability for digital age; building and managing information systems for organizational use. Hands-on activity on the usage of office automation system and designing relational database shall be covered in lab sessions.

**Course Outcomes**

CO 1 Describe information systems' roles in modern organization and its functions in obtaining organizational competitive advantages.

CO 2 Describe information technology infrastructure and its requirement for digital firm and security threats involved.

CO 3 Discuss various strategies and approaches in system development

.

CO 4 Demonstrate the usage of office automation system in performing operational tasks and managing information resources within organization.

**BPF2213**
**Intoduction to Finance**
**Credit : 3**
**Prerequisite: None**

**Synopsis**

With recent spate of companies experiencing financial difficulties, the issue of sound financial management is now more important than ever. This course enables students to appreciate and understand the financial issues faced by an organization management and the activities undertaken by the organization to have an effective financial management. It examines relevant issues including financial strategy, debt and equity management, the key drivers of shareholders value, risk and return concept in investment and capital budgeting as vehicles to evaluate investment choice.

**Course Outcomes**

CO 1 Define and explain the concept and key driver in financial management.

CO 2 Calculate and relate financial formula to

particular area in financial management.

CO 3 Examine and analyze financial management problems by using all concepts in financial management.

**BPF2113**
**Research Methodology**
**Credit : 3**
**Prerequisite: None**

**Synopsis**

This course is intended to give an understanding and knowledge on the methodology of research and its application when conducting research projects. The topics to be covered are: Introduction to Research; Research Topic, Research Question and Research Design; Reviewing the Literature; Sampling and Measurement; Observation; Research Instruments; Analyzing Data, Completing the Research Project.

**Course Outcomes**

CO 1 Define and identify research methods.

CO 2 Relate research methods in developing research proposals.

CO 3 Design research proposals.

**BPF2123**
**Quality Management System**
**Credit : 3**
**Prerequisite: None**

**Synopsis**

This course intends to provide an understanding of fundamentals of quality management. The topics covered include Introduction to Quality Management, Quality's Guru, Quality Tools and Concept, Different Quality Approaches, Quality Control Tools and Statistical Process Controls. Students will be exposed to various case studies on quality concepts, locally and internationally.

**Course Outcomes**

CO 1 Define and explain the fundamental concepts and definition of total quality management.

CO 2 Identify the basic knowledge of quality management and quality control in production and manufacturing.

CO 3 Demonstrate and evaluate new concept of quality control for production and manufacturing, and quality practices in service sector which integrate fundamental aspects of quality management.

**BUM2413**
**Applied Statistics**
**Credit : 3**
**Prerequisite: None**

**Synopsis**

Students are exposed to statistics including statistical problem-solving methodology and descriptive statistic, probability distributions commonly used in practice, sampling distribution and confidence interval, hypothesis testing, analysis of variance (ANOVA), goodness of fit test and contingency tables and regression and correlation including simple and multiple linear regressions. Appropriate software is used by students to implement some of these ideas in practice.

**Course Outcomes**

CO 1 Analyse data using statistical theory and methodology, and recommend a conclusion or suggestion based on analysed data.

CO 2 Perform statistical data analysis by using appropriate statistical software and scientific calculator.

CO 3 Apply statistical concepts and methods learned to solve any related problems in various disciplines.

**BPF3113**
**Managing Human Capital**
**Credit : 3**
**Prerequisite: None**

**Synopsis**

This course provides an overview of many issues related to managing human capital in organisation. Topics are designed to gain an understanding of how individuals in organization grow and progress in their organisation, and what are the formal dimensions that impinge upon employees and employers, and their relationship to planning, mobility, goal-achievement, motivation and performance.

**Course Outcomes**

CO 1 Understand key principles underlying effective selection, management, development, and retention of human capital.

CO 2 Identify and explain the employment law issues relevant to managing human capital.

CO 3 Assess the likely efficacy of different approaches to managing human capital.

CO 4 Develop problem-solving skills relevant to managing human capital.

CO 5 Demonstrate abilities in managing human resource functions at the workplace.

**CORE PROGRAMME**

**BPP1113**
**Project Management**
**Credit : 3**
**Prerequisite: None**

**Synopsis**

This course provides foundation and conceptual framework of project management. Students will be exposed to various body of knowledge and institutions in promoting project management in particular Project Management Institute (PMI). Throughout the semester, students will have opportunity to discuss various topics; project integration, project initiation, organizational influence to project performance, project manager's role, project management context and project management process groups. Last but not least, students will also have the opportunity to explore various methods and approaches of project documentation and project management softwares.

**Course Outcomes**

CO 1 Describe core concepts of project management according to selected body of knowledge, project manager and project team's roles and organizational influence towards project management success.

CO 2 Describe project initiation activities and develop project charter.

CO 3 Describe project scope management.

CO 4 Evaluate factors in selecting best-fit project management software to the organization.

**BPS1113**
**Occupational Safety and Health (OSH) Fundamentals**
**Credit : 3**
**Prerequisite: None**

**Synopsis**

This course introduces the principles and basic concepts of occupational safety and health. Students will be exposed to the history of occupational safety and health (OSH) development, acts and legislations in relation to OSH , the responsibilities and qualification of safety and health practitioner and professional ethics. The human bodies and its psychological functions and its relationship to workplace productivity will also be discussed. Introduction to Occupational Hygiene will also be discussed as a foundation for the next subjects. Some common safety and health hazards will be emphasized for better understanding.

**Course Outcomes**

CO 1 Understand the importance of ocupational safety and health at the workplace in any organization and Occupational Safety and Health Act introduced in 1994 and aware of the person's rights at work including the responsibilities of employees and employers.

CO 2 Identify the risk, safety and health factors at the workplace in order to take action effectively and efficiently.

CO 3 Practice the application and reduction of the risk, hazard and loss impact due to unhealthy practices at the workplace.

**BPP2113**
**Project Planning and Control**
**Credit : 3**
**Prerequisite: None**

**Synopsis**

The aim of this course is to expose students to frameworks and processes that are useful in project planning and control. At the end of this course students will be able to apply SMART principles to a project. They will be aware of the wider issues of planning and control in relation to project management.

**Course Outcomes**

CO 1 Identify planning and control tools and how to use them.

CO 2 Demonstrate the way project managers carry out planning and control responsibilities.

CO 3 Apply hands-on experience in the use of these planning and control tools.

CO 3 Relate planning and control to the entire life cycle including acquisition of new business.

**BPS2113**
**Occupational Safety & Health (OSH) Management System**
**Credit : 3**
**Prerequisite: BPS1113 OSH FUNDAMENTALS**

**Synopsis**

This course will expose the students to the latest and existing Occupational Safety and Health Management System (OSH-MS), the evolution and the elements in the systems that cater current requirement in OSH. The course also introduces the concepts, relationships and principles of managing the OSH function and the development of training procedures and practices to integrate that function in the organization.

**Course Outcomes**

**CO 1** Explain the principles and interrelation of loss prevention, risk management and OSH-MS.

CO 2 Apply the the PDCA cycle and OSH-MS models based on recognized standards.

CO 3 Analyze and execute OSH-MS planning phase; policy, hazard and risk analysis, compliance of legal and other requirements, objectives and programmes.

CO 4 Analyze and execute OSH-MS implementation phase; organization structure, competency, communication, control of documentation, operational control, management of change and emergency planning.

C0 5 Analyze and execute OSH-MS evaluation phase; performance measurement, incident and nonconformity management, audit and review.

**BPP2223**
**Project Cost & Budget Management**
**Credit : 3**
**Prerequisite: None**

**Synopsis**

This course is intended to introduce students the first step in successfully managing a project's costs which is to have a project budget that realistically reflects the costs for executing the project. It addresses the identification, elaboration, planning, development and management of the project budget. The students will learn how to develop a project cost estimate, project budget and the project budget baseline. In addition, the students will practice the preparation of a spending profile that supports variance analysis and corrective action using earned value management (EVM). The students will also gain an effective skill set for developing and controlling the project budget baseline

**Course Outcomes**

CO 1 Define and explain the concepts of project planning and organization, budgeting and control, and project life cycles.

CO 2 Apply tools and techniques to make accurate cost decisions to make project success.

CO 3 Analyze the key project budgeting principles and identify the common mistakes people make when building a project budget.

**BPP2123**
**Project Portfolio Management**
**Credit : 3**
**Prerequisite: None**

**Synopsis**

This course aims to provide a bird-eye's view in managing all projects within the organization. Students will have opportunity to obtain firm understanding on project portfolio management (PPM). Improving resource utilization and planning, and making right decision at the right time about adding new projects or continue with the current one are the key topics. Establishing proper methods in evaluating, selecting and prioritizing organizational resources to the projects shall be discussed extensively. Appropriate tools and techniques shall be practiced in class to assist students in evaluating project that is aligned with corporate strategies and return on investment goals. At the end, students are able to develop necessary skills in monitoring resource utilization, cost and projects across the portfolio.

**Course Outcomes**

CO 1 Describe project portfolio perspective and its relationship with organizational strategies and return on investment goals.

CO 2 Describe and apply methods and strategies in evaluating, selecting and prioritizing organizational resources to projects.

CO 3 Apply proper tools and techniques in project evaluation.

CO 4 Analyze issues, challenges and future trends in portfolio management.

**BPP3413**
**Project Management Tools**
**Credit : 3**
**Prerequisite: BPP1113 Project Management**

**Synopsis**

Project Management Tools (PMT) course aims to endow students with knowledge as well as practical experiences in managing a project using selected project management software. The ultimate goal of this course is to show how elements of project management can be made more predictable and scientific through the use of structured system and integrated tools. Selected project management tools/software will be introduced during the lab sessions to grant students with necessary knowledge and skills in dealing with stages of the project life cycle, how to work within organizational and cost constraints, and manage resources and project team effectively.

**Course Outcomes**

CO 1 Apply the ability to use Project Management software in managing a project.

C0 2 Identify three types of resources in a project and how to assign those resources to tasks.

C0 3 Employ different methods in fine tuning the project planning as well as tracking the progress.

CO 4 Detect the problems of a project.

**BPP3213**
**Project Estimation & Scheduling**
**Credit : 3**
**Prerequisite: None**

**Synopsis**

This course attempts to explain the importance of estimation and scheduling process in project planning. It will focus on approaches and strategies in developing viable schedules and cost estimation which influence the business success projects, products and organizations. The students will discover a number of sophisticated tools and technique that can be applied in managing time and costs effectively on every type of project.

**Course Outcomes**

CO 1 Understand the importance of scheduling and estimation in ensuring the successful of project.

CO 2 Apply Precedence Diagram Method (PDM) in determining relationship between tasks.

CO 3 Use appropriate techniques for resources estimation for a project planning.

**BPP3113**
**Change Management**
**Credit : 3**
**Prerequisite: None**

**Synopsis**

In this course, the students will identify ways to solve problems related to change on the job, including recognizing, anticipating, and effectively managing changes. The students will also define change management, identify change management strategies, define the psychological process of moving through changes, identify ways of preparing for changes, and explore ways to embrace changes on an ongoing basis.

**Course Outcomes**

CO 1 Understand the steps involved to effectively manage organizational changes in a variety of contexts and settings.

CO 2 Identify the nature and significance of various mpediments to organizational changes.

CO 3 Explain, articulate, and disseminate information and knowledge concerning organizational changes to others through dialogue and critique.

**BPT3113**
**Management Of Technology**
**Credit : 3**
**Prerequisite: None**

**Synopsis**

This course is intended to give an understanding on the concept of technology management and its application to an organization particularly business firm. The topics to be covered are : Introduction to Management of Technology, The Role of Technology in the Creation of Wealth, Critical Factors in Managing Technology, Technology Life Cycles, The Process of Technological Innovation, Business Strategy and Technology Strategy, Competitiveness, Technology Planning and Technology Transfer.

**Course Outcomes**

CO 1 Recognise the general principles, terms and definition used in the management of technology.

CO 2 Explain the role of technology management in the development, operation and marketing of goods and/or services.

CO 3 Manipulate the impact of contextual forces on technology policies and strategies within and between organizations.

CO 4 Apply decision making techniques in the management of technology to address problems in the range of sectors.

**BPP3133**
**Contract and Procurement Management**
**Credit : 3**
**Prerequisite: None**

**Synopsis**

This course develops an understanding on the concepts and practices in contract and procurement management. It involved strategies applied during procurement processes and contract negotiations as one of the project management activities. Procurement solution options, procurement decision model, problem solving approach by considering project objectives, risk allocation and responsibility will be discussed during the class sessions. At the end of the course, students will be equipped with the skills and necessary knowledge in negotiating and successfully managing the contract and procurement processes for a project.

**Course Outcomes**

CO 1 Understand the six major areas of procurement processes from the PMBoK.

CO 2 Develop effective plan, anticipate the risk, undertake proper measures and control to successfully manage the contract and avoid any legal pitfalls.

CO 3 Apply the best strategies and methods of costing, budgets, cash flow forecast and evaluate the best purchasing strategy.

CO 4 Develop proper mechanism to manage conflicts that anticipated to be arose from contract and procurement processes and apply appropriate methods to resolve conflicts.

**BPP3143**
**Project Risk Management**
**Credit : 3**
**Prerequisite: None**

**Synopsis**

This course develops student with necessary knowledge and skills in managing risks and in becoming a good project manager. Project managers are required to possess a wide range of knowledge and skills, including time management, budget analysis, interpersonal and communication skills as well as risk management competencies. In this course, students will be exposed to the Project Life Cycle in assessing risk management processes. The discussion will cover input and output from risk identification, quantification, response development as well as risk control.

**Course Outcomes**

CO 1 Understand and identify key project risks.

CO 2 Analyze, estimate and characterize the impacts of risks to a project in order to finalized the best

mitigation strategies to be employed.

CO 3 Develop proper plan to track, update and control the risk.

CO 4 Execute risk management plan.

**BPP3522**
**Final Year Project I**
**Credit : 3**
**Prerequisites: All core faculty and core programme courses from Semester 1 to Semester 5**

**Synopsis**

This course will expose the students on the process of conducting academic research in order to provide the skills and ability in carrying out research project in the area of their studies. The covered areas are: (i) problem background (ii) problem statement (iii) research objective (iv) research questions (v) research framework (vi) literature reviews; and (vii) research methods.

**Course Outcomes**

CO 1 Identify problems/issues/ incidences, research objectives/questions, apprtopriate literature and research methods.

CO 2 Relate problems/issues/ incidences with research objectives, research questions and literatures.

CO 3 Prepare research proposal comprising research problem, ROs, RQs, literature review and research methods.

**BPP4113**
**Project Communication & Negotiation**
**Credit : 3**
**Prerequisite: None**

**Synopsis**

This course is intended to introduce to the students the communication and negotiation skills in project management. It focuses on project communication management, documentation, performance reporting, information distribution, administration closure, project management bottleneck, communication plan, managing conflict and negotiation in project, and negotiation ethics.

**Course Outcomes**

CO 1 Explain the components in project communication management.

CO 2 Describe the needs of communication power to find balance in a negotiation.

CO 3 Develop a negotiation plan for distributive and integrative negotiations in project management scenarios.

CO 4 Apply negotiation skills in problem solving situations in project management.

**BPP4123**
**Contract Law**
**Credit : 3**
**Prerequisite: None**

**Synopsis**

This course will provide students and future project managers with essential understanding and knowledge of principles, techniques and requirements for effective project contract management. Students will be given opportunity to analyze various contract law

definitions and implications, what types of contract exists and the effect of statutory law on any contractual agreements. In addition, this course will also inculcate the crucial elements in preparing a good contract, tips for understanding contractual material as well as traps and pitfalls of contract drafting. On top of that, contract law also scrutinize the "exit door" when things does not go well, offering options for assessing damages and remedies for contract breach as well as contractual implication.

**Course Outcomes**

CO 1 Understand the principles and legal terms that guide the operation and formation of a contract.

CO 2 Understand contractual rights and liabilities following terms of contracts.

CO 3 Differentiate void and voidable contracts, and comprehend how contracts can be discharged.

CO 4 Analyze and determine the proper remedies for breach of contracts.

**BPP4133**
**Strategic Management**
**Credit : 3**
**Prerequisite: None**

**Synopsis**

This course exposes students on the aspects of strategic management in business environment. The covered areas for this course are: the nature of strategic management; external and internal assessment; strategic analysis and choice; strategy implementation; and strategic evaluation and control.

**Course Outcomes**

CO 1 Describe the strategic management concepts and techniques.

CO 2 Apply the strategic management concepts and techniques in business environment.

CO 3 Analyze internal and external environment and formulate strategy choice for implementation.

**BPP4524 (Semester 7/4)**
**Final Year Project II**
**Credit : 3**
**Credit : 3**
**Prerequisite: Final Year Project I (BPP3522)**

**Synopsis**

This course will expose the students on the process of conducting academic research in order to provide the skills and ability in carrying out research project in the area of their study. The covered areas are: (i) development of research instruments for data collection (ii) carrying out data collection (iii) analysing data collected (iv) interpreting data, and (v) writing reports.

**Course Outcomes**

CO 1 Develop research instruments.

CO 2 Analyze data collected using research instruments developed.

CO 3 Prepare Final Year Project report comprising research problem, ROs, RQs, literature review, research methods, data analysis and conclusions.

**BPP4538**
**Industrial Training**
**Credit : 3**
**Prerequisites: All core faculty and core programme courses from Semester 1 to Semester 7**

**Synopsis**

This course aims to give chances for the students to practise and apply their knowledge and skills gained during their studies. During the placement, it is expected for the students to keep a log book, in which they make a regular entries describing the work they are undertaking. Students are supervised by industrial and faculty supervisors to guide and ensure they can do their work as good as possible and achieve the objectives for this course.

**Course Outcomes**

CO 1 Adapt working culture and regulation of host industry or agency.

CO 2 Solve problem in the host industry or agency by applying the theory or methodology as learned previously.

CO 3 Work effectively with others in the host organization as a team.

CO 4 Practise interpersonal skills and professional ethics in host organization.

CO 5 Perform assigned task as required by host industry or agency training supervisor.

**BPP4534**
**Industrial Training Report**
**Prerequisites: All core faculty and core programme courses from Semester 1 to Semester 7**

**Synopsis**

During the placement, it is expected for students to keep a log book, in which they make regular entries describing the work they are undertaking. Then, students need to provide industrial training report to describe their technical and personal development during their placements. The industrial training reports need to be handed in to the faculty supervisors. Students need to do final presentation for assessment.

**Course Outcomes**

CO 1 Organize the industrial training knowledge, experience and skill in the preparation of the industrial training report.

CO 2 Apply technical writing skill in preparing the final industrial training report.

CO 3 Submit binded final industrial training reports complying with faculty academic standards and industrial training regulations.

CO 4 Present industrial training experience to faculty.

**ELECTIVE COURSES**

**BPP2613**
**Environmental Management And Sustainability**
**Credit : 3**
**Prerequisite: None**

**Synopsis**

This course will cover the principles and concepts about ecology and ecosystems, weather and human impacts on the environment and its management and pollution, natural renewable and non-renewable resources and its management, current issues on the environment, including economics, global view and ethics. The topics that will be discussed include issues related to trade, environment and development and roles that are played by the consumer, community, industry and government towards sustainable development. The students will also be introduced to the ISO 14000 series of Environmental Management Standards.

**Course Outcomes**

CO 1 Understand the terminologies, theories and principles of environmental management and sustainable development.

CO 2 Understand the current environmental issues and the appropriate solutions.

CO 3 Understand the local and international environmental legislations and standards.

C0 4 Indentify and apply environmental management tools in solving environmental problems.

CO 5 Implement environmental management system to achieve sustainability.

**BPP3613**
**Stakeholder Management**
**Credit : 3**
**Prerequisite: None**

**Synopsis**

Business is about how customers, suppliers, employees, financiers (stockholders, bondholders, bank etc.), communities, the media and managers interact and create value. In this subject, concrete principles and practical techniques for managing stakeholder relationships in order to ensure a firm's survival, reputation and success will be learnt.

**Course Outcomes**

CO 1 Understand the possible influence of stakeholder so that project managers could establish strong mechanism in managing stakeholderteam's roles and organizational influence towards project management success.

CO 2 Develop proper communication channel to ensure that all stakeholders understand the process and benefits of the project.

C0 3 Apply appropriate communication strategy at various level particularly involving stakeholder.

CO 4 Analyze and anticipate people's reaction to the project activities which may affect progress of a project.

**BPT3613**
**Technology Assessment**
**Credit : 3**
**Prerequisite: None**

**Synopsis**

This course provides students with the opportunity to understand the importance of technology assessment in corporate strategic planning, understand the critical elements of technology assessment, and learn and apply the tools and techniques related to technology scanning, technology impacts, strategic technology analysis, technology road mapping, technology forecasting, and measuring technology performance.

**Course Outcomes**

CO 1 Describe the role of technology assessment and its benefits.

CO 2 Apply a systematic approach to conduct assessment of technology fitness of a company.

CO 3 Apply appropriate techniques and tools to assess the present technology portfolio and measure technology performance.

## CURRICULUM STRUCTURE
## Bachelor of Occupational Safety and Health

| YEAR | FIRST | SECOND | THIRD | FOURTH |
|---|---|---|---|---|
| FACULTY AND PROGRAM COURSES | BPS1113<br>OSH Fundamentals | BPF2413 Management Information System | BPF3313<br>Statistics | BPS4413<br>Process Safety and Loss Prevention |
| | BPS1413<br>Fire Prevention & Protection System | BPS2113<br>OSH Management System | BPS3413 Construction Safety | BPS4423 Occupational Epidemiology & Disease |
| | BUM2123<br>Applied Calculus | BPS2123<br>Behaviour Based Safety | BPS3423<br>Exposure Measurement Techniques & Analysis | BPS4113 Occupational Safety & Health Legislation |
| | BPF1123<br>Industrial Psychology | BPS2413<br>Toxic & Hazardous Waste Management | # BPS3613<br>Solid Waste Management | BPS4514<br>Final Year Project II |
| | BPS1423<br>Industrial Hygiene | BPF2113<br>Research Methodology | BPS3433<br>Applied Mechanics for Safety | # BPS4613 Wastewater Treatment Technology |
| | BPS1433<br>Hazard Recognition & Risk Management | BPF2123<br>Quality Management System | BPS3443<br>Human Factor in Engineering | BPS4538<br>Industrial Training |
| | BPS1443 Industrial Toxicology | BPS2423<br>Industrial Safety | BPS3453<br>Accident & Incident Investigation & Analysis | BPS4534<br>Industrial Training Report |
| | | BPS2433 Ergonomics | # BPS3623<br>Air Polution Control Technology | |
| | | # BPS2613 Environmental Management & Sustainability | BPS3512<br>Final Year Project I | |
| **102** | **21** | **27** | **26** | **28** |
| **20** | **University Courses :** Co-Curriculum I, Co-Curriculum II, Technopreneurship, Islamic & Asean Civilization, Ethnic Relations, Islamic Institutions, Foreign Language, Foreign Language 2, Technical English, Technical Writing, Academic Report Writing, Softskill I, Softskill II | | | |
| **122** | **Total Unit for Graduation** | | | |

**# Elective Courses**

**Elective course to be offer in Bachelor of Occupational Safety & Health (Honours)**

| NO. | CODE | COURSE | CREDIT HOUR |
|---|---|---|---|
| 1 | BPS2613 | Environmental Management & Sustainability | 3 |
| 2 | BPS3613 | Solid Waste Management | 3 |
| 3 | BPS4613 | Wastewater Treatment Technology | 3 |
| 4 | BPS3623 | Air Polution Control Technology | 3 |
| Total Credit | | | 12 |

**CORE FACULTY**

**BUM2123**
**APPLIED CALCULUS**
**Credit: 3 credit**
**Pre-requisite: None**

**Synopsis**

This course introduces Polar Coordinates and Vector, Vector-Valued Functions, Partial Derivatives, and Multiple Integrals. Appropriate software is used by students to implement some of these ideas in practice.

**Course outcomes**

CO 1 Analyze and apply appropriate calculus concepts to solve various science and engineering problems.

CO 2 Use appropriate software and tool to solve the graphical and computational problems in calculus.

CO 3 Analyze and think critically a wide range of problem and solve it using ideas and methods in calculus.

CO 4 Relate and applied the concepts and methods studied into other courses.

**BPF1123**
**Industrial Psychology**
**Credit: 3 credit**
**Prerequisites: None**

**Synopsis**

The Industrial Psychology course introduces students to the principles of behaviors as it exists at the workplace: attitudes of employees and employers, organizational behavior, workplace environment and its effects. It focuses on three parts concerning personnel issues, organizational issues, and work environment issues investigated in industrial/organizational psychology. Specifically, the course explains the major applications of Industrial Psychology; describes the importance relationship of selecting, training, and evaluating employees; discusses the issues facing industrial psychology today and how these issues affect workers, organizations, and society; and illustrates how the principles of Industrial Psychology can be applied to day-to-day experiences as an organizational member, and to help you develop as an effective organizational member or manager.

**Course Outcome**

CO 1 Know major applications of Industrial Psychology

CO 2 Describe the importance relationship of selecting, training and evaluating employees

CO 3 Relate the issues affecting workers, organizations, and society

CO 4 Illustrate how the principles of Industrial Psychology can be applied in organization

**BPF2413**
**Management Information System**
**Credit: 3 credit**
**Prerequisites: None**

**Synopsis**

This course aims to provide firm understanding on the significance role of information systems in today's organization in particular in managing organizational most valuable assets - its data and information. The discussion sessions shall covers four major topics; Information Systems and its applicability in modern enterprise and organization including its strategic competitive advantage as well as ethical issues involved; Information technology infrastructure and security issues; Information system applicability for digital age; building and managing information systems for organizational use.

Hands on activity on the usage of office automation system and designing relational database shall be cover in lab sessions.

**Course Outcome**

CO 1 Describe information systems roles in modern organization and its functions in obtaining organizational competitive advantage

CO 2 Describe information technology infrastructure and its requirement for digital firm and security threats involved

CO 3 Discuss various strategies and approaches in system development

CO 4 Demonstrate the usage of office automation system in performing operational tasks and managing information resources within organization.

**BPF2113**
**Research Methods**
**Credit: 3 credit**
**Prerequisites: None**

**Synopsis**

This subject is intended to give an understanding and knowledge on the methodology of research and its application when conducting research projects. The topics to be covered are: Introduction to Research; Research topic, research question and research design; Reviewing the Literature; Sampling and measurement; Observation; Research instruments; Analyzing Data, Completing the Research Project.

**Course Outcome**

CO 1 Define and identify research methods

CO 2 Relate research methods in developing research proposals

CO 3 Design research proposals.

**BPF2123**
**Quality Management System**
**Credit: 3 credit**
**Prerequisites: None**

**Synopsis**

This course intends to provide and understanding of fundamentals of Quality Management. The topics covered include Introduction to Quality Management, Quality's Guru, Quality Tools And Concept, different quality approaches, quality control tools and statistical process controls. Students will be exposed to various case studies on quality concept, locally and internationally.

**Course Outcome**

CO 1 Define and able to explain the fundamental concept and definition of total quality management as a career of choice.

CO 2 Identify the basic knowledge of quality management and quality control in production and manufacturing.

CO 3 Demonstrate and evaluate new concept of quality control for production and manufacturing, and quality practices in service sector which integrates fundamental aspects of quality management.

**BUM2413**
**Applied Statistic**
**Credit: 3 credit**
**Prerequisites : None**

**Synopsis**

Students are exposed to statistics including statistical problem-solving methodology and descriptive statistic, probability distributions

commonly used in practice, sampling distribution and confidence interval, hypothesis testing, analysis of variance (ANOVA), goodness-of-fit test and contingency tables, and regression and correlation including simple and multiple linear regressions. Appropriate software is used by students to implement some of these ideas in practice.

**Course Outcome**

CO 1 Analyze data using statistical theory and methodology, and recommend a conclusion or suggestion based on the analyzed data.

CO 2 Perform statistical data analysis by using appropriate software and scientific calculator.

CO 3 Apply statistical concepts and methods learned to solve any related problems in various diciplines.

**CORE PROGRAM**

**BPS1113**
**OSH Fundamental**
**Credit: 3 credit**
**Prerequisites : None**

**Synopsis**

This course introduces the principles and basic concepts of occupational safety and health. Students will be exposed to the history of occupational safety and health (OSH) development, acts and legislations in relation to OSH, the responsibilities and qualification of safety and health practitioner and professional ethics. The human bodies and its psychological functions and its relationship to workplace productivity will also be discussed. Introduction to Occupational Hygiene is also discussed as a foundation for the next subjects. Some common safety and health hazards will be emphasized for better understanding.

**Course Outcome**

CO 1 Understand the importance of ocupational safety and health at the workplace in any organization and Occupational Safety and Health Act introduced in 1994 and aware of the person's rights at work including the responsibilities of employees and employers

C0 2 Identify the risk, safety and health factors at the workplace in order to take action effectively and efficiently

CO 3 Practice the application and reduction of the risk, hazard and loss impact due to unhealthy practices at the workplace

**BPS1413**
**Fire Prevention & Protection System**
**Credit: 3 credit**
**Prerequisites : None**

**Synopsis**

This subject is aimed to give an understanding on the basic concept of Fire Prevention and Protection System including its application in buildings. The course will cover topics such as: Introduction to Basic Principles of Fire, The Components of Fire Safety, The (Protection) Active and (Prevention) Passive Fire Safety System, The Life Cycles of A Building, Loss Impact and Means of Escape During Emergencies. Upon completion of this course, the student will have studied the major topic areas within the field of fire hazard management and other sources of hazard, fire safety best practices and fire management system as well as emergency preparedness. Besides, they will learn about the theory of combustion and causes of fire and the way to fight fire, including the types and correct use of fire extinguishers. Students will use a Live Fire Training Unit to learn how to use fire extinguishers correctly and safely.

**Course Outcome**

CO 1 To recognize the importance of fire safety technology theoretically within the building industries.

CO 2 To apply and detect correctly the importance of fire safety system based on the loss impact studies on individual, organization, society and country.

CO 3 To recognise efficiency of the escape route design according to the needs of occupancies during fire emergencies at work place.

CO 4 To demonstrate and response towards extinguishing fire during any emergency and practice their knowledge on fire safety at all time.

**BPS1423**
**Industrial Hygiene**
**Credit: 3 credit**
**Prerequisites : BPS1113 Occupational Safety And Health Fundamentals**

**Synopsis**

This course generally will give an introduction to the field of industrial hygiene, including the chemical, physical and biological agents which affect the health and safety of employees, the application of control measures for the various agents and study of occupational exposure limit. Upon completion of this course, the student will have studied the major topic areas within the field of chemical, physical and biological hazards, principle of exposure monitoring, medical surveillance and personal protective equipment.

**Course Outcome**

CO 1 Explain basic terms, concepts, calculations, legislations, profession and historical frameworks integral to the practice of industrial hygiene.

CO 2 Apply basic principles of industrial hygiene such as anticipation, recognition and evaluation of occupational health hazards.

CO 3 Discuss and choose appropriate controls for prevention or reduction of occupational health hazards exposure.

**BPS1433**
**Hazard Recognition & Risk Management**
**Credit: 3 credit**
**Prerequisites : BPS1113 Occupational Safety And Health Fundamentals**

**Synopsis**

The most important aspect of OSH study is the ability in recognizing and understanding the existence of hazardous substance or materials within the work place or living areas. The level of risk is depends on how the hazards are being managed and controlled. This course is aimed to give an understanding on the basic steps in recognizing hazards at work place and managing the risks to an acceptable standard. These include the studies of hazard identification, types of risks, risk characterization, international standards, total quality management and impact assessment.

**Course Outcome**

CO 1 Recognize the concept of managing risk in industrial setting

CO 2 identify the hazardous materials, substance and acts at work place within the industries.

CO 3 assess and calculate the level of risk at work place and surrounding environment.

CO 4 Manage the risk available within work place, propose a safe working and living environment to an acceptable standard based on the impact assessment and healthy culture

organization, society and country.

**BPS2113**
**OSH Management System**
**Credit: 3 credit**
**Prerequisites : BPS1113 Occupational Safety And Health Fundamentals**

**Synopsis**

This course will expose the candidates to the latest and existing occupational safety and health management system, the evolution and the elements in the systems that cater current requirement in occupational safety and health. The course also introduces the concepts, relationships and principles of managing the occupational safety and health function and the development of training procedures and practices to integrate that function into the organization.

**Course Outcome**

CO 1 To understand the importance of occupational safety and health at work place in any organization.

CO 2 To apply the Occupational Safety and Health Act introduced in 1994 and the persons at work rights including the employee and employers responsibilities.

CO 3 To identify the risk, safety and health factors at work place in order to manage action effectively and efficiently.

CO 4 To establish the safety and health working procedure at workplace by ensuring the emergency preparedness system ready to cater any incidents.

CO 5 To ensure the continuous effort on OSH is maintained and a safe and health environment is materialized.

**BPS1443**
**Industrial Toxicology**
**Credit: 3 credit**
**Prerequisites : BPS1113 Occupational Safety And Health Fundamentals**

**Synopsis**

This course provides students with a basic understanding and appreciation of the principles of the toxic effects of chemicals on the living organism, regulatory aspect, application of toxicology in industry and the effects of toxic substances on man and the environment. Topics include: disposition and metabolism of toxic substances, types of exposure and response, toxic responses of selected body systems, toxic mechanisms of drugs, industrial chemicals, food additives, pesticides, environmental pollutants, household products, toxicity testing and risk assessment.

**Course Outcome**

CO 1 Explain the dose-response relationship and the concept of threshold dose

CO 2 Explain how toxins enter the body and are transported to different organs and tissues

CO 3 Describe the types of responses or toxic effects that can result from exposure to a substance

CO 4 List dan discuss several types of toxic chemicals available in the occupational environment

CO 5 Apply the principles of chemical safety management in the workplace

**BPS2123**
**Behaviour Based Safety**
**Credit: 3 credit**
**Prerequisites : BPF1123 Industrial Psychology**

**Synopsis**

This course will introduce usage of behavior-based safety as a tool for widespread involvement and change. The course will review the relationship between attitudes, culture, systems, and behavior; explain how behavior-based safety fits into the hierarchy of control; and introduce four elements of the behavior-based safety process. Underlying concepts related to performance management and a powerful tool (ABC analysis) is learned and applied to understanding behavior and to developing a change plan. Overall, the course provides a clear understanding of how attitudes, cultures, and systems influence or affect behavior, and focuses on understanding how successful behavioral change efforts really work. Effective leadership and management are seen as the cornerstone to success in promoting safety culture. This course also will introduce current thinking on safety leadership and supervision models and strategies relevant to health and safety at work.

**Course Outcome**

CO 1 Recognize the concepts of person-based safety and behavior based safety in behavioral based safety approach

CO 2 Identify the technique to recognize at-risk behavior due to the complexity of people

CO 3 Conduct the behavioral based approach in intervening the work process in order to manage the at-risk behavior

CO 4 Conduct behavioral based analysis by considering the factor of cost and benefit

**BPS2413**
**Toxic & Hazardous Waste Management**
**Credit: 3 credit**
**Prerequisites : BPS1443 Industrial Toxicology**

**Synopsis**

This course introduces the student to the physical, chemical and toxic properties of toxic and hazardous wastes which are the basis for their hazard classification, movement and distribution as well as their impacts on human health and the environment. The industries which generate toxic and hazardous waste will be discussed. The management of these wastes which include handling, storage and transportation based on the regulations stipulated in the Environmental Quality Act, 1974 as well as other international regulations will be discussed. Understanding on the treatment and disposal processes will be emphasized including pollution prevention and waste minimization strategies.

**Course Outcome**

CO 1 Understand the terminologies, theories and principle of toxic and hazardous waste management, the impact and the risks towards human health and environment.

CO 2 Understand the legal requirements on toxic and hazardous waste management.

CO 3 Identify the physical, chemical, biological and thermal treatment of toxic and hazardous waste.

CO 4 Apply pollution prevention and waste minimization principles in toxic and hazardous waste management.

CO 5 Understand the final disposal of toxic and hazardous waste.

**BPS2423**
**Industrial Safety**
**Credit: 3 credit**
**Prerequisites : BPS1113 Occupational Safety And Health Fundamentals**

**Synopsis**

This course is designed to give student understanding in industrial safety field and its application in the hazards identification and risk management. Students will be exposed to machinery safety practices including design, safe operation, fencing and guarding. Student also will be introduced to mechanical handling safety which details out the design and safe operation of material handling equipment. Hazards and control of confined space and pressure vessel are also exposed to student. Basic electrical safety topics are discussed as part of industrial safety management.

**Course Outcome**

CO 1 Recognise physical hazards that may exist in the workplace.

CO 2 Discuss the history and regulatory ackground of indistrial safety and related regulations or standards.

CO 3 Apply the practice of industrial safety, and how the management of industrial safety issues and standards in the workplace and explain different approaches for dealing with workplace hazards.

**BPS2433**
**Ergonomics**
**Credit: 3 credit**
**Prerequisites : BPS1113 Occupational Safety And Health Fundamentals**

**Synopsis**

This course provides a foundation for understanding the key concepts and principles related to ergonomics. The aim of ergonomics in industry is to increase productivity, and decrease accidents and illnesses by obtaining a good fit between the employer and the job. This course also examines the relationships between employer, work equipment and work environment. Case studies are also used to test student current knowledge and understanding of the way complex systems are designed and used.

**Course Outcome**

CO 1 Recognize ergonomics related problems and solutions

CO 2 Identify occurrences of failing to consider ergonomics design procedure.

CO 3 Conduct ergonomic assessment and measure risk associated with ergonomics

CO 4 Apply ergonomics concepts to the design process and do cost justification for implementing ergonomics intervention

**BPS2613**
**Environmental Management & Sustainability**
**Credit: 3 credit**
**Prerequisites : None**

**Synopsis**

This course will cover principles and concepts about ecology and ecosystems, weather and human impacts on the environment and its management and pollution. Natural renewable and non-renewable resources and its management, current issues on the environment, including economics, global view and ethics comprise the materials of the course. The topics that will be discussed include issues related to trade, environment and development and roles that are played by the consumer, community, industry and government towards sustainable development. The students will be also introduced to the ISO 14000 series of Environmental Management Standards.

**Course Outcome**

CO 1 Understand the terminologies, heories and principle of environmental management and sustainable development.

CO 2 Understand the current environmental issues and the appropriate solutions.

CO 3 Understand the local and international environmental legislations and standards.

CO 4 Identify and apply environmental management tools in solving environmental problems.

CO 5 Implement environmental management system to achieve sustainability.

**BPS3413**
**Construction Safety**
**Credit: 3 credit**
**Prerequisites : BPS1113 Occupational Safety And Health Fundamentals**

**Synopsis**

This course is designed for persons who work in the construction industry. This course will provide all members with greater safety in construction field particularly referred to fire safety awareness. It is also designed to increase their confidence in the action to take in case of any emergencies or fire occurring. The stages of construction and most of the building process within the life cycle of a building will be elaborated. All the relevant document and acts particularly relating to Malaysia scenario are among the important references that will be discussed along with the sequence of building construction. Building materials Students are expected to venture into a general safe working practices at construction site and able to supervise the total environment as a free accident area.

**Course Outcome**

CO 1 Identify the hazardous materials , substances and unsafe practices at constructions industries

CO 2 Assess the level of risk and safety of work places compliance to the national safety regulation.

CO 3 Outline a proposal to enhances and increase a safer work practices in construction industries.

**BPS3423**
**Exposure Measurement Techniques & Analysis**
**Credit: 3 credit**
**Prerequisites : BPS1423 Industrial Hygiene**

**Synopsis**

This course is for advanced in-depth study of the approaches to workplace and personal exposure sampling. Emphasis is on statistical sampling methods, passive monitoring, colorimetric devices, breathing zone, area sampling strategies, monitoring and surveillance techniques. Course work will include laboratory exercises and field works. This course is also designed to assist students in understanding the various instruments that are utilized in industrial hygiene studies and give them the chance to fully understand the way these instruments are calibrated and applied.

**Course Outcome**

CO 1 Recognize the principles of industrial hygiene sampling

CO 2 Identify and select the appropriate analytical instruments and methods for evaluating the workers exposure to hazards.

CO 3 Perform data collection and analysis through surveys, calibration, sampling, monitoring by using the instantaneous or integrated

instruments to assess the risk of health hazards.

CO 4 Report health hazards assessment cases to comply with relevant legislation.

**BPS3613**
**Solid Waste Management**
**Credit: 3 credit**
**Prerequisites : None**

**Synopsis**

This course introduces the students to elements of solid waste management systems, which include generation, on-site handling, collection, transportation, treatment and disposal. Aspects to be discussed include methods of waste classification, categorization and listing, handling of waste at source, collection and transportation of waste, waste treatment technologies including waste minimization and recycling, and final disposal technologies. Current and legal issues on solid waste management both from local and international perspectives will also be discussed.

**Course Outcome**

CO 1 To explain the importance of the legal aspect of solid waste management.

CO 2 To identify the technology of managing the solid waste that are available within the national and international practices.

CO 3 To analyze and recognize the characterization of solid waste.

CO 4 To apply the management and technological approach in reducing the impact of solid waste into the environment.

CO 5 To analyze the most suitable method of handling solid waste disposal management system.

**BPS3512**
**Final Year Project 1**
**Credit: 3 credit**
**Prerequisites : All the first and second year subjects**

**Synopsis**

This course will expose the students on the process of conducting academic research in order to provide the skills and ability in carrying out research project in the area of their study. The covered areas for Final Year Project 1 are: (i) problem background, (ii) problem statement, (iii) research objectives, (iv) research questions, (v) research framework, (vi) literature reviews, and (vii) research methods.

**Course Outcome**

CO 1 Identify problems/issues/incidences, research objectives/ questions, appropriate literature and research methods

CO 2 Relate problems/issues/incidences with research objectives, research questions and literatures

CO 3 Prepare research proposal comprising research problem, Ros, RQs, literature review and research methods

**BPS3443**
**Human Factor in Safety engineering**
**Credit: 3 credit**
**Prerequisites : Ergonomics**

**Synopsis**

An analysis of the man-machine relationship and the biological, physiological and psychological factors that contribute to accident causation; examination of theoretical and applied research findings.

**Course Outcome**

CO 1 Describe human factors principles to their safety engineering procedures.

CO 2 Explain the basic human systems of cognition and perception and interprate their affects to safety aspects.

CO 3 Identify and analyze the designs that avoid occupation - related injuries.

**BPS3433**
**Applied Mechanics for Safety**
**Credit: 3 credit**
**Prerequisites : Mathematics**

**Synopsis**

This course introduces a foundation in engineering science principles which will provide a systematic approach to problem solving in the field of occupational safety and health (OSH) problems such as accident and incident investigation, ergonomics, industrial safety, construction safety and etc. It goes beyond the core engineering science include all the material science, statics, dynamics, fluid mechanics, thermodynamics and heat transfer that can be included in course at this level. The emphasis on the integration of student`s understanding and the application aspects of all engineering science principles, supported with many examples, makes this course a very useful for practicing the OSH.

**Course Outcome**

CO 1 Explain a fundamental knowledge of engineering science principles such as theories, laws, equations and models.

CO 2 Use the equations in engineering science for OSH applications.

CO 3 Apply a systematic approach of engineering science for problem solving in OSH.

**BPS3453**
**Accident & Incident Investigation & Analysis**
**Credit: 3 credit**
**Prerequisites: BPS1113 Occupational Safety And Health Fundamentals**

**Synopsis**

This subject is aimed to introduce and give an understanding on the methodologies for accident and incident investigation and analysis. Topics include data collection, investigation methodologies, interviewing techniques, techniques of date analysis, reporting formats, system safety and developing recommendations to prevent recurrences. An accident investigation can be seen as a safety analysis which includes the analysis of safety management and safety culture within the industries.

**Course Outcome**

CO 1 To describe practical approach in handling accident and incidents investigation within the industries.

CO 2 To understand the role of an investigation team and the typical management system involved in dealing with accident and incidents at work place.

CO 3 To respond and implement correctly towards the importance of accident and incident investigation and analysis task as a safety officer or manager in an organization.

CO 4 To manage and design an investigation team to deal the data gathering on accident and incidents evidence at work place.

**BPS3623**
**Air Pollution Control Technology**
**Credit: 3 credit**
**Prerequisites: None**

**Synopsis**

The topics in this course discuss several important aspects of air pollution that include classification and sources of air pollutants, their effects on human, vegetation and material. Sampling methods, pollution control and air quality management system will be discussed.

**Course Outcome**

CO 1 Understand the terminologies, theories and principle of air pollution control technology.

CO 2 Understand the impacts and the risks of air pollution towards human health and environment.

CO 3 Understand the meteorological concept ant its application in air pollution studies.

CO 4 Identify the specific air pollutants and its control technology.

CO 5 Apply proper air pollutants sampling methods for air quality monitoring.

**BPS4514**
**Final Year Project II**
**Credit: 3 credit**
**Prerequisites: Final Year Project I**

**Synopsis**

This course will expose the students on the process of conducting academic research in order to provide the skills and ability in carrying out research project in the area of their study. The covered areas for Final Year Project II are: (i) development of research instruments for data collection, (ii) carrying out data collection, (iii) analyzing data collected, (iv) interpreting data, (v) writing reports.

**Course Outcome**

CO 1 Develop research instruments

CO 2 Analyze data collected using research instruments developed

CO 3 Prepare Final Year Project report comprising research problem, Ros, RQs, literature review, research methods, data analysis and conclusions

**BPS4413**
**Process Safety and Loss Prevention**
**Credit: 3 credit**
**Prerequisites: Hazard Recognition and Risk Management**

**Synopsis**

This course presents the principles and methodology for Process Safety Management (PSM) in chemical and process based industries. In particular, it emphasizes on the Process Hazard Analysis (PHA) and Quantitative Risk Assessment (QRA) including risk contours. The implementation of PSM also will be explained to students. Loss prevention systems such as relief system, emergency shutdown system, toxic release suppression, explosion prevention and safety instrumented system will also be discussed. Students also will be trained on major hazard management including safety case report development and disaster planning based on major accident case studies.

**Course Outcome**

CO 1 Explain the concepts of process safety and historical cases of major hazard disasters.

CO 2 Apply the Process Hazards Analysis (PHA) and Quantitative Risk Assessment (QRA) techniques.

CO 3 Analyze the process loss prevention techniques and safety systems.

CO 4 Demonstrate skill in implementation of the Process Safety Management (PSM) system.

CO 5 Demonstrate skill in the implementation of the requirements for managing major hazards.

**BPS4423**
**Occupational Epidemiology & Disease**
**Credit: 3 credit**
**Prerequisites: Industrial Toxicology, Statistics**

**Synopsis**

This course will expose the students to basic principles of epidemiology necessary to understand scientific literature, monitor data in industry, and/or to conduct scientific investigations or surveillance activities. This course will emphasize on aspects of disease transmission and causation, occurrence of disease, determining the cause of disease and estimating risk. The major types of epidemiologic study (cohort, case referent and cross-sectional) will be described. Threats to validity and issues in interpreting epidemiologic data such as bias, confounding factors, and random error will be discussed. Communicable and non-communicable diseases plus epidemiologic surveillance will be also discussed for preventing and controlling diseases. Students will also learn how to review a number of published articles related to epidemiologic issues.

**Course Outcome**

CO 1 Understand the basic concepts, nomenclature, and importance of epidemiology in discovering causes, measuring risks and determining priorities for intervention and evaluation.

CO 2 Demonstrate the knowledge of measuring health and disease occurrence

CO 3 Differentiate the main types of study design and calculate basic ratios and rates in epidemiologic studies.

CO 4 Differentiate the communicable and non-communicable diseases

CO 5 Apply the epidemiology concepts and methods to current environmental and occupational health problem

**BPS4113**
**Occupational Safety & Health Legislation**
**Credit: 3 credit**
**Prerequisites:None**

**Synopsis**

This course introduces the history of occupational safety and health law and the principle of tort and liability. It focuses on existing Malaysian legislations pertaining to occupational safety and health. The main objective is to expose students on the applicable law and how it affected their organizations and themselves as safety and health personnel in the organizations.

**Course Outcome**

CO 1 Identify the legislations related to Occupational Safety and Health (OSH).

CO 2 Apply OSH legislations to solve issues related to safety and health.

CO 3 Analyze cases related to OSH malpractice.

**BPS4613**
**Wastewater Treatment Technology**
**Credit: 3 credit**
**Prerequisites: None**

**Synopsis**

This course gives the students exposure to the physical, biological and chemical processes that are used in the treatment of wastewater. Process design calculation for specific processes will be stressed. Examples of the use of these processes in the manufacturing sector and agriculture including low waste zero discharged technology also will be discussed. The environmental laboratory is introduced to students the important of scientific analysis of the wastewater as part of environmental impact assessment. This is to curb the damaged done to the purity of water and to be able to reduce the level of pollution into the surrounding living space particularly involving the quality of river.

**Course Outcome**

CO 1 Describe the physical, chemical, and biological characteristics necessary to analyze basic wastewater treatment pollutions.

CO 2 To analyze the level of pollutions for determining appropriate wastewater treatment technologies.

CO 3 Report the environmental impact assessment (EIA) in order to control and supervise the level of wastewater pollution by complying to the related legislation.

**BPS4538**
**Industrial Training**
**Credit: 8 credit**
**Prerequisites: All Subject**

**Synopsis**

This course aims to give chances for the student to practice and apply their knowledge and skills that they gain during their study. During the placement, we expect students to keep a log book, in which they make a regular entries describing the work they are undertaking. Student are supervised by industrial and university supervisors to guide and ensure they can do their work as good as possible and achieve the objective for this course.

**Course Outcome**

CO 1 Adapt working culture and regulation of host industry or agency

CO 2 Solve problem in the host industry or agency by applying the theory or methodology as learned previously

CO 3 Work effectively with others in the host organization as a team

CO 4 Practice interpersonal skills and professional ethics in host organization

CO 5 Perform assigned task as required by host industry or agency training supervisor

**BPS4534**
**Industrial Training Report**
**Credit: credit**
**Prerequisites: Industrial Training**

**Synopsis**

During the placement, we expect students to keep a log book, in which they make a regular entries describing the work they are undertaking. Then, student need to provide industrial training report to describe their technical and personal development during their placement. The industrial training report need to hand in to the university supervisor. Student need to do final presentation for assessment.

**Course Outcome**

CO 1 Organize the industrial training knowledge, experience and skill in the preparation of the industrial training report

CO 2 Apply technical writing skill in preparing the final industrial training report

CO 3 Submit binded final industrial training reports complying with faculty academic standards and industrial training regulations.

CO 4 Present industrial training experience to faculty

## CURRICULUM STRUCTURE
## Bachelor of Industrial Technology Management with Honours

| YEAR | FIRST | SECOND | THIRD | FOURTH |
|---|---|---|---|---|
| FACULTY AND PROGRAM COURSES | BPS1113<br>OSH Fundamentals | BPF2413<br>Management Information System | BUM2413<br>Applied Statistics | BPT4113<br>Strategic Management |
| | BUM1123<br>Mathematics for Management | BPF2213<br>Introduction to Finance | BPT3113<br>Management of Technology | BPT4413<br>Manufacturing Technology |
| | BPF1113<br>Principles of Management | BPT2413<br>Principles of CAD/CAM | BPT3413<br>Optimization Methods | BPT4423<br>Manufacturing Design |
| | BPF1213<br>Principles of Economics | BPT2113<br>Legal and Ethical Issues | BPT3133<br>Procurement in Industrial Management | BPT4514<br>Final Year Project II |
| | BPF1223<br>Introduction to Cost Accounting | BPF2113<br>Research Methodology | BPT3123<br>Industrial Logistic | BPT4538<br>Industrial Training |
| | BPF1123<br>Industrial Psychology | BPF2123<br>Quality Management System | BPF3113<br>Managing Human Capital | BPT4534<br>Industrial Training Report |
| | BPT1113<br>Operation & Production in Industrial Management | BPT2123<br>Supply Chain Management | BPT3423<br>Production Planning and Control | |
| | | BPT2423<br>Statistical Process Control | BPT3153<br>Creativity and Innovation | |
| | | # Elective Course | BPT3512<br>Final Year Project I | |
| | | | # Elective Course | |
| **102** | **21** | **27** | **29** | **25** |
| **18** | **University Courses :** Co-Curriculum I, Co-Curriculum II, Technopreneurship, Islamic & Asean Civilization, Ethnic Relations, Islamic Institutions, Foreign Language, Foreign Language 2, Technical English, Technical Writing, Academic Report Writing, Softskill I, Softskill II | | | |
| **120** | **Total Unit for Graduation** | | | |
| **# Elective Courses:** Technology Assessment, Environmental Management & Sustainability, Change Management, Project Management | | | | |

**COURSE STRUCTURE**

**CORE FACULTY**

**BUM1123**
**Mathematics for Management**
**Credit : 3**
**Prerequisites: None**

**Synopsis**

This subject introduce the use of mathematical technique in the field of business administration and management. The topics introduce to the inequality, matrices, functions and the key business topics susch as simple interest, compound interest, annuity, notes and bank discount, mathematics of buying, markup and markdown.

**Course Outcomes**

CO 1 Use the basic principle and methodologies of mathematics to solve the mathematical analysis problems.

CO 2 Use the methods and concept of mathematics to solve any related financial management problems.

C0 3 Apply the mathematical concepts and the usage of the mathematical technique in business administration and management.

**BPF1113**
**Principles of Management**
**Credit : 3**
**Prerequisites: None**

**Synopsis**

Principles of management aim to provide students with information and knowledge on theoretical management and applied practiced in managing a successful organization. Students will discuss the major principles of management known as POLC: Planning, Organizing, Leading and Controlling. Contemporary issues and global challenges for future managers will also be discussed to equipped students with current trends and best practices in managing a successful organization.

**Course Outcomes**

CO 1 Explain the basic principles of management.

CO 2 Identify the best practices in management.

CO 3 Apply the basic principles of management in solving contemporary issues and global challenges in business management.

**BPF1213**
**Principles of Economics**
**Credit : 3**
**Prerequisites: None**

**Synopsis**

This course is designed to introduce students to key concepts used in micro and macroeconomics, and facilitate a basic understanding of economic phenomena. The goal is to help student to understand fundamental concepts and tools so

that student can use it to analyse various economic issues at the national and international levels. It is primarily concerned with Malaysian economy and will help to understand how economy works.

**Course Outcomes**

CO 1 Understand the basic Macro & Micro economic concepts.

CO 2 Explain the usage of economics concept for business management.

CO 3 Interpret the economics data and graphs to explain the business trend.

**BPF1222**
**Introduction to Cost Accounting**
**Credit : 3**
**Prerequisites: None**

**Synopsis**

To introduce students to the concepts and terminology of accounting and financial reporting for modern business enterprises. They will also learn to use accounting information to make conclusions about business activities and to communicate these conclusions to others, basic accounting concepts, how accounting information reflects basic activities of businesses and organizations and how accounting information is used to make decisions about these entities.

**Course Outcomes**

CO 1 Explain the principles of accounting and identify the four basic financial statements.

CO 2 Calculate cost for business using the principles of costing systems.

CO 3 Solve accounting problem by applying the accounting method in a business setting.

**BPF1123**
**Industrial Psychology**
**Credit : 3**
**Prerequisites: None**

**Synopsis**

The Industrial Psychology course introduces students to the principles of behaviors as it exists at the workplace: attitudes of employees and employers, organizational behavior, workplace environment and its effects. It focuses on three parts concerning personnel issues, organizational issues and work environment issues investigated in industrial / organizational psychology. Specifically, the course explains the major applications of Industrial Psychology; describes the importance relationship of selecting, training and evaluating employees; discusses the issues facing industrial psychology today and how these issues affect workers, organizations, and society; and illustrates how the principles of Industrial Psychology can be applied to day-to-day experiences as an organizational member, and to help you develop as an effective organizational member or manager.

**Course Outcomes**

CO 1 Know major applications of Industrial Psychology

CO 2 Describe the importance relationship of selecting,

training and evaluating employees

CO 3 Relate the issues affecting workers, organizations, and society

CO 4 Illustrate how the principles of Industrial Psychology can be applied in organization

**BPF2413**
**Management Information System**
**Credit : 3**
**Prerequisites: None**

**Synopsis**

This course aims to provide firm understanding on the significance role of information systems in today's organization in particular in managing organizational most valuable assets - its data and information. The discussion sessions shall covers four major topics; Information Systems and its applicability in modern enterprise and organization including its strategic competitive advantage as well as ethical issues involved; Information technology infrastructure and security issues; Information system applicability for digital age; building and managing information systems for organizational use. Hands on activity on the usage of office automation system and designing relational database shall be cover in lab sessions.

**Course Outcomes**

CO 1 Describe information systems roles in modern organization and its functions in obtaining organizational competitive advantage

CO 2 Describe information technology infrastructure and its requirement for digital firm and security threats involved

CO 3 Discuss various strategies and approaches in system development

CO 4 Demonstrate the usage of office automation system in performing operational tasks and managing information resources within organization.

**BPF2213**
**Intoduction to Finance**
**Credit : 3**
**Prerequisites:None**

**Synopsis**

With recent spate of companies experiencing financial difficulties. The issue of sound financial management is now more important than ever. This course enable students to appreciate and understand the financial issues faced by an organisation's management and the activities undertaken by the organisation to have effective financial management. It examines relevant issues including financial strategy, debt and equity msnsgement, the key drivers of shareholders value, risk and return concept in investment, capital budgeting as vehicles to evaluate investment choice.

**Course Outcomes**

CO 1 Define and explain the concept and key driven in financial management

CO 2 To calculate and relate financial formula to

particular area in financial management

CO 3 Examine and analyze financial management problems by using all concepts in financial management

**BPF 2113**
**Research Methodology**
**Credit : 3**
**Prerequisites: None**

**Synopsis**

This subject is intended to give an understanding and knowledge on the methodology of research and its application when conducting research projects. The topics to be covered are: Introduction to Research; Research Topic, Research Question and Research Design; Reviewing the Literature; Sampling and Measurement; Observation; Research Instruments; Analyzing Data, Completing the Research Project.

**Course Outcomes**

CO 1 Define and identify research methods

CO 2 Relate research methods in developing research proposals

CO 3 Design research proposals.

**BPF2123**
**Quality Management System**
**Credit : 3**
**Prerequisites: None**

**Synopsis**

This course intends to provide and understanding of fundamentals of Quality Management. The topics covered include Introduction to Quality Management, Quality's Guru, Quality Tools And Concept, Different Quality Approaches, Quality Control Tools and Statistical Process Controls. Students will be exposed to various case studies on quality concept, locally and internationally.

**Course Outcomes**

CO 1 Define and able to explain the fundamental concept and definition of total quality management as a career of choice.

CO 2 Identify the basic knowledge of quality management and quality control in production and manufacturing.

CO 3 Demonstrate and evaluate new concept of quality control for production and manufacturing, and quality practices in service sector which integrates fundamental aspects of quality management.

**BUM2413**
**Applied Statistics**
**Credit : 3**
**Prerequisites: None**

**Synopsis**

Students are exposed to statistics including statistical problem-solving methodology and descriptive statistic, probability distributions commonly used in practice, sampling distribution and confidence interval, hypothesis testing, analysis of variance (ANOVA), goodness of fit test and contingency tables and regression and correlation including simple and multiple linear regressions. Appropriate software is used by students to implement some of these ideas in practice.

**Course Outcomes**

CO 1 Analyze data using statistical theory and methodology and recommend a conclusion or suggestion based on the analyzed data.

CO 2 Perform statistical data analysis by using appropriate software and scientific calculator.

CO 3 Apply statistical concepts and methods learned to solve any related problems in various diciplines.

**BPF 3113**
**Managing Human Capital**
**Credit : 3**
**Prerequisites: None**

**Synopsis**

This course provides an overview of many issues related to managing human capital in organisation. Topics are designed to gain an understanding of how individuals in organisation grow and progress in their organisation and what are the formal dimensions that impinge upon employees and employers, and their relationship to planning, mobility, goal-achievement, motivation and performance.

**Course Outcomes**

CO 1 Understand key principles underlying effective selection, management, development and retention of human capital

CO 2 Identify and explain the employment law issues relevant to managing human capital

CO 3 Assess the likely efficacy of different approaches to managing human capital

CO 4 Develop problem-solving skills relevant to managing human capital

CO 5 Demonstrate abilities in managing human resource functions at the work place

**CORE PROGRAM**

**BPS1113**
**Occupational Safety and Health Fundamentals**
**Credit : 3**
**Prerequisites: None**

**Synopsis**

This course introduces the principles and basic concepts of occupational safety and health. Students will be exposed to the history of occupational safety and health (OSH) development, acts and legislations in relation to OSH, the responsibilities and qualification of safety and health practitioner and professional ethics. The human bodies and its psychological functions and its relationship to workplace productivity will also be discussed. Introduction to Occupational Hygiene is also discussed as a foundation for the next subjects. Some common safety and health hazards will be emphasized for better understanding.

**Course Outcomes**

CO 1 Understand the importance of ocupational safety and health at the workplace in any organization and Occupational Safety and Health Act introduced in 1994 and aware of the person's rights at work including the responsibilities of employees and employers

CO 2 Identify the risk, safety and health factors at the workplace in order to take action effectively and effiiciently

CO 3 Practice the application and reduction of the risk, hazard and loss impact due to unhealthy practices at the workplace

**BPT 1113**
**Operation & Production in Industrial Management**
**Credit : 3**
**Prerequisites: None**

**Synopsis**

The subject is intended to provide an understanding on the operational aspects of management techniques. It will focus on the nature of operations management and its impact on competitiveness, and the role of the operations manager and the relationship with other business functions.

**Course Outcomes**

CO 1 Explain operation and production in terms of inputs, processes, outputs, information flows, suppliers and customers relationship

CO 2 Calculate production and operation parameters such as productivity, capacity, break-even point and cycle time.

CO 3 Solve various operation and production problems such as capacity planning, layout, location, process selection and line balancing.

**BPT2413**
**Principles of CAD/CAM**
**Credit : 3**
**Prerequisites: None**

**Synopsis**

The subject is intended to provide students with introduction and theoretical understanding of computer-aided technologies used in design (CAD) and manufacturing. Students are exposed to various problem solving techniques as well as hands-on experience and project-based approach in the aspects of industrial product design and development

**Course Outcomes**

CO 1 Describe product design and development, Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM).

CO 2 Apply selected CAD/CAM software for performing basic design work and product development functions.

CO 3 Solve various design and product development problems using suitable computer software and production application tools.

**BPT2113**
**Legal and Ethical Issues**
**Credit : 3**
**Prerequisites: None**

**Synopsis**

This course is intended to introduce the legal and ethical issues pertaining to business and organization. Students examine such issues as personnel law and obligations; negotiations; contract management; constitutional rights of individuals; legal liability of professionals and organizations; legal compliance and ethical standards.

**Course Outcomes**

CO 1 Understand the business law and ethical issues.

CO 2 Identify the law that involves in a particular business.

CO 3 Apply the knowledge of law in decision making for business and organization.

**BPT2243**
**Statistical Process Control**
**Credit : 3**
**Prerequisites: None**

**Synopsis**

The subject is designed to introduce methods for data collection, control chart construction and interpretation, and statistical diagnosis for process improvement. The course blends statistical process control (SPC) and principles of statistics for quality control and process improvement purpose. It also covers forecasting techniques and acceptance sampling methods.

**Course Outcomes**

CO 1 Utilise statatistics principles in data analysis for forecasting and quality control calculation

CO 2 Analyse results of forecasting, statistical process control and acceptance sampling output

CO 3 Apply forecasting, statistical process control and acceptance sampling techniques in solving industrial quality and process improvement problems

**BPT2123**
**Supply Chain Management**
**Credit : 3**
**Prerequisites: None**

**Synopsis**

The subject is intended to introduce the strategic role of a supply chain from vendor to customer and the methods used to manage these supply chains.

**Course Outcomes**

CO 1 Describe the supply chain goals and managerial actions that improve supply chain performance.

CO 2 Explain strategic framework for supply chain decisions which involves planning, designing and operating processes

CO 3 Apply technical knowledge in problem solving situation in supply chain management

**BPT3113**
**Management of Technology**
**Credit : 3**
**Prerequisites: None**

**Synopsis**

This subject is intended to give an understanding on the concept of technology management and its application to an organization particularly business firm. The topics to be covered are: Introduction to Management of Technology, The Role of Technology in the Creation of Wealth, Critical Factors in Managing Technology, Technology Life Cycles, The Process of Technological Innovation, Competitiveness, Business Strategy and Technology Strategy, Technology Planning and Technology Transfer.

**Course Outcomes**

CO 1 Recognise the general principles, terms and definition used in the management of technology.

CO 2 Explain the role of technology management in the development, operation and marketing of goods and/or services.

CO 3 Manipulate the impact of contextual forces on technology policies and strategies within and between organizations.

CO 4 Apply decision making techniques in the management of technology to address problems in the range of sectors.

**BPT3413**
**Optimization Method**
**Credit : 3**
**Prerequisites: None**

**Synopsis**

The course will expose and develop skills in the theory, algorithms and application of optimization techniques. Optimization methodologies include linear programming, network optimization, integer programming, decision trees and dynamics programming. The methods have application to logistics, manufacturing, marketing transportation, project management and finance.

**Course Outcomes**

CO 1 Explain the strategic importance of optimization and methods in industrial operations

CO 2 Analyse industrial optimization problems in business operation management

CO 3 Solve optimization problems in industry using appropriate management science technique

**BPT3123**
**Industrial Logistics**
**Credit : 3**
**Prerequisites: None**

**Synopsis**

This course will cover tools and techniques used in the industrial logistics operations. It focuses on logistics system which includes inventory management, transportation and shipping, material management, warehousing, logistics information technology framework, international logistics and logistics system control.

**Course Outcomes**

CO 1 Explain the strategic importance of logistics and appropriate logistic approach in industrial operation

CO 2 Analyse industrial logistic problems in industrial operation management

CO 3 Solve industrial logistics problems in industry using appropriate operation management technique

**BPT3133**
**Procurement in Industrial Management**
**Credit : 3**
**Prerequisites: None**

**Synopsis**

This subject is aimed to provide the understanding of procurement management in industrial sector. It focuses on the Management of the Procurement, Purchasing Procedures and Systems Contracting, Order Management, Supplier Selection and Evaluation, Price / Cost Analysis and Negotiation Strategies**,** Relationship Management, E-Procurement and Special Purchasing Applications.

**Course Outcomes**

CO 1 Explain ethical and unethical behaviors in managing procurement process.

CO 2 Describe how to select and evaluate supplier.

CO 3 Analyze price cost relationship for procurement decision making.

CO 4 Apply technical knowledge in problem solving situation in procurement.

**BPT3153**
**Creativity & Innovation**
**Credit : 3**
**Prerequisites: None**

**Synopsis**

This subject is intended to help students develop or enhance their own creativity, to understand the relationship between creativity and innovation, and finally, to explore how business organizations foster and inhibit creativity for competitiveness and commercialization.

**Course Outcomes**

CO 1 Elaborate core concepts of creativity and innovation in industrial organization

CO 2 Perform appropriate management approach in developing creative and innovative ideas for business or organization implementation

CO 3 Evaluate creative and innovative ideas and make reasoned recommendations for business and industrial commercialization

**BPT3423**
**Production Planning and Control**
**Credit : 3**
**Prerequisites: None**

**Synopsis**

The subject covers planning and controlling of production in production and operation management; concepts of JIT, MRP, MRPII, ERP, production system design, analytical techniques and concepts of production and process control in industrial management.

**Course Outcomes**

CO 1 Explain the importance of industrial planning and control and its activities

CO 2 Analyze industrial production planning and control problems

CO 3 Apply production planning and control methods for solving industrial operation problems

**BPT3512**
**Final Year Project 1**
**Credit : 2**
**Prerequisites: All the first and second year subjects**

**Synopsis**

This course will expose the students on the process of conducting academic research in order to provide the skills and ability in carrying out research project in the area of their study. The covered areas for Final Year Project 1 are: (i) problem background, (ii) problem statement, (iii) research objectives, (iv) research questions, (v) research framework,

(vi) literature reviews and (vii) research methods.

**Course Outcomes**

CO 1 Identify problems / issues / incidences, research objectives / questions, appropriate literature and research methods

CO 2 Relate problems / issues / incidences with research objectives, research questions and literatures

CO 3 Prepare research proposal comprising research problem, ROS, RQs, literature review and research methods

**BPT4113**
**Strategic Management**
**Credit : 3**
**Prerequisites: None**

**Synopsis**

This course exposes students on the aspects of strategic management in business environment. The covered areas for this course are: the nature of strategic management; external and internal assessment; strategic analysis and choice; strategy implementation; and strategic evaluation and control.

**Course Outcomes**

CO 1 Describe the strategic management concepts and techniques.

Co 2 Apply the strategic management concepts and techniques in business environment.

Co 3 Analyze internal and external environment and formulate strategy choice for implementation

**BPT4413**
**Manufacturing Technology**
**Credit : 3**
**Prerequisites: None**

**Synopsis**

The subject is intended to introduce manufacturing processes as used by industries to transform raw material to a final product: covering basic principles in metal forming, casting, joining and machining processes. The subject also covers manufacturing automation which focuses on mechanization of parts handling; parts feeding and transfer mechanisms; automated production and assembly; industrial robotics; introduction to machine vision; and economic justification of automation.

**Course Outcomes**

CO 1 Explain the fundemantals of manufacturing technology applicable to industrial production processes

CO 2 Determine the compatibility of manufacturing technology alternative with product specification for industrial production processes.

CO 3 Perform basic manufacturing work as practiced by production industries

**BPT4423**
**Manufacturing Design**
**Credit : 3**
**Prerequisites: None**

**Synopsis**

The subject is intended to give an in-depth understanding of the entire process of new product development, as it should operate within a modern manufacturing company which encompassing both the design and development, not only of the visual appearance of products but also design for manufacturing, design to meet market needs, design for cost reduction, design for reliability and design for environmental friendliness.

**Course Outcomes**

CO 1 Explain about the systematic approach to new product development and market-focus as required throughout the product development process.

CO 2 Apply technical knowledge in problem solving using appropriate software and management techniques in manufacturing design.

CO 3 Design products for both manual and automatic assembly by applying appropriate techniques for stimulating creativity and coming up with more innovative solutions to design problems.

**BPT4514**
**Final Year Project II**
**Credit : 4**
**Prerequisites: Final Year Project I**

**Synopsis**

This course will expose the students on the process of conducting academic research in order to provide the skills and ability in carrying out research project in the area of their study. The covered areas for Final Year Project II are: (i) development of research instruments for data collection, (ii) carrying out data collection, (iii) analysing data collected, (iv) interpreting data and (v) writing reports.

**Course Outcomes**

CO 1 Develop research instruments

CO 2 Analyze data collected using research instruments developed

CO 3 Prepare Final Year Project report comprising research problem, ROS, RQs, literature review, research methods, data analysis and conclusions

**BPT4538**
**Industrial Training**
**Credit : 3**
**Prerequisites: All Courses**

**Synopsis**

This course aims to give chances for the student to practise and apply their knowledge and skills that they gain during their study. During the placement, we expect students to keep a log book, in which they make a regular entries describing the work they are undertaking. Student are supervised by industrial and university supervisors to guide and ensure they can do their work as good as possible and achieve the objective for this course.

**Course Outcomes**

| | |
|---|---|
| CO 1 | Adapt working culture in project, consultant, manufacturer and any related industry |
| CO 2 | Construct solution by applying the theory learned to solve real problem in organization |
| CO 3 | Work effectively with others in organization to perform task given |
| C0 4 | Practice interpersonal skills and professional ethics in organization |
| CO 5 | Practice the related theory in the community and prepare for the better career opportunity in business or industry area |

**BPT4534**
**Industrial Training Report**
**Credit : 4**
**Prerequisites: Industrial Training**

**Synopsis**
During the placement, we expect students to keep a log book, in which they make a regular entries describing the work they are undertaking. Then, student need to provide industrial training report to describe their technical and personal development during their placement. The industrial training report need to hand in to the university supervisor. Student need to do final presentation for assessment.

**Course Outcomes**

| | |
|---|---|
| CO 1 | Organize the industrial training knowledge, experience and skill in the preparation of the industrial training report |
| CO 2 | Apply technical writing skill in preparing the final industrial training report |
| CO 3 | Submit binded final industrial training reports complying with faculty academic standards and industrial training regulations. |
| CO 4 | Present industrial training experience to faculty |

**ELECTIVE**

**BPS2613**
**Environmental Management & Sustainability**
**Credit : 3**
**Prerequisites : None**

**Synopsis**

This course will cover principles and concepts about ecology and ecosystems, weather and human impacts on the environment and its management and pollution. Natural renewable and non-renewable resources and its management, current issues on the environment, including economics, global view and ethics comprise the materials of the course. The topics that will be discussed include issues related to trade, environment and development and roles that are played by the consumer, community, industry and government towards sustainable development. The students will be also introduced to the ISO 14000 series of Environmental Management Standards.

**Course Outcomes**

CO 1 Understand the terminologies, theories and principle of environmental management and sustainable development.

CO 2 Understand the current environmental issues and the appropriate solutions.

CO 3 Understand the local and international environmental legislations and standards.

CO 4 Identify and apply environmental management tools in solving environmental problems.

CO 5 Implement environmental management system to achieve sustainability.

**BPT3613**
**Technology Assessment**
**Credit : 3**
**Prerequisites: None**

**Synopsis**

This course provides students with the opportunity to understand the importance of technology assessment in corporate strategic planning, understand the critical elements of technology assessment, and learn and apply tools and techniques related to technology scanning, technology impacts, strategic technology analysis, technology road mapping, technology forecasting, and measuring technology performance.

**Course Outcomes**

CO 1 Describe the role of technology assessment and its benefits

CO 2 Apply a systematic approach to conduct assessment of technology fitness of a company.

CO 3 Apply appropriate techniques and tools to assess the present technology portfolio and measure technology performance

**CURRICULUM STRUCTURE**
**Bachelor of Engineering Technology (Electrical) With Honors**

| YEAR | FIRST | SECOND | THIRD | FOURTH |
|---|---|---|---|---|
| FACULTY AND PROGRAM COURSES | BTU1001 Physics Laboratory | BTE2001 Electric Fundamental & CA I Laboratory | BTE3001 Electronics 1 Laboratory | BTE4213 Control System II |
| | BTU1004 Physics | BTE2004 Electric Fundamental & CA I | BTE3004 Electronics 1 | BTE4703 Digital Control System |
| | BTU1011 Chemistry Lab | BTM1003 Basic Manufacturing Processes | BTE3011 Digital Logic Design Lab | BTE4723 Power Electronics |
| | BTU1013 Chemistry | BTU1041 Calculus II Laboratory | BTE3014 Digital Logic Design | BTE4806 Engineering Technology Senior Design Project II |
| | BTU1023 Trigonometry & Elementary Functions | BTU1043 Calculus II | BTE3021 Electrical Machines & Transformers Lab | BTM3074 Computer Integrated Manufacturing |
| | BTE1004 Electric & Electronics Fundamentals | BTE2011 Electrical Fundamental & CA II Laboratory | BTE3024 Electrical Machines & Transformers | BTE4909 Industrial Training |
| | BTE1011 Electrics & Electronics Fundamentals Lab | BTE2014 Electrical Fundamental & CA II | BTE3031 Communication System Design Lab | BTE4913 Industrial Training Report |
| | BTU1031 Calculus I Laboratory | BTE2021 Electricity & Electronic Numerical Simulation Lab | BTE3034 Communication System Design | |
| | BTU1033 Calculus I | BTE2023 Electricity & Electronic Numerical Simulation | BTE3041 Electronics II Laboratory | |
| | BTU1064 Computer Programming | BTM1004 Computer Aided Design | BTE3044 Electronics II | |
| | | BTM2014 Manufacturing Computer Application | BTE3051 Microprocessors & Interfacing Lab | |
| | | | BTE3054 Microprocessors & Interfacing | |
| | | | BTE3061 Control System Lab | |
| | | | BTE3064 Control System | |
| | | | BTE3923 Engineering TechnologySenior Design Project I | |
| **123** | **25** | **29** | 38 | **31** |

| | |
|---|---|
| **18** | **University Courses :** Co-Curriculum I, Co-Curriculum II, Technopreneurship, Islamic & Asean Civilization, Ethnic Relations, Islamic Institutions, Foreign Language, Foreign Language 2, Technical English, Technical Writing, Academic Report Writing, Softskill I, Softskill II |
| **141** | **Total Unit for Graduation** |
| **# Elective Subjects:** Environmental Management and Sustainability, Organizational Behavior, Project Management, Change Management, Islamic Institution | |

**COURSE STRUCTURE**

**CORE FACULTY**

**BTU1001**
**Physics Laboratory**
**Credit: 1**
**Prerequisites: None**

**Synopsis**

This laboratory introduces the students with the application of physics concept in engineering devices such as Free Fall, Bernoulli's Law, Hydrostatic Pressure And Electric Field. The concepts of physics introduced related in mechanics or dynamics motion and basic concepts of electrical area. The students will learn how to run the experiment with referring the basic concepts of physics during the lab hours.

**Course Outcome**

CO 1 Understanding the basic concepts, theories and principles of physics in engineering application

CO 2 Demonstrating skills in logical thinking in handling equipment.

CO 3 Applying basic physics concepts to problem solving

CO 4 Applying physics knowledge to personal decisions involving physical problems

**BTU1004**
**Physics**
**Credit: 3**
**Prerequisites: None**

**Synopsis**

This course introduces a fundamental of physics. It covers unit and measurements, kinematics, forces and Newton's law of motion, statics equilibrium, work, energy and power, fluid mechanics, electric and magnetism.

**Course Outcome**

CO 1 Understanding the basic concepts, theories and principles of physics in engineering application

CO 2 Solve problems in kinematics, forces and static equilibrium

CO 3 Solve problems in work, energy and power, fluids, electricity & magnetism

CO 4 Applying physics knowledge to personal decisions involving physical problems

**BTU1011**
**Chemistry Lab**
**Credit: 1**
**Prerequisites: None**

**Synopsis**

In chemistry laboratory the students are responsible to conduct the basic physical, organic and analytical chemistry experimentssuch as solubility, miscibility, chemical equilibrium, buffer and pH changes, calorimetry, solvent extraction,

gravimetric, UV-VIS spectrometer, FTIR, DSC and gas chromotography. At the end of experiments, the students should be able to inculcate the critical thinking and able to work in safe working condition.

**Course Outcome**

CO 1 Apply physical, organic & analytical chemistry theory in laboratory

CO 2 Apply the basic science and analytical chemistry knowledge in operation of analytical chemistry equipment.

CO 3 Able to demonstrate and operate each analytical equipment base on the theories applied in analytical chemistry

CO 4 Able to indicate any minor/major malfunction of equipment, incorrect step/ result & troubleshoot it

**BTU1013**
**Chemistry**
**Credit: 3**
**Prerequisites:None**

**Synopsis**

Development of the fundamental principles and concepts of chemistry by lecture-demonstration, as well as the development of an appreciation of the nature of chemistry as a science. An historical development of the most important concepts and ideas. Methods and limitations of chemistry, its evolution and discussions of the problems currently being solved and created

**Course Outcome**

CO 1 Apply the basic knowledge about physical, inorganic and analytical chemistry.

CO 2 Relate chemical concept and principles while presenting a broad range of topic in a clear and concise manner.

CO 3 Develop problem solving and critical thinking skills on general chemistry.

CO 4 Communicate effectively in written and oral form through group discussion, tutorial and presentation.

CO 5 Work in group to complete the assigned tasks in a given time.

**BTU1013**
**Trigonometry and Elementary Function**
**Credit:3**
**Prerequisites: None**

**Synopsis**

This course introduces and discusses the fundamental of mathematics focusing on providing a solid theoretical foundation for further work. Student are exposed to number system, equations, inequalities and absolute value, polynomials, sequences and series, matrices and system of linear equations, functions and graphs, and trigonometric functions. This course also integrates symbolic tools, graphical concepts, and numerical calculations.

**Course Outcome**

CO 1 Define and use the concepts and properties of basic mathematics.

CO 2 Apply concepts and methods learned to solve any related problem of basic mathematics in various fields.

CO 3 Relate and apply the concepts and methods studied into other courses.

**BTU1031**
**Calculus I Laboratory**
**Credit:3**
**Prerequisites: None**

**Synopsis**

This course introduces the number system, functions, introduction to derivatives, exponential functions, applications of derivatives, limits of functions and continuity. Appropriate software is used by students to implement some of these ideas in practice.

**Course Outcome**

CO 1 Analyze and apply appropriate calculus concepts to solve various science and engineering problems using mathematical software.

CO 2 Use appropriate software to solve the graphical problems in calculus.

CO 3 Analyze and think critically a wide range of problem and solve it using ideas and methods in calculus in math software.

CO 4 Relate and applied the concepts and methods studied into other courses.

**BTU1033**
**Calculus I**
**Credit:3**
**Prerequisites: None**

**Synopsis**

This course introduces the number system, functions, introduction to derivatives, exponential functions, applications of derivatives, limits of functions and continuity. Appropriate software is used by students to implement some of these ideas in practice.

**Course Outcome**

CO 1 Analyze and apply appropriate calculus concepts to solve various science and engineering problems.

CO 2 Use appropriate software to solve the graphical problems in calculus.

CO 3 Analyze and think critically a wide range of problem and solve it using ideas and methods in calculus.

CO 4 Relate and applied the concepts and methods studied into other courses.

**BTU1064**
**Computer Programming**
**Credit: 4**
**Prerequisites: None**

**Synopsis**

This subject is designed to introduce to the students the principle of computer-aided design. Topics includes Drafting Overview, Drawing Set-up , Basic CAD ,Commands Geometric Construction , Orthographic Projection , Basic Drawing ,Tools, Pictorial Drawings, Sectional Views, Advance CAD Commands, Modifying CAD,Drawings, Dimensioning, Tolerances, Working Drawings, Threads and Fasteners

**Course Outcome**

CO 1 Analyze problem in technical drawing and understand drawing

CO 2 Use basic geometric construction techniques to create objects in CAD

CO 3 Project a 3 dimensional object in 2 dimensional space with the proper utilization of views in CAD

CO 4 Read & create dimensioned drawings using conventional techniques in CAD.

CO 5 Identify and understand the components of working drawings & the standards that apply.

**BTU1041**
**Calculus II Laboratory**
**Credit: 1**
**Prerequisites:None**

**Synopsis**

This course introduces the differentiation,integration, techniques of integration, interpolation & approximation, sequences, series, power of series and the Binomial theorem. Appropriate software is used by students to implement some of these ideas in practice.

**Course Outcome**

CO 1 Analyze and apply appropriate calculus concepts to solve various science and engineering problems using mathematical software.

CO 2 Use appropriate software to solve the graphical problems in calculus.

CO 3 Analyze and think critically a wide range of problem and solve it using ideas and methods in calculus in math software.

CO 4 Relate and applied the concepts and methods studied into other courses.

**BTU1043**
**Calculus II**
**Credit:3**
**Prerequisites: None**

**Synopsis**

This course introduces the differentiation,integration, techniques of integration, interpolation & approximation, sequences, series, power of series and the Binomial theorem. Appropriate software is used by students to implement some of these ideas in practice.

**Course Outcome**

CO 1 Analyze and apply appropriate calculus concepts to solve various science and engineering problems.

CO 2 Analyze and think critically a wide range of problem and solve it using ideas and methods in calculus.

CO 3 Use appropriate software to solve the graphical problems in calculus.

CO 4 Relate and applied the concepts and methods studied into other courses.

**CORE PROGRAM**

**BTE1004**
**Electric & Electronics Fundamentals**
**Credit: 4**
**Prerequisites: None**

**Synopsis**

Fundamentals of DC and AC circuits, network laws and theorems, passive circuit components, semiconductors, electric machines, and digital systems

**Course Outcome**

CO 1 Apply electricity fundamentals

CO 2 Apply electronic fundamentals

**BTE1011**
**Electrics & Electronics Fundamentals Lab**
**Credit:3**
**Prerequisites: None**

**Synopsis**

Fundamentals laboratory of DC and AC circuits, network laws and theorems, passive circuit components, semiconductors, electric machines, and digital systems

**Course Outcome**

CO 1 Apply electricity fundamentals

CO 2 Apply electronic fundamentals

**BTE2001**
**Electric Fundamental & CA I Laboratory**
**Credit:1**
**Prerequisites: None**

**Synopsis**

This course introduces the basic concepts and engineering methods of DC and AC circuit analysis. The contents include Ohm's Law, Kirchhoff's Law, series and parallel circuits, Mesh and Nodal analysis, Source Transformation Theorems,

and responses of basic First Order circuits.

**Course Outcome**

CO 1 Explain the basic concepts of electrical quantities by using basic circuit laws (Ohm's law and Kirchhoff's law) and simplification of resistive circuits [PO1,P2]

CO 2 Shows the DC and AC circuit problems using nodal analysis and mesh analysis, and evaluate the most efficient methods among them [PO2,P2]

CO 3 Explain the natural and forced responses of voltages and currents of first- order circuits [PO2,P2]

CO 4 Construct DC and AC electric circuits to understand the concept of electrical quantities and verify circuit theorems [PO3,P3,CTPS4]

CO 5 Demonstrate the role of individual in team to achieve task completion [PO8,A3,TS3]

**BTE2004**
**Electric Fundamental & Circuit Analysis I**
**Credit:4**
**Prerequisites: None**

**Synopsis**

This course introduces the basic concepts and engineering methods of DC and AC circuit analysis. The contents include Ohm's Law, Kirchhoff's Law, series and parallel circuits, Mesh and Nodal analysis, Source Transformation Theorems, and responses of basic First Order circuits.

**Course Outcome**

CO 1 Explain the basic concepts of electrical quantities by using basic circuit laws (Ohm's law and Kirchhoff's law) and simplification of resistive circuits [PO1,P2]

CO 2 Shows the DC and AC circuit problems using nodal analysis and mesh analysis, and evaluate the most efficient methods among them [PO2,P2]

CO 3 Explain the natural and forced responses of voltages and currents of first- order circuits [PO2,P2]

CO 4 Construct DC and AC electric circuits to understand the concept of electrical quantities and verify circuit theorems [PO3,P3,CTPS4]

CO 5 Demonstrate the role of individual in team to achieve task completion [PO8,A3,TS3]

**BTM1003**
**Basic Manufacturing Process**
**Credit:3**
**Prerequisites: None**

**Synopsis**

This course intended to introduce to materials, techniques, and equipment of industrial manufacturing. Emphasis on laboratory demonstration and simulation activities such as machining, welding, casting, and forming operations.

**Course Outcome**

CO 1 Explain the structure and properties of basic engineering materials and their relationship to manufacturing.

CO 2 Describe the fundamental equipment and processes employed in common manufacturing operations.

CO 3 Identify process parameters and how they affect the manufacturing processes.

**BTE2011**
**Electrical Fundamental & CA II Laboratory**
**Credit:1**
**Prerequisites: Electrical Fundamental & CA I**

**Synopsis**

This course provides the basic concepts and engineering methods of DC and AC circuits. The contents include applications of Mesh and Nodal analysis, Superposition and Source Transformation Theorems, Thevenin and Norton Theorem. Resonant circuit, second order circuit and Balanced 3-phase circuits are also covered.

**Course Outcome**

CO 1 Follows voltages, currents and powers using basic laws and principles of circuit theorems (DC and AC). [PO1,P3

CO 2 Explain the variation of RLC circuits using frequency domain and resonant parameter. [PO1,P2]

CO 3 Reproduce second order circuits of series and parallel RLC circuits. [PO2,P3]

CO 4 Assemble schematic circuits in actual circuit and interpret the experimental results into report. [PO3,P4,CTPS4]

CO 5 Work in a team and communicate effectively. [PO8,A3,TS4]

**BTE2014**
**Electrical Fundamental & CA II**
**Credit:4**
**Prerequisites: Electrical Fundamental & CA I**

**Synopsis**

This course provides the basic concepts and engineering methods of DC and AC circuits. The contents include applications of Mesh and Nodal analysis, Superposition and Source Transformation Theorems, Thevenin and Norton Theorem. Resonant circuit, second order circuit

and Balanced 3-phase circuits are also covered.

**Course Outcome**

CO 1 Analyze voltages, currents and powers using basic laws and principles of circuit theorems (DC and AC). [PO1,C4]

CO 2 Analyze variation RLC circuits using frequency domain and resonant parameter. [PO1,C4]

CO 3 Analyze second order circuits of series and parallel RLC circuits. [PO2,C4]

CO 4 Assemble schematic circuits in actual circuit and interpret the experimental results into report. [PO3,P4,CTPS4]

CO 5 Work in a team and communicate effectively. [PO8,A3,TS4]

**BTE2021**
**Electricity & Electronic Numerical Simulation Lab**
**Credit:1**
**Prerequisites: None**

**Synopsis**

Laboratory activities on numerical and computer software simulation with respect to electrical and electronic problems etc.

**Course Outcome**

CO 1 Apply the specific computer software to assist electrical design

CO 2 Apply the specific computer software to assist electronic design

**BTE2023**
**Electricity & Electronic Numerical Simulation**
**Prerequisites:None**

**Synopsis**

Use of computer software in the design, troubleshooting and simulation of electrical/electronic circuitry.

**Course Outcome**

CO 1 Apply the specific computer software to assist electrical design

CO 2 Apply the specific computer software to assist electronic design

**BTM1004**
**Computer-Aided Design**
**Credit:4**
**Prerequisites: None**

**Synopsis**

This subject is designed to introduce to the students the principle of computer-aided design. Topics includes Drafting Overview, Drawing Set-up , Basic CAD ,Commands Geometric Construction , Orthographic Projection , Basic Drawing ,Tools, Pictorial Drawings, Sectional Views, Advance CAD Commands, Modifying CAD,Drawings, Dimensioning, Tolerances, Working Drawings, Threads and Fasteners

**Course Outcome**

CO 1 Analyze problem in technical drawing and understand drawing

CO 2 Use basic geometric construction techniques to create objects in CAD

CO 3 Project a 3 dimensional object in 2 dimensional space with the proper utilization of views in CAD

CO 4 Read & create dimensioned drawings using conventional techniques in CAD.

CO 5 Identify and understand the components of working drawings & the standards that apply.

**BTM2014**
**Manufacturing Computer Application**
**Credit:4**
**Prerequisites: Trigonometry and Elementary Functions**

**Synopsis**

Overview of computer hardware, software, and processing concepts related to the control of manufacturing tasks. Emphasis on use of integrated software packages in the solution of a variety of manufacturing problems. Laboratory assignments in automation control, real time data sampling, and creation of user interfaces.

**Course Outcome**

CO 1 Apply software development for technology problem solving.

CO 2 Perform adaptive programming skills for more diverse application environment.

**BTE3001**
**Electronics 1 Laboratory**
**Credit:3**
**Prerequisites: None**

**Synopsis**

This course introduces the fundamental of semiconductor devices which are diodes and transistors. It also describes BJT transistors operational characteristic that covers the DC and AC analysis. In addition, the various type of BJT configuration will be examined and analyzed. Furthermore, the analysis of the amplifier circuit will be extended to its frequency response.

**Course Outcome**

CO 1 Display the characteristic and operation of semiconductor diodes and BJT transistor properties in AC and DC condition.[PO3,P5, CTPS5]

CO 2 Vary the operating condition of various BJT configuration in AC and DC condition.[PO2,P6, CTPS4]

CO 3 Construct the frequency response of various BJT configuration.[PO3,P4,CTPS4]

CO 4 Construct the semiconductor diode and BJT transistor circuit. [PO11,P5,CTPS4]

CO 5 Work effectively as an individual and in a group. [PO8,A3,LS3]

**BTE3004**
**Electronics 1**
**Credit:4**
**Prerequisites: None**
**Synopsis**

This course introduces the fundamental of semiconductor devices which are diodes and transistors. It also describes BJT transistors operational characteristic that covers the DC and AC analysis. In addition, the various type of BJT configuration will be examined and analyzed. Furthermore, the analysis of the amplifier circuit will be extended to its frequency response.

**Course Outcome**

CO 1 Ilustrate the characteristic and operation of semiconductor diodes and BJT transistor properties in AC and DC condition. [PO1,C3]

CO 2 Analyze the operating condition of various BJT configuration in AC and DC condition . [PO2,C4]

CO 3 Construct the frequency response of various BJT configuration. [PO3,P4,CTPS4]

CO 4 Construct the semiconductor diode and BJT transistor circuit. PO11,P5,CTPS4]

CO 5 Work effectively as an individual and in a group. [PO8,A3,LS3]

**BTE3011**
**Digital Logic Design Laboratory**
**Credit:1**
**Prerequisites: None**

**Synopsis**

This course emphasizes on the fundamental of digital electronics. The student is first taught about the number system and logic gates before introducing them to digital IC technology. Then they are exposed to both combinational logic network and combinational MSI logic. In concurrence with this, the fundamental of sequential logic, flip-flop, counter and shift register will be taught. Finally, the memory devices are
introduced.

**Course Outcome**

CO 1 Explain the various techniques for digital logic simplification [PO1, P2]

CO 2 Shows the basic gates, flip flops and MSI in digital circuit [PO2, P2]

CO 3 Measures the logic system, counter, decoder and multiplexer [PO2, P4]

CO 4 Construct logic circuit and counter [PO3, P5, CTPS3]

CO 5 Work in a team and communicateeffectively [PO5,A3,TS2]

**BTE3014**
**Digital Logic Design**
**Credit:4**
**Prerequisites: None**

**Synopsis**
This course emphasizes on the fundamental of digital electronics. The student is first taught about the number system and logic gates before introducing them to digital IC technology. Then they are exposed to both combinational logic network and combinational MSI logic. In concurrence with this, the fundamental of sequential logic, flip-flop, counter and shift register will be taught. Finally, the memory devices are
introduced.

**Course Outcome**

CO 1 Apply various techniques for digital logic simplification [PO1, C3]

CO 2 Apply basic gates, flip flops and MSI in digital circuit [PO2, C3]

CO 3 Analyze logic system, counter, decoder and multiplexer [PO2, C4]

CO 4 Construct logic circuit and counter [PO3, P5, CTPS3]

CO 5 Work in a team and communicate effectively [PO5,A3,TS2]

**BTE3021**
**Electrical Machines and Transformers Laboratory**
**Credit:1**
**Prerequisites: None**

**Synopsis**

This course introduces the fundamental concepts and principles of transformer and various types of electrical machines. It is intended for students to understand fundamental aspects of rotating electrical machines. The first part of the course is a quick review of some electromagnetism fundamental while the following will deal with the transformers and different types of electrical machines.

**Course Outcome**

CO 1 Describes the basic principles of selected electrical machines (PO2,P1).

CO 2 Displays the transformer and machines equivalent circuits and the operating conditions for electrical machines under steady state conditions (PO2, P4).

CO 3 Construct driver citcuit for DC and AC motor(PO3,P4,CTPS3)

CO 4 Justify the importance of electrical machines and impacts to the enivoroment. (PO9,A3, TS3)

CO 5 Measure, Determine and interpret the parameters of transformer and torque-speed characteristics of rotating machines. (PO11, P4, CTPS3)

**BTE3024**
**Electrical Machines and Transformers**
**Credit:3**
**Prerequisites: None**

**Synopsis**

This course introduces the fundamental concepts and principles of transformer and various types of electrical machines. It is intended for students to understand fundamental aspects of rotating electrical machines. The first part of the course is a quick review of some electromagnetism fundamental while the following will deal with the transformers and different types of electrical machines.

**Course Outcome**

CO 1 Attribute the basic principles of selected electrical machines (PO1,C3).

CO 2 Analyze the transformer and machines equivalent circuits and the operating conditions for electrical machines under steady state conditions (PO2, C4).

CO 3 Construct driver citcuit for DC and AC motor(PO3,P4,CTPS3)

CO 4 Justify the importance of electrical machines and impacts to the enviroment. (PO9,A3, TS3)

CO 5 Measure, Determine and interpret the parameters of transformer and torque-speed characteristics of rotating machines. (PO11, P4, CTPS3)

**BTE3031**
**Communication System Design Laboratory**
**Credit:3**
**Prerequisites: None**

**Synopsis**

This course introduces theories in the area of communication systems. Topics covered include the basic elements of communications, signal analysis, amplitude modulation, angle modulations and digital modulations, as well as transmission channels and noise impact on the modulation system. Finally, some emergence of digital communication technologies are presented and compared.

**Course Outcome**

CO 1 Shows differentiate various type of modulation and demodulation techniques [PO2, P2]

CO 2 Manipulates the concepts to practical applications in telecommunication [PO2, P4]

CO 3 Measure the parameters for various type of modulation and demodulation [PO3, P4, CTPS5]

CO 4 Work in a team effectively as an individual and in a group [PO8, A3, TS4]

CO 5 Shows ability to communicate effectively [PO7, P2, CS4]

**BTE3034**
**Communication System Design 1**
**Credit:4**
**Prerequisites: None**

**Synopsis**
This course introduces theories in the area of communication systems. Topics covered include the basic elements of communications, signal analysis, amplitude modulation, angle modulations and digital modulations, as well as transmission channels and noise impact on the modulation system. Finally, some emergence of digital communication technologies are presented and compared.

**Course Outcome**

CO 1 Analyze and differentiate various type of modulation and demodulation techniques [PO1, C4]

CO 2 Analyze the concepts to practical applications in telecommunication. [PO2, C4]

CO 3 Measure the parameters for various type of modulation and demodulation [PO3, P4, CTPS5]

CO 4 Work in a team effectively as an individual and in a group [PO8, A3, TS4]

CO 5 Shows ability to communicate effectively [PO7, P2, CS4]

**BTE3041**
**Electronics II Laboratory**
**Credit:1**
**Prerequisites: Electronic I Lab & Electronic I**

**Synopsis**

This course introduces the fundamental of semiconductor devices which are transistors. It also describes Field-Effect-Transistor (FET) operational characteristic that covers the DC and AC analysis. Some important devices such as op-amp and active filters are also introduced. Towards the end of this course, students are exposed to the applications of these semiconductor devices. During the laboratory sessions, students are expected to demonstrate and troubleshoot basic semiconductor device circuits.

**Course Outcome**

CO 1 Practice the fundamental operation of FET and op-amp in AC and DC condition [PO1, C1]

CO 2 Identify and analyze various FET and op-amp configuration in AC and DC condition [PO2, P2, CTPS3]

CO 3 Design for various type of FET configuration and active filters [PO2, P6,CTPS3]

CO 4 Asemble and analyze FET and op-amp circuits [PO3, P4,CTPS3]

CO 5 Work effectively as individual, and as a member/leader in a team [PO8, A3, TS3]

**BTE3044**
**Electronics II**
**Credit:4**
**Prerequisites: Electronic I Lab & Electronic I**

**Synopsis**

This course introduces the fundamental of semiconductor devices which are transistors. It also describes Field-Effect-Transistor (FET) operational characteristic that covers the DC and AC analysis. Some important devices such as op-amp and active filters are also introduced. Towards the end of this course, students are exposed to the applications of these semiconductor devices. During the laboratory sessions, students are expected to demonstrate and troubleshoot basic semiconductor device circuits.

**Course Outcome**

CO 1 Describe the characteristic and understand the operation of FET and op-amp in AC and DC condition [PO1, C1]

CO 2 Identify and analyze various FET and op-amp configuration in AC and DC condition [PO1, C2]

CO 3 Design for various type of FET configuration and active filters [PO2, C4, CTPS3]

CO 4 Asemble and analyze FET and op-amp circuits [PO3, P4, CTPS3 ]

CO 5 Work effectively as individual, and as a member/leader in a team [PO8, A3, TS3]

**BTE3051**
**Microprocessor and Interfacing Laboratory**
**Credit:1**
**Prerequisites: None**

**Synopsis**

This course in an introduction to a microprocessor. Students are exposed to the internal architecture of the mictoprocessor, various instruction sets, and basic hardware design of microprocessor-based.

**Course Outcome**

CO 1 Explain the architecture of the microprocessor system and its interface [PO1 P2]

CO 2 Manipulates the M68000 instruction sets [PO3, P4, CTPS4]

CO 3 Develop a program in a microprocessor system by using an assembly language [PO3, P5, CTPS5]

CO 4 Design and build a simple hardware based on the M68000 processor [PO11, P7, CTPS 4]

**BTE3054**
**Microprocessor and Interfacing**
**Credit:4**
**Prerequisites: None**

**Synopsis**

This course in an introduction to a microprocessor. Students are exposed to the internal architecture of the mictoprocessor, various instruction sets, and basic hardware design of microprocessor-based.

**Course Outcome**

CO 1 Illustrate the architecture of the microprocessor system and its interface.[PO1 C3]

CO 2 Interpret the M68000 instruction sets [PO1 C8]

CO 3 Develop a program in a microprocessor system by using an assembly language [PO2 C5]

CO 4 Design and build a simple hardware based on the M68000 processor [PO11, P7, CTPS 4]

**BTE3061**
**Control System Laboratory**
**Credit:1**
**Prerequisites: None**

**Synopsis**

This course introduces students to the control system technology, mathematical models of feedback systems. The students will be exposed to transient and steady-state analysis, root locus, frequency response and analysis design of compensator.

**Course Outcome**

CO 1 Explain fundamental concept of control systems. [PO3, P2]

CO 2 Display mathematical model and transfer function of physical systems. [PO2, P5]

CO 3 Measure control system performance in terms of transient and steady-state of a linear time invariant systems. [PO3, P5]

CO 4 Alter a compensator to meet specifications in frequency domain. [PO4, P6]

CO 5 Utilize Computer aided tools for control system analysis and design. [PO10, A4, LL3]

**BTE3064**
**Control System**
**Credit:4**
**Prerequisites: None**

**Synopsis**

This course introduces students to the control system technology, mathematical models of feedback systems. The students will be exposed to transient and steady-state analysis, root locus, frequency response and analysis design of compensator.

**Course Outcome**

CO 1 Acquire fundamental concept of control systems.

CO 2 Derive and manipulate mathematical model and transfer function of physical systems.

CO 3 Analyze control system performance in terms of transient and steady-state of a linear time invariant systems.

CO 4 Design a compensator to meet specifications in frequency domain.

CO 5 Utilize Computer aided tools for control system analysis and design.

**BTE3923**
**Engineering Technology Senior Design**
**Credit:3**
**Prerequisites: None**

**Synopsis**

This course is designed to expose the students to a senior design project. They have to apply all the knowledge that they have learned in the programme to complete the senior design project. Each student will be supervised by at least one lecturer or two lecturers (main supervisor and co-supervisor). During the senior design project I, the students will be able to do a literature survey and prepare a draft which contains objective of the project, problem statement, literature survey, solving techniques, methodology, expected result, treatment of results and list of reference publications. At the end of this subject, the students are required to present the draft in a short seminar which will be evaluated by a faculty's panel.

**Course Outcome**

CO 1 Propose background study, problem statement, objective and scopes of the research

CO 2 Practice positive attitude in research activities

CO 3 Present the research proposal and cited latest publications on the subject

**BTE4806**
**Engineering Technology Senior Design Project II**
**Credit:6**
**Prerequisites: None**
**Synopsis**

This subject is the continuation of the subject Engineering Technology Senior Design Project I. In this course, the students are required to conduct the research, collect and analyze data, discuss the findings and form the conclusions. At the end of the semester, the students are required to produce a design project report and present it to faculty's evaluation panel.

**Course Outcome**

CO 1 Analyze data, discuss and conclude the findings

CO 2 Manage the research work

CO 3 Practice positive attitude in research activities

CO 4 Present the research report and cited latest publications on the subject

**BTM3074**
**Computer Integtrated Manufacturing**
**Credit:4**
**Prerequisites: None**

**Synopsis**

Three basic themes will be stressed throughout the course. First, developing manufacturing strategy involves considering factors beyond the traditional boundaries of the manufacturing function. Such factors include the overall competitive position of the firm, the nature of market demand, competitor's actions,

government regulations, and so on. Second, there is a strong linkage between a firm's competitive strategy and its manufacturing strategy. If this linkage is maintained, operations can become a formidable competitive weapon. If this linkage is neglected, even the best-designed strategies can fail. Finally, the course will consider manufacturing strategy issues in an integrative manner by developing the interrelationship between operations, finance, accounting, and marketing.

**Course Outcome**

CO 1 List components of a computerized integrated manufacturing environment.

CO 2 Explain various automation techniques currently used in industry.

CO 3 Develop a systematic plan for manufacturing strategy implementation

CO 4 Develop a systematic plan for manufacturing strategy implementation required for a selected product.

CO 5 Model enterprise manufacturing and automation strategies that respond to national and global manufacturing demands.

**BTE4909**
**Industrial Training**
**Credit:9**
**Prerequisites: All Subject**

**Synopsis**

In Industrial Training the students should gain insight into industrial practice, in order to visualize the tasks and possibilities of their later occupation work. All students are required to undergo and industrial training for a certain period that has been agreed by the faculty during last semester of the academic year. The performance of each student during the periods of his/her industrial training is evaluated by the faculty staff, and the representatives from employer organization.

**Course Outcome**

CO 1 Show and classify in-depth the industrial structure and organization and to understand roles of typical personnel in that particular industry.[PO2,C3]

CO 2 Manipulate the knowledge learned in the university and to practice them in problem solving direct or indirect application to any design, planning, production or management .[PO3,P5,CTPS3]

CO 3 Practice the professionalism and work etiquette that comply to good and responsible engineer.[PO6,A5,EM2]

CO 4 Demonstrate management/leadership skills to lead or manage

effectively in a industry environment. [PO8,A3,TS3]

CO 5 Demonstrate the knowledge and ability to search and retrieve information and materials related to the industrial needs. [PO10,A3,LL2]

**BTE4913**
**Industrial Training Report**
**Credit:3**
**Prerequisites: Industrial Training**

**Synopsis**

In Industrial Training the students should gain insight into industrial practice, in order to visualize the tasks and possibilities of their later occupation work. All students are required to undergo and industrial training for a certain period that has been agreed by the faculty during last semester of the academic year. The performance of each student during the periods of his/her industrial training is evaluated by the faculty staff, and the representatives from employer organization.

**Course Outcome**

CO 1 Arrange and display data and relevant information with a systematic approach.[PO6,A4,EM3]

CO 2 Explain and organize the industrial training experience through written communication.[PO7,P5,CS4]

**ELECTIVE COURSES**

**BTE4213**
**Control System II**
**Credit:3**
**Prerequisites: Control System & Control System Lab**

**Synopsis**

This course introduce students the basic concept of state space approaches in control system and provide a basic understanding of the state space representation to control, analysis and design. With this basic overview students enable to design controllers and observers using state variable feedback and optimal control.

**Course Outcome**

CO 1 To use and apply the basic concept of state space approaches in control system [PO1,C3]

Co 2 To differentiate the various forms of state space representation [PO10,C4,LL3]

CO 3 To design controllers and observers using state variable feedback and optimal control methods [PO3,C5,CTPS4]

CO 4 Assemble modern computational techniques and tools for solving the control system problems in state space. [PO11,P4,CTPS4]

CO 5 Justify the role of individual in the team in other to complete the task given [PO8,A3,LS3]

**BTE4703**
**Digital Control System**
**Credit:3**
**Prerequisites: None**

**Synopsis**

This course introduces students to the basic design and analysis tools used in practical discrete-time and sampled data control systems as well as to give an exposure of the student to the general area of linear systems theory which appears so very often in all branches of engineering

**Course Outcome**

CO 1 Discover the principles of signal conversion in digital control systems, sampling/reconstruction process, and mathematical modeling of discrete time domain.

CO 2 Analyze and Construct various method of discretization of analog transfer function into discrete-time in Z-domain.

CO 3 Traces the realization of Digital Filters and Controllers, and the quantization effect due to truncation or rounding propagation. [P03,P3,CTPS3]

CO 4 Use and apply modern computational techniques and tools for solving computer controllers system problems. [PO11,P4,CTPS4]

CO 5 Differentiate the role of individual in the team to achieve task completion [PO8,A3,TS3,LS3]

**BTE4723**
**Power Electronic**
**Credit:3**
**Prerequisites: None**

**Synopsis**

The primary objective of the course is to give students a foundation of knowledge, understanding, analysis and design of power electronics circuits for conversion and control of electrical energy. The course presents concepts, fundamentals analysis tools, practical consideration for design, and a range of power electronics applications. Practical experiments in the laboratory will also be conducted. Students will be exposed to the power converter, PWM switching techniques, DC and induction motor drives.

**Course Outcome**

CO 1 Investigate switching characteristics of basic solid state power devices, operating principles, advantages and disadvantages of basic power electronic converter topologies [PO1, C4]

CO 2 Design power electronic converters using commercially available simulation tools [PO4,C5]

CO 3 Construct power electronic converters to meet

functional objectives (P11, P4, CTPS4)

CO 4 Work effectively in team [P08, A3, LS2]

CO 5 Construct electrical drives using electronic converter [PO4, C3]

## CURRICULUM STRUCTURE
## Bachelor of Engineering Technology (Manufacturing) With Honors

| YEAR | FIRST | SECOND | THIRD | FOURTH |
|---|---|---|---|---|
| FACULTY AND PROGRAM COURSES | BTU1001 Physics Laboratory | BTE1004 Electric & Electronics Fundamentals | BTM3004 Fluid Mechanics | BTE4806 Engineering Technology Senior Design Project II |
| | BTU1004 Physics | BTE1011 Electrics & Electronics Fundamentals Lab | BTM3003 Properties of Materials | BTM3074 Computer Integrated Manufacturing |
| | BTU1011 Chemistry Lab | BTM2023 Eng. Mechanics | BTM3013 Strength of Materials | BTM4723 Production Control System |
| | BTU1013 Chemistry | BTU1041 Calculus II Laboratory | BTM3014 Geometric Design and Tolerancing | BTM4733 Automated Manufacturing Systems |
| | BTU1023 Trigonometry & Elementary Functions | BTU1043 Calculus II | BTV3003 Industrial Quality Control | BTV4713 Occupational Epidemiology & Disease (E) |
| | BTM1003 Basic Mfg Process | BTM2013 Eng. Dynamics | BTE3923 Engineering Technology Senior Design Project I | BTM4909 Industrial Training |
| | BTM1004 Computer Aided Design | BTM2014 Manufacturing Computer Application | BTM3044 Manufacturing Component Design | BTM4913 Industrial Training Report |
| | BTM1024 Machine Production Processes | BTU2043 Basic Statistics | BTM3053 Programmable Logic Controllers | |
| | BTU1031 Calculus I Laboratory | BTV3104 Facilites Management Technology | BTM3063 Numerical Control Systems | |
| | BTU1033 Calculus I | BTV3073 Engineering Economy | BTM4743 Manufacturing System | |
| | | | BTV3083 Energy Management | |
| **123** | **27** | **29** | **36** | **31** |
| **18** | **University Courses :** Co-Curriculum I, Co-Curriculum II, Technopreneurship, Islamic & Asean Civilization, Ethnic Relations, Islamic Institutions, Foreign Language, Foreign Language 2, Technical English, Technical Writing, Academic Report Writing, Softskill I, Softskill II | | | |
| **141** | **Total Unit for Graduation** | | | |
| **# Elective Subjects:** Environmental Management and Sustainability, Organizational Behavior, Project Management, Change Management, Islamic Institution | | | | |

**COURSE STRUCTURE**

**CORE FACULTY**

**BTU1001**
**Physics Laboratory**
**Credit:1**
**Prerequisites: None**

**Synopsis**

This laboratory introduces the students with the application of physics concept in engineering devices such as Free Fall, Bernoulli's Law, Hydrostatic Pressure And Electric Field. The concepts of physics introduced related in mechanics or dynamics motion and basic concepts of electrical area. The students will learn how to run the experiment with referring the basic concepts of physics during the lab hours.

**Course Outcome**

CO 1 Understanding the basic concepts, theories and principles of physics in engineering application

CO 2 Demonstrating skills in logical thinking in handling equipment.

CO 3 Applying basic physics concepts to problem solving

CO 4 Applying physics knowledge to personal decisions involving physical problems

**BTU1004**
**Physics**
**Credit:4**
**Prerequisites: None**

**Synopsis**
This course introduces a fundamental of physics. It covers unit and measurements, kinematics, forces and Newton's law of motion, statics equilibrium, work, energy and power, fluid mechanics, electric and magnetism.

**Course Outcome**

CO 1 Understanding the basic concepts, theories and principles of physics in engineering application

CO 2 Solve problems in kinematics, forces and static equilibrium

CO 3 Solve problems in work, energy and power, fluids, electricity & magnetism

CO 4 Applying physics knowledge to personal decisions involving physical problems

**BTU1011**
**Chemistry Lab**
**Credit:1**
**Prerequisites: None**

**Synopsis**

In chemistry laboratory the students are responsible to conduct the basic physical, organic and analytical chemistry experimentssuch as solubility, miscibility, chemical equilibrium, buffer and pH changes, calorimetry, solvent extraction, gravimetric, UV-VIS spectrometer, FTIR, DSC and gas chromotography. At the end of experiments, the students should be able to inculcate the critical thinking and able to work in safe working condition.

**Course Outcome**

CO 1 Apply physical, organic & analytical chemistry theory in laboratory

CO 2 Apply the basic science and analytical chemistry knowledge in operation of analytical chemistry equipment.

CO 3 Able to demonstrate and operate each analytical equipment base on the theories applied in analytical chemistry

CO 4 Able to indicate any minor/major malfunction of equipment, incorrect step/ result & troubleshoot it

**BTU1013**
**Chemistry**
**Credit:3**
**Prerequisites: None**

**Synopsis**

Development of the fundamental principles and concepts of chemistry by lecture-demonstration, as well as the development of an appreciation of the nature of chemistry as a science. An historical development of the most important concepts and ideas. Methods and limitations of chemistry, its evolution and discussions of the problems currently being solved and created

**Course Outcome**

CO 1 Apply the basic knowledge about physical, inorganic and analytical chemistry.

CO 2 Relate chemical concept and principles while presenting a broad range of topic in a clear and concise manner.

CO 3 Develop problem solving and critical thinking skills on general chemistry.

CO 4 Communicate effectively in written and oral form through group discussion, tutorial and presentation.

CO 5 Work in group to complete the assigned tasks in a given time.

**BTU1013**
**Trigonometry and Elementary Function**
**Credit:3**
**Prerequisites: None**

**Synopsis**

This course introduces and discusses the fundamental of mathematics focusing on providing a solid theoretical foundation for further work. Student are exposed to number system, equations, inequalities and absolute value, polynomials, sequences and series, matrices and system of linear equations, functions and graphs, and trigonometric functions. This course also integrates symbolic tools, graphical concepts, and numerical calculations.

**Course Outcome**

CO 1 Define and use the concepts and properties of basic mathematics.

CO 2 Apply concepts and methods learned to solve any related

problem of basic mathematics in various fields.

CO 3 Relate and apply the concepts and methods studied into other courses.

**BTU1031**
**Calculus I Laboratory**
**Credit:1**
**Prerequisites: None**

**Synopsis**

This course introduces the number system, functions, introduction to derivatives, exponential functions, applications of derivatives, limits of functions and continuity. Appropriate software is used by students to implement some of these ideas in practice.

**Course Outcome**

CO 1 Analyze and apply appropriate calculus concepts to solve various science and engineering problems using mathematical software.

CO 2 Use appropriate software to solve the graphical problems in calculus.

CO 3 Analyze and think critically a wide range of problem and solve it using ideas and methods in calculus in math software.

CO 4 Relate and applied the concepts and methods studied into other courses.

**BTU1033**
**Calculus I**
**Credit:3**
**Prerequisites: None**

**Synopsis**

This course introduces the number system, functions, introduction to derivatives, exponential functions, applications of derivatives, limits of functions and continuity. Appropriate software is used by students to implement some of these ideas in practice.

**Course Outcome**

CO 1 Analyze and apply appropriate calculus concepts to solve various science and engineering problems.

CO 2 Use appropriate software to solve the graphical problems in calculus.

CO 3 Analyze and think critically a wide range of problem and solve it using ideas and methods in calculus.

CO 4 Relate and applied the concepts and methods studied into other courses.

**BTU1041**
**Calculus II Laboratory**
**Credit:3**
**Prerequisites: None**

**Synopsis**

This course introduces the differentiation,integration, techniques of integration, interpolation & approximation, sequences, series, power of series and the Binomial

theorem. Appropriate software is used by students to implement some of these ideas in practice.

**Course Outcome**

CO 1 Analyze and apply appropriate calculus concepts to solve various science and engineering problems using mathematical software.

CO 2 Use appropriate software to solve the graphical problems in calculus.

CO 3 Analyze and think critically a wide range of problem and solve it using ideas and methods in calculus in math software.

CO 4 Relate and applied the concepts and methods studied into other courses.

**BTU1043**
**Calculus II**
**Credit:3**
**Prerequisites: None**

**Synopsis**

This course introduces the differentiation,integration, techniques of integration, interpolation & approximation, sequences, series, power of series and the Binomial theorem. Appropriate software is used by students to implement some of these ideas in practice.

**Course Outcome**

CO 1 Analyze and apply appropriate calculus concepts to solve various science and engineering problems.

CO 2 Analyze and think critically a wide range of problem and solve it using ideas and methods in calculus.

CO 3 Use appropriate software to solve the graphical problems in calculus.

CO 4 Relate and applied the concepts and methods studied into other courses.

**CORE PROGRAM**

**BTM1003**
**Basic Manufacturing Process**
**Credit:3**
**Prerequisites: None**

**Synopsis**

This course intended to introduce to materials, techniques, and equipment of industrial manufacturing. Emphasis on laboratory demonstration and simulation activities such as machining, welding, casting, and forming operations.

**Course Outcome**

CO 1 Explain the structure and properties of basic engineering materials and their relationship to manufacturing.

CO 2 Describe the fundamental equipment and processes employed in common manufacturing operations.

CO 3 Identify process parameters and how they affect the manufacturing processes.

**BTM1004**
**Computer-Aided Design**
**Credit:4**
**Prerequisites:None**

**Synopsis**

This subject is designed to introduce to the students the principle of computer-aided design. Topics includes Drafting Overview, Drawing Set-up , Basic CAD ,Commands Geometric Construction , Orthographic Projection , Basic Drawing ,Tools, Pictorial Drawings, Sectional Views, Advance CAD Commands,Modifying CAD,Drawings, Dimensioning, Tolerances, Working Drawings, Threads and Fasteners

**Course Outcome**

CO 1 Analyze problem in technical drawing and understand drawing

CO 2 Use basic geometric construction techniques to create objects in CAD

CO 3 Project a 3 dimensional object in 2 dimensional space with the proper utilization of views in CAD

CO 4 Read & create dimensioned drawings using conventional techniques in CAD.

CO 5 Identify and understand the components of working drawings & the standards that apply.

**BTM1024**
**Machine Production Processes**
**Credit:4**
**Prerequisites: None**

**Synopsis**

This course intends to provide detailed study of traditional and contemporary methods of metal machining. Laboratory experience includes the fundamentals of machine tool setup and operation, precision measurement techniques, and machine tool safety, care and maintenance.

**Course Outcome**

CO 1 Develop basic machine tool processing knowledge, abilities and skills.

CO 2 Expand machine tool processing knowledge, abilities and skills through experience with traditional process.

CO 3 Complete assigned projects as directed within safety, planningand specifications consistent with items above.

CO 4 Demonstrate understanding of function and application of processes through examination and discussion and operation.

CO 5 Provide study and understanding of nontraditional processes in manufacturing.

**BTE1004**
**Electric & Electronics Fundamentals**
**Credit:4**
**Prerequisites: None**

**Synopsis**

Fundamentals of DC and AC circuits, network laws and theorems, passive circuit components, semiconductors, electric machines, and digital systems

**Course Outcome**

CO 1 Apply electricity fundamentals

CO 2 Apply electronic fundamentals

**BTE1011**
**Electrics & Electronics Fundamentals Laboratory**
**Credit:1**
**Prerequisites: None**

**Synopsis**

Fundamentals laboratory of DC and AC circuits, network laws and theorems, passive circuit components, semiconductors, electric machines, and digital systems

**Course Outcome**

CO 1 Apply electricity fundamentals
CO 2 Apply electronics fundamentals

**BTM2023**
**Engineering Mechanics**
**Credit:3**
**Prerequisites: None**

**Synopsis**
This course introduces force vector algebra, equilibrium of forces on particle, equilibrium of forces on single rigid body and force analysis on simple frames and machine structures (multi-rigid bodies) and problems involving dry friction.

**Course Outcome**

CO 1 Perform force vector algebra – resultant of forces, cross product, dot product and mixed triple product of forces

CO 2 Solve equilibrium of forces on particle problems

CO 3 Solve equilibrium of forces on single rigid body problems

CO 4 Solve equilibrium of forces on simple frame and machine structure problems.

CO 5 Solve problems involving dry friction.

**BTM2013**
**Engineering Dynamics**
**Credit:3**
**Prerequisites: None**

**Synopsis**

This course intended to introduce the basic principles including friction and motion of a point in both one and two dimensions, as well as rigid body motion.

**Course Outcome**

CO 1 Ability to understand and apply properties of friction.

CO 2 Ability to determine velocity and acceleration of a given particle in one and two dimensions.
CO 3 Ability to determine rectilinear and curvilinear motion.

CO 4 Ability to determine angular

and linear velocity and acceleration.

CO 5 Ability to apply acceleration and velocity concepts to rigid body motion.

**BTM2014**
**Manufacturing Computer Application**
**Credit:4**
**Prerequisites: Trigonometry and Elementary Functions**

**Synopsis**

Overview of computer hardware, software, and processing concepts related to the control of manufacturing tasks. Emphasis on use of integrated software packages in the solution of a variety of manufacturing problems. Laboratory assignments in automation control, real time data sampling, and creation of user interfaces.

**Course Outcome**

CO 1 Apply software development for technology problem solving.

CO 2 Perform adaptive programming skills for more diverse application environment.

**BTU2043**
**Basic Statistics**
**Credit:3**
**Prerequisites:None**

**Synopsis**
Students are exposed to statistics including statistical problem-solving methodology and descriptive statistic, probability distributions commonly used in practice, sampling distribution and confidence interval, hypothesis testing, analysis of variance (ANOVA), goodness of fit test and contingency tables and regression and correlation including simple and multiple linear regressions. Appropriate software is used by students to implement some of these ideas in practice.

**Course Outcome**

CO 1 Analyze data using statistical theory and methodology, and recommend a conclusion or suggestion based on the analyzed data.

CO 2 Perform statistical data analysis by using appropriate software tools.

CO 3 Apply statistical concepts and methods learned to solve any related problems in various scientific diciplines.

CO 4 Relate and apply the techniques and methods studied into other courses

**BTV3014**
**Facilites Management Technology**
**Credit:3**
**Prerequisites: None**

**Synopsis**

Overview of the technology facility management responsibilities, policies, and practices that are involved with implementing and/or managing technology properties that have sustainable goals connected to it. Identification of competencies needed by the technology facility management function to properly design, operate, and maintain facilities within the scope of responsibilities of technology facilities managers.

**Course Outcome**

CO 1 Understand the knowledge on facility management responsibilities, policies and practices.

CO 2 Implementing managing technology properties and key facilities management issues.

CO 3 Identify the need fo technology management function including human management factors.

CO 4 Identify the need and relevency of information system and smart management system.

**BTV3073**
**Engineering Economy**
**Credit:3**
**Prerequisites: None**

**Synopsis**

This course introduces concept of life cycle cost, interest and equivalent. Formula and factors for single and multiple cash flow. Method for investment assessment and alternative comparison and project evaluation using cost worth ratio, inflation and cash flow method.

**Course Outcome**

CO 1 Analyze the engineering cost concept.

CO 2 Analyze the return to capital

CO 3 Analyze the money-time relationship

CO 4 Analyze the depreciation of the asset

CO 5 Analyze the cost estimation and project evaluation

**BTM3004**
**Fluid Mechanics**
**Credit:4**
**Prerequisites: None**

**Synopsis**

This subject is designed to introduce to the students the principle of fluid mechanic. Topics includes stress and strain rate descriptions, fluid statics, use of differential and finite control volume analysis with continuity, momentum, and energy equations, Bernoulli and Euler equations, vorticity, potential flow, incompressible viscous flow using Navier-Stokes equations, dimensional analysis, pipe flow, boundary layers, separation, introduction to turbulence.

**Course Outcome**

CO 1 Understand of fluid mechanics fundamentals, including concepts of mass and momentum conservation.

CO 2 Apply the Bernoulli equation to solve problems in fluid mechanics.

CO 3 Apply control volume analysis to problems in fluid mechanics.

CO 4 Use potential flow theory to solve problems in fluid mechanics.

CO 5 Perform dimensional analysis for problems in fluid mechanics

**BTM3003**
**Properties of Materials**
**Prerequisites: None**

**Synopsis**
This course intends to provide comprehensive introduction to the different classes of industrial materials, their structure, properties and industrial uses. The purpose of this course is to introduce the student to a wide range of engineering materials, which are important to industry. Such knowledge will be useful to make an intelligent selection of materials for a variety of commercial applications based on an understanding of properties, test methods and processes.

**Course Outcome**

CO 1 Knowledge of fundamental structure of materials.

CO 2 Understanding of material properties.

CO 3 Knowledge of material processing by casting and forging.

CO 4 Solve the stress and strain in structural members subjected combined loads.

**BTM3013**
**Strength of Materials**
**Credit:3**
**Prerequisites: None**

**Synopsis**

This course intends to provide mechanics of deformable bodies with emphasis on principles of stress and strain, shear and bending moment, torsion, buckling, failure criteria and design concepts.

**Course Outcome**

CO 1 Determine axial and bending stress and strain as well as torsional stress and strain and Hookes law.

CO 2 Determine material properties and principal stresses both theoretically and experimentally

CO 3 Utilize mathematics and physics properties in solving complex stress / strain problems

CO 4 Utilize stress and strain information in designing tasks.

**BTM3014**
**Geometric Design and Tolerencing**
**Credit:4**
**Prerequisites: None**

**Synopsis**
Dimensioning techniques using CAD, limits and fits, material condition modifiers, tolerance stacks, and dimensioning standards. Geometric dimensioning and tolerancing

**Course Outcome**

CO 1 apply the principles of geometric tolerancing

CO 2 apply the tolerancing of cone

CO 3 apply positional tolerancing

CO 4 substitute geometric elements

CO 5 recognize and apply the maximum, envelope and least material requirements

**BTV3003**
**Industrial Quality Control**
**Credit:3**
**Prerequisites: PRQ: MATH 155 with a C or better, STAT 208 or STAT 301, or consent of department**

**Synopsis**

Techniques of establishing and maintaining quality of product including statistical quality control applications.

**Course Outcome**

CO 1 Analyze the productivity in an organization by using productivity concept and fundamentals.

CO 2 Select layout design based on layout design procedure location and basic layout design by taking into account the impact of sustainable environment

CO 3 Analyze production planning, control and inventory management activities based on given cases.

CO 4 Evaluate solutions for a given cases based on total quality management systems, quality control concept ISO 17001.

**BTV3083**
**Energy Management**
**Credit:3**
**Prerequisites: None**

**Synopsis**
This subject is designed to introduce to the students the importance of energy in peoples' life and in national as well as global economic development. The student will be exposed to the different types of fossil energy supply; supply and consumption trends both at global as well as national level; as well as energy consumption in residential, commercial and industrial sectors. The course also includes discussions on the impacts of energy use on the environment and the growing need for new and renewable energy technologies.

**Course Outcome**

CO 1 Understand the importance of energy to human life and to economic development; energy supply and consumption trends; and how escalating energy costs will disrupt national as well as global economy.

CO 2 Understand the national energy mix; energy use in domestic, commercial and industrial sectors; the importance of energy effciency and conservation programmes; introduction of energy audits;

CO 3 Impact of escalating energy costs to national and global economy; and impact of energy production-to-consumption chain towards local and global environment;

CO 4 Understand the impact of the current unsustainable use of energy to future world energy scenario; and importance of developing alternative energy technologies to supplement fossil-fuel based technologies.

**BTM4743**
**Manufacturing System**
**Credit:3**
**Prerequisites:None**

**Synopsis**

This course is designed to provide students with an introduction to industrial manufacturing systems by having them engage in selected activities essential for modern manufacturing. Manufacturing systems, tools, and processes are studied as they are applied to producing products. Laboratory experiences cover manufacturing systems emphasizing tooling design, automated manufacturing, and control systems. Includes laboratory activities

**Course Outcome**

CO 1 Discuss the importance and characteristics of manufacturing technology

CO 2 Conduct scholarly research that thoroughly presents and critically analyzes a manufacturing system or topic

CO 3 Apply sound principles of manufacturing engineering to solve problems related to manufacturing

CO 4 Develop programming to control a variety of automated manufacturing equipment

CO 5 Fabricate products using advanced manufacturing and design equipment

**BTM3044**
**Manufacturing Component Design**
**Credit:3**
**Prerequisites: Trigonometry and Elementary Functions**

**Synopsis**

Design of motion components for the manufacturing industry. Includes CAD techniques to study solid modeling and manufacturing components such as gears, cams, and linkages, and their application.
**Course Outcome**

CO 1 Design parts using solid modeling and identify downstream applications.

CO 2 Apply parametric solid modeling techniques in component design

CO 3 Perform design skills in the usage of Solid Works software

CO 4 Able to determine position, acceleration and velocity for a 4-bar mechanism

CO 4 Able to analyze a compound and epicycylic gear trains and design and analyze cams

**BTM3053**
**Programmable Logic Controllers**
**Credit:3**
**Prerequisites: None**

**Synopsis**

This subject is designed to introduce to the students the principle of programmable logic controllers. This subject emphasize basic concepts and skills needed to program and apply programmable electronic controllers in industry. Man Machine Interface (MMI)

and Supervisory Data Acquisition (SACADA) systems will be examined. Experiments in operation, programming, and industrial applications.

**Course Outcome**

CO 1 Identify and define functions of hardware component of programmable logic controllers.

CO 2 Distinguish between different types and architectures of PLC's and their applications.

CO 3 Demonstrate proficiency in ladder logic by applying programming skills to implement industrial applications.

CO 4 Identify problems in industrial applications requiring PLC's by troubleshooting hardware and software.

**BTM3063**
**Numerical Control Systems**
**Prerequisites: None**

**Synopsis**

This subject is designed to introduce to the students numerical control systems. Topics includesPrinciple of CNC part programming, tooling and work-holding devices,machine tool position and motion control systems,automatic tool changers and machining centres,kinematics and mechanics of milling operations,part programming using CAD/CAM systems.

**Course Outcome**

CO 1 Write fundamental manual G-code programs, for various machining applications, including spindle speeds, and feed rates.

CO 2 Program absolute and incremental tool positions for machining canned cycle operations, linear and circular interpolation, looping and subroutine.

CO 3 Use a PC to prepare, edit and print a machine readable part program and use a CNC machine to verify and machine a basic part.

CO 4 Use 2D CAM software to create job operation files, 2D shape profiles, generate machine code, verify tool path using computer simulation, and machine basic parts on a CNC machine using computer generated code.

**BTE3923**
**Engineering Technology Senior Design Project I**
**Credit:3**
**Prerequisites: None**

**Synopsis**

This course is designed to expose the students to a senior design project. They have to apply all the knowledge that they have learned in the programme to complete the senior design project. Each student will be supervised by at least one lecturer or two lecturers (main supervisor and co-supervisor). During the senior design project I, the students will be able to do a literature survey and prepare a draft which contains objective of the project, problem statement, literature survey, solving techniques, methodology, expected result, treatment of results and list of reference publications. At the end of this subject, the students are

required to present the draft in a short seminar which will be evaluated by a faculty's panel.

**Course Outcome**

CO 1 Propose background study, problem statement, objective and scopes of the research

CO 2 Practice positive attitude in research activities

CO 3 Present the research proposal and cited latest publications on the subject

**BTM3074**
**Computerized Integrated Manufacturing**
**Credit:4**
**Prerequisites: None**

**Synopsis**

Three basic themes will be stressed throughout the course. First, developing manufacturing strategy involves considering factors beyond the traditional boundaries of the manufacturing function. Such factors include the overall competitive position of the firm, the nature of market demand, competitor's actions, government regulations, and so on. Second, there is a strong linkage between a firm's competitive strategy and its manufacturing strategy. If this linkage is maintained, operations can become a formidable competitive weapon. If this linkage is neglected, even the best-designed strategies can fail. Finally, the course will consider manufacturing strategy issues in an integrative manner by developing the interrelationship between operations, finance, accounting, and marketing.

**Course Outcome**

CO 1 List components of a computerized integrated manufacturing environment.

CO 2 Explain various automation techniques currently used in industry.

CO 3 Develop a systematic plan for manufacturing strategy implementation

CO 4 Develop a systematic plan for manufacturing strategy implementation required for a selected product.

CO 5 Model enterprise manufacturing and automation strategies that respond to national and global manufacturing demands.

**BTE4806**
**Engineering Technology Senior Design Project II**
**Credit:6**
**Prerequisites: None**
**Synopsis**

This subject is the continuation of the subject Engineering Technology Senior Design Project I. In this course, the students are required to conduct the research, collect and analyze data, discuss the findings and form the conclusions. At the end of the semester, the students are required to produce a design project report and present it to faculty's evaluation panel.

**Course Outcome**

CO 1 Analyze data, discuss and conclude the findings

CO 2 Manage the research work

CO 3 Practice positive attitude in research activities

CO 4 Present the research report cited latest publications on the subject

**BTM4909**
**Industrial Training**
**Credit:9**
**Prerequisites: None**

**Synopsis**

In Industrial Training the students should gain insight into industrial practice, in order to visualize the tasks and possibilities of their later occupation work. All students are required to undergo and industrial training for a certain period that has been agreed by the faculty during last semester of the academic year. The performance of each student during the periods of his/her industrial training is evaluated by the faculty staff, and the representatives from employer organization.

**Course Outcome**

CO 1 Show and classify in-depth the industrial structure and organization and to understand roles of typical personnel in that particular industry.[PO2,C3]

CO 2 Manipulate the knowledge learned in the university and to practice them in problem solving direct or indirect application to any design, planning, production or management [PO3,P5,CTPS3]

CO 3 Practice the professionalism and work etiquette that comply to good and responsible engineer. [PO6,A5,EM2]

CO 4 Demonstrate management/ leadership skills to lead or manage effectively in a industry environment. [PO8,A3,TS3]

CO 5 Demonstrate the knowledge and ability to search and retrieve information and materials related to the industrial needs .[PO10,A3,LL2]

**ELECTIVE COURSES**

**BTV4713**
**Occupational Epidemiology & Disease**
**Credit:3**
**Prerequisites: None**

**Synopsis**

This course will expose the students to basic principles of epidemiology necessary to understand scientific literature, monitor data in industry, and/or to conduct scientific investigations or surveillance activities. This course will emphasize on aspects of disease transmission and causation, occurrence of disease, determining the cause of disease and estimating risk. The major types of epidemiologic study (cohort, case referent and cross-sectional) will be described. Threats to validity and issues in interpreting epidemiologic data such as bias, confounding factors, and random error will be discussed. Communicable and non-communicable diseases plus epidemiologic surveillance will be also discussed for preventing and controlling diseases. Students will also learn how

to review a number of published articles related to epidemiologic issues.

**Course Outcome**

CO 1 Understand the basic concepts, nomenclature, and importance of epidemiology in discovering causes, measuring risks and determining priorities for intervention and evaluation.

CO 2 Demonstrate the knowledge of measuring health and disease occurrence

CO 3 Differentiate the main types of study design and calculate basic ratios and rates in epidemiologic studies.

CO 4 Differentiate the communicable and non-communicable diseases

CO 5 Apply the epidemiology concepts and methods to current environmental and occupational health problem

**BTM4723**
**Production Control System**
**Credit:3**
**Prerequisites: None**

**Synopsis**

The topics covered in the course are production and operations strategy, forecasting techniques, deterministic inventory planning and control, stochastic inventory planning and control, aggregate production planning, and master production scheduling.

**Course Outcome**

CO 1 Analyze the fundamental problem areas of production systems as well as the relationship between production planning and control activities.

CO 2 Justify different strategies employed in manufacturing and service industries to plan production and control inventory.

CO 3 Analyze the planning problems and use the appropriate analytical skills and tools to solve these problems.

**BTM4733**
**Automated Manufacturing Systems**
**Credit:3**
**Prerequisites: None**

**Synopsis**

Study of automated manufacturing systems utilized by industry, including robotics, computer-aided manufacturing, computer-aided design, computer-aided inspection, and system integration using PLC's, sensors, and other automation components. Emphasis on laboratory experiences with automation components.

**Course Outcome**

CO 1 Explain various automation techniques currently used in industry and list components of an assembly process

CO 2 Classify and select sensors and their applications for inspection, measurement and

control of manufacturing and assembly processes.

CO 3 Model enterprise manufacturing and automation strategies that respond to national and global manufacturing demands.

CO 4 Design and implement an automation project.

## CURRICULUM STRUCTURE
## Bachelor of Engineering Technology (Energy and Environmental) With Honors

| YEAR | FIRST | SECOND | THIRD | FOURTH |
|---|---|---|---|---|
| FACULTY AND PROGRAM COURSES | BTU1001 Physics Laboratory | BTU2043 Basic Statistics | BTV3003 Industrial Quality Control | BTM3074 Computer Integrated Manufacturing |
| | BTU1004 Physics | BTM1003 Basic Manufacturing Processes | BTV3004 Facilities Management Technology | BTV4806 Engineering Technology Senior Design Project II |
| | BTU1011 Chemistry Lab | BTV1024 Introduction Geographic Information System | BTV3014 Design for Energy Efficiency and Green Materials | # BTV4713 Occupational Epidemiology & Disease |
| | BTU1013 Chemistry | BTV2003 Pollution, Pstilence, Prevention and the Cost of Doing Business | BTV3024 Heating, Ventilating and Air Conditioning Technology | # BTV4723 Industrial Toxicology |
| | BTU1023 Trigonometry & Elementary Functions | BTM1024 Machine Production Processes | BTV3034 Biobased Fuels and Alternative Energy Applications | BTV4733 Air Pollution Control Technology |
| | BTE1004 Electric & Electronics Fundamentals | BTM2014 Manufacturing Computer Application | BTV3073 Engineering Economy | BTV4909 Industrial Training |
| | BTE1011 Electrics & Electronics Fundamentals Lab | BTV2013 Environmental Laws, Policy and Economics | BTV3054 Disaster Preparedness | BTV4913 Industrial Training Report |
| | BTM1004 Computer Aided Design | BTV2023 Green Technology | BTV3064 Energy Audit | |
| | BTU1031 Calculus I Laboratory | | BTV3083 Energy Management | |
| | BTU1033 Calculus I | | BTV3923 Engineering Technology Senior Design Project 1 | |
| | BTV1003 Map and Mapping | | | |
| **122** | **28** | **27** | **36** | **31** |
| **18** | **University Courses :** Co-Curriculum I, Co-Curriculum II, Technopreneurship, Islamic & Asean Civilization, Ethnic Relations, Islamic Institutions, Foreign Language, Foreign Language 2, Technical English, Technical Writing, Academic Report Writing, Softskill I, Softskill II | | | |
| **140** | **Total Unit for Graduation** | | | |

**# Elective Subjects:** Environmental Management and Sustainability, Organizational Behavior, Project Management, Change Management, Islamic Institution

**COURSE STRUCTURE**

**CORE FACULTY**

**BTU1001**
**Physics Laboratory**
**Credit:1**
**Prerequisites: None**

**Synopsis**

This laboratory introduces the students with the application of physics concept in engineering devices such as Free Fall, Bernoulli's Law, Hydrostatic Pressure And Electric Field. The concepts of physics introduced related in mechanics or dynamics motion and basic concepts of electrical area. The students will learn how to run the experiment with referring the basic concepts of physics during the lab hours.

**Course Outcome**

CO 1 Understanding the basic concepts, theories and principles of physics in engineering application

CO 2 Demonstrating skills in logical thinking in handling equipment.

CO 3 Applying basic physics concepts to problem solving

CO 4 Applying physics knowledge to personal decisions involving physical problems

**BTU1004**
**Physics**
**Credit:4**
**Prerequisites: None**

**Synopsis**
This course introduces a fundamental of physics. It covers unit and measurements, kinematics, forces and Newton's law of motion, statics equilibrium, work, energy and power, fluid mechanics, electric and magnetism.

**Course Outcome**

CO 1 Understanding the basic concepts, theories and principles of physics in engineering application

CO 2 Solve problems in kinematics, forces and static equilibrium

CO 3 Solve problems in work, energy and power, fluids, electricity & magnetism

CO 4 Applying physics knowledge to personal decisions involving physical problems

**BTU1011**
**Chemistry Lab**
**Credit:3**
**Prerequisites: None**

**Synopsis**
In chemistry laboratory the students are responsible to conduct the basic physical, organic and analytical chemistry experimentssuch as solubility, miscibility, chemical equilibrium, buffer and pH changes, calorimetry, solvent extraction, gravimetric, UV-VIS spectrometer, FTIR, DSC and gas chromotography.

At the end of experiments, the students should be able to inculcate the critical thinking and able to work in safe working condition.

**Course Outcome**

CO 1 Apply physical, organic & analytical chemistry theory in laboratory

CO 2 Apply the basic science and analytical chemistry knowledge in operation of analytical chemistry equipment.

CO 3 Able to demonstrate and operate each analytical equipment base on the theories applied in analytical chemistry

CO 4 Able to indicate any minor/major malfunction of equipment, incorrect step/ result & troubleshoot it

**BTU1013**
**Chemistry**
**Credit:3**
**Prerequisites: None**

**Synopsis**

Development of the fundamental principles and concepts of chemistry by lecture-demonstration, as well as the development of an appreciation of the nature of chemistry as a science. An historical development of the most important concepts and ideas. Methods and limitations of chemistry, its evolution and discussions of the problems currently being solved and created

**Course Outcome**

CO 1 Apply the basic knowledge about physical, inorganic and analytical chemistry.

CO 2 Relate chemical concept and principles while presenting a broad range of topic in a clear and concise manner.

CO 3 Develop problem solving and critical thinking skills on general chemistry.

CO 4 Communicate effectively in written and oral form through group discussion, tutorial and presentation.

CO 5 Work in group to complete the assigned tasks in a given time.

**BTU1013**
**Trigonometry and Elementary Function**
**Credit:3**
**Prerequisites: None**

**Synopsis**

This course introduces and discusses the fundamental of mathematics focusing on providing a solid theoretical foundation for further work. Student are exposed to number system, equations, inequalities and absolute value, polynomials, sequences and series, matrices and system of linear equations, functions and graphs, and trigonometric functions. This course also integrates symbolic tools, graphical concepts, and numerical calculations.

**Course Outcome**

CO 1 Define and use the concepts and properties of basic mathematics.

CO 2 Apply concepts and methods learned to solve any related problem of basic mathematics in various fields.

CO3 Relate and apply the concepts and methods studied into other courses.

**BTU1031**
**Calculus I Laboratory**
**Credit:1**
**Prerequisites: None**

**Synopsis**

This course introduces the number system, functions, introduction to derivatives, exponential functions, applications of derivatives, limits of functions and continuity. Appropriate software is used by students to implement some of these ideas in practice.

**Course Outcome**

CO 1 Analyze and apply appropriate calculus concepts to solve various science and engineering problems using mathematical software.

CO 2 Use appropriate software to solve the graphical problems in calculus.

CO 3 Analyze and think critically a wide range of problem and solve it using ideas and methods in calculus in math software.

CO 4 Relate and applied the concepts and methods studied into other courses.

**BTU1033**
**Calculus I**
**Credit:3**
**Prerequisites: None**

**Synopsis**

This course introduces the number system, functions, introduction to derivatives, exponential functions, applications of derivatives, limits of functions and continuity. Appropriate software is used by students to implement some of these ideas in practice.

**Course Outcome**

CO 1 Analyze and apply appropriate calculus concepts to solve various science and engineering problems.

CO 2 Use appropriate software to solve the graphical problems in calculus.

CO 3 Analyze and think critically a wide range of problem and solve it using ideas and methods in calculus.

CO 4 Relate and applied the concepts and methods studied into other courses.

**BTU2043**
**Basic Statistics**
**Credit:3**
**Prerequisites: None**

**Synopsis**

Students are exposed to statistics including statistical problem-solving methodology and descriptive statistic, probability distributions commonly used in practice, sampling distribution and confidence interval, hypothesis testing, analysis of variance (ANOVA), goodness of fit test and contingency tables and regression and correlation including simple and multiple linear regressions. Appropriate software is used by students to implement some of these ideas in practice.

**Course Outcome**

| | |
|---|---|
| CO 1 | Analyze data using statistical theory and methodology, and recommend a conclusion or suggestion based on the analyzed data. |
| CO 2 | Perform statistical data analysis by using appropriate software tools. |
| CO 3 | Apply statistical concepts and methods learned to solve any related problems in various scientific diciplines. |
| CO 4 | Relate and apply the techniques and methods studied into other courses |

**CORE PROGRAM**

**BTE1004**
**Electric & Electronics Fundamentals**
**Credit:3**
**Prerequisites: None**

**Synopsis**

Fundamentals of DC and AC circuits, network laws and theorems, passive circuit components, semiconductors, electric machines, and digital systems

**Course Outcome**

| | |
|---|---|
| CO 1 | Apply electricity fundamentals |
| Co 2 | Apply electronics fundamentals |

**BTE1011**
**Electrics & Electronics Fundamentals Lab**
**Credit:1**
**Prerequisites: None**

**Synopsis**

Fundamentals laboratory of DC and AC circuits, network laws and theorems, passive circuit components, semiconductors, electric machines, and digital systems

**Course Outcome**

| | |
|---|---|
| CO 1 | Apply electricity fundamentals |
| CO 2 | Apply electronics fundamentals |

**BTM1004**
**Computer-Aided Design**
**Credit:3**
**Prerequisites: None**

**Synopsis**
This subject is designed to introduce to the students the principle of computer-aided design. Topics includes Drafting Overview, Drawing Set-up , Basic CAD ,Commands Geometric Construction , Orthographic Projection , Basic Drawing ,Tools, Pictorial Drawings, Sectional Views, Advance CAD Commands, Modifying CAD,Drawings, Dimensioning, Tolerances, Working Drawings, Threads and Fasteners

**Course Outcome**

CO 1 Analyze problem in technical drawing and understand drawing

CO 2 Use basic geometric construction techniques to create objects in CAD

CO 3 Project a 3 dimensional object in 2 dimensional space with the proper utilization of views in CAD

CO 4 Read & create dimensioned drawings using conventional techniques in CAD.

CO 5 Identify and understand the components of working drawings & the standards that apply.

**BTV1003**
**Maps & Mapping**
**Credit:3**
**Prerequisites: None**

**Synopsis**

Introduction to maps as models of our earth, tools of visualization, and forms of graphic communication. Use of satellite and aerial imagery, land surveying, and geographic information systems in map production. Thematic maps and how they are used. Map design for informational and persuasive purposes.

**Course Outcome**

CO 1 Understand the role of human perception in map use and map design.

CO 2 Be able to manipulate coordinates, data, symbols, and map projections to produce maps for problem-solving.

CO 3 become familiar with the use of drawing software to produce thematic maps

**BTM1003**
**Basic Manufacturing Process**
**Credit:3**
**Prerequisites: None**

**Synopsis**
This course intended to introduce to materials, techniques, and equipment of industrial manufacturing. Emphasis on laboratory demonstration and simulation activities such as machining, welding, casting, and forming operations.

**Course Outcome**

CO 1 Explain the structure and properties of basic engineering materials and their relationship to manufacturing.

CO 2 Describe the fundamental equipment and processes employed in common manufacturing operations.

CO 3 Identify process parameters and how they affect the manufacturing processes.

**BTV1024**
**Introduction Geographic information System**
**Credit:4**
**Prerequisites: PRQ: GEOG 256 or consent of department**

**Synopsis**

Study of the fundamental principles of Geographic Information Systems (GIS). Emphasis on the development of these systems, their components and their integration into mainstream geography.

**Course Outcome**

CO 1 Describe the concepts, principles, techniques and applications that are fundamental to GIS and that differentiate GIS and geographic science from other information systems, technologies and sciences.

CO 2 Explain the nature and characteristics of geospatial data, data representations, methods of data input and editing, and data organization/management in GIS.

CO 3 Apply GIS concepts, principles and techniques to real-world spatial problem solving and mapping applications.

CO 4 Evaluate different GIS data collection approaches and data sources that require the knowledge of data quality, data fusion, data exchange, metadata management, and other issues such as data pricing, data access policies, privacy, security, and organizational influences.

**BTV2003**
**Pollution, Pestilences, Prevention and the Cost of Doing Business**
**Credit:2**
**Prerequisites: PRQ: GEOG 256 or consent of department**

**Synopsis**

Study of environmental and occupational issues with an impact on the safety and health of employees and the general population. Analysis of case studies to evaluate potentially adverse outcomes (injury, illness, environmental impact, etc.) in relation to existing legislation (EPA, OSHA, HSA) and the existing public policies. Economic impact of adverse environmental and safety issues in the private sector.

**Course Outcome**

CO 1 Develop a multi-disciplinary perspective, embracing science, engineering and social and economic policy,

and to understanding of how standards are set

CO 2 Evaluate or support the health, safety and environmental issues, developing an emergency plan or needing basic risk assessment skills

CO 3 Analyze the economic impacts of adverse environmental and safety issue in Malaysia

CO 4 Understand and presenting the concept of environmental, health and safety issues

**BTV1024**
**Machine Production Processes**
**Credit:3**
**Prerequisites: None**

**Synopsis**

This course intends to provide detailed study of traditional and contemporary methods of metal machining. Laboratory experience includes the fundamentals of machine tool setup and operation, precision measurement techniques, and machine tool safety, care and maintenance.

**Course Outcome**

CO 1 Develop basic machine tool processing knowledge, abilities and skills.

CO 2 Expand machine tool processing knowledge, abilities and skills through experience with traditional process.

CO 3 Complete assigned projects as directed within safety, planning and specifications consistent with items above

CO 4 Demonstrate understanding of function and application of processes through examination and discussion and operation.

CO 5 Provide study and understanding of nontraditional processes in manufacturing.

**BTM2014**
**Manufacturing Computer Application**
**Credit:4**
**Prerequisites: Trigonometry and Elementary Functions**

**Synopsis**

Overview of computer hardware, software, and processing concepts related to the control of manufacturing tasks. Emphasis on use of integrated software packages in the solution of a variety of manufacturing problems. Laboratory assignments in automation control, real time data sampling, and creation of user interfaces.

**Course Outcome**

CO 1 Apply software development for technology problem solving.

CO 2 Perform adaptive programming skills for more diverse application environment.

**BTV2013**
**Environmental Law, Policy & Economics**
**Credit:3**
**Prerequisites: None**

**Synopsis**

Overview of how society has responded to environmental problems through law and policy. Examination of the public policy debates that have animated the environmental movement in general, and environmental law in particular, including risk assessment and risk management . Includes an overview of environmental law, including the regulatory process, judicial review, and a brief examination of basic environmental statutes. Introduction to an economic analysis of environmental problems and proposed market-based solutions

**Course Outcome**

CO 1 Describe the ethics and responsibilites as engineer towards environmental law and expose to environmental legislation and regulation practices in Malaysia.

CO 2 Review problems and its solving involving clean water act and relationship between policy and economics

CO 3 Analyze the concept involved in management of clean water , air and solid wastes and the enforcement procedures

CO 4 Understand and presenting the concept of environmental issues

**BTV2023**
**Green Technology**
**Credit:3**
**Prerequisites: None**

**Synopsis**

Introduction to environmentally friendly engineering and technological advances and new technologies that utilize green principles and green transportation. Course includes topics in new areas of green manufacturing and materials used today and planned for the future, including the operation and manufacture of solar cells and the production of wind, thermal, and hydroelectric power. Topics will vary depending upon new trends in industry. Several experiments related to green technology were exposed in this subject

**Course Outcome**

CO 1 Describe the ethics and responsibilites as engineer towards green environment and expose to environmental legislation and regulation practices in Malaysia.

CO 2 Describe the principle of green chemistry, review problems and its solving involving green technology applications

CO 3 Analyze the concept involved in green management, policy, and economics

CO 4 Demonstrate professionalism behavior in conducting laboratory, ethics and good communication skills

**BTV3003**
**Industrial Quality Control**
**Credit:3**
**Prerequisites: PRQ: MATH 155 with a C or better, STAT 208 or STAT 301, or consent of department**

**Synopsis**

Techniques of establishing and maintaining quality of product including statistical quality control applications.

**Course Outcome**

CO 1 Analyze the productivity in an organization by using productivity concept and fundamentals.

CO 2 Select layout design based on layout design procedure location and basic layout design by taking into account the impact of sustainable environment

CO 3 Analyze production planning, control and inventory management activities based on given cases.

CO 4 Evaluate solutions for a given cases based on total quality management systems, quality control concept ISO 17001.

**BTV3004**
**Facilities Management Technology**
**Credit:3**
**Prerequisites: None**

**Synopsis**

Overview of the technology facility management responsibilities, policies, and practices that are involved with implementing and/or managing technology properties that have sustainable goals connected to it. Identification of competencies needed by the technology facility management function to properly design, operate, and maintain facilities within the scope of responsibilities of technology facilities managers.

**Course Outcome**

CO 1 Understand the knowledge on facility management responsibilities, policies and practices.

CO 2 Implementing managing technology properties and key facilities management issues.

CO 3 Identify the need fo technology management function including human management factors.

CO 4 Identify the need and relevency of information system and smart management system.

**BTV3014**
**Design for Energy Efficiency and Green Materials**
**Credit:4**
**Prerequisites: None**

**Synopsis**

Overview of energy forms, sources, generation, devices, systems, and materials. Review of the physics of energy transformation and conservation. Energy efficiencies of components and systems from stationary and transportation sectors.

Energy-efficient design in residential, commercial, industrial, and manufacturing systems. Sustainability, environmental impacts, economic and social issues, and global governmental policies. Potential of alternative energy sources. Use of eco-friendly materials to improve efficiency. Topics from an applied perspective of technology practices, management, responsibilities, and policies involved with implementing energy conservation designs.

**Course Outcome**

CO 1 Analysing gaps in the energetic behaviour of existing building and developing plans for improvement.

CO 2 Development of integrative energy efficiency systems.

CO 3 Develop key skills with the aim to enable students to use Modeling and Simulation in the design and verification of Renewable and Green Energy systems

CO 4 Advanced knowledge about and training in ICT for energy-efficient building design

**BTV3024**
**Heating, Ventilating and Air Conditioning Technology**
**Credit:4**
**Prerequisites: PRQ: MATH 155 with a C or better, and PHYS 150A or PHYS 210.**

**Synopsis**

Heat gains and losses, heat-producing equipment, cooling, and refrigeration equipment are studied. System design is presented, including controls and instrumentation for commercial, industrial, and residential systems.

**Course Outcome**

CO 1 Recognize and explain the operation of common HVAC&R equipment such as chillers, cooling towers, heat exchangers, etc.

CO 2 Demonstrate the ability to apply thermal-fluids principles to compute the performance of HVAC&R equipment.

CO 3 evaluate the performance of refrigeration and air conditioning equipment using the vapor compression cycle.

CO 4 Evaluate air heating and cooling processes using a psychrometric chart and perform basic heating and cooling load calculations

CO 5 Apply standard industry practices to the design of HVAC&R system

**BTV3034**
**Biobased Fuels and Alternative Energy Applications**
**Credit:3**
**Prerequisites: None**

**Synopsis**

Overview of bio-fuel sources, production, and applications. Review of conventional energy supplies and uses. The study of liquid and gaseous fuels derived from plant and animal matter, utilizing of biofuels for combustion, stationary power, and transportation. Study of biofuels used in conventional and alternative manners; sustainability, environmental impacts, economic and social issues, and global governmental policies. Topics from an applied perspective of technology practices, management, responsibilities, and policies involved with implementing large-scale consumption of biofuels.

**Course Outcome**

CO 1 Describe the fundamentals and main characteristics of biobased energy sources and their differences compared to fossil fuels

CO 2 Development of integrative energy efficiency systems.

CO 3 Design biofuel energy systems that meet specific energy demands, are economically feasible and have a minimal impact on the environment

CO 4 Advanced knowledge about and training in ICT for energy-efficient building design

**BTV3073**
**Engineering Economy**
**Credit:3**
**Prerequisites: None**

**Synopsis**

This course introduces concept of life cycle cost, interest and equivalent. Formula and factors for single and multiple cash flow. Method for investment assessment and alternative comparison and project evaluation using cost worth ratio, inflation and cash flow method.

**Course Outcome**

CO 1 Analyze the engineering cost concept.

CO 2 Analyze the return to capital

CO 3 Analyze the money-time relationship

CO 4 Analyze the depreciation of the asset

CO 5 Analyze the cost estimation and project evaluation

**BTV3054**
**Disaster Preparedness**
**Credit:4**
**Prerequisites: None**

**Synopsis**

Organization for survival from natural and human-made disasters. Includes topics such as emergency response procedures, communications, training, and abatement as they relate to hazardous waste operations, chemical spills, hazardous materials recognition, risk assessment, site

control, monitoring, and personal protective equipment use.

**Course Outcome**

CO 1 Describe the role of public health before, during, and after public health emergencies

CO 2 Describe the major public health threats from natural, accidental, and intentional causes

CO 3 Describe the essentials of public health preparedness and response, including infectious diseases, outbreak investigation, environmental health, mental health, special needs and vulnerable populations, and emergency operations planning and exercises

CO 4 Describe the essential components of public health emergency project management

**BTV3064**
**Energy Auditing**
**Credit:3**
**Prerequisites: None**

**Synopsis**

This course exposes the students on the methods of auditing energy consumption primarily in commercial and industrial operations. Students will be introduced to the different types of energy auditing, different types of auditing processes, techniques to determine the energy flow diagram, making energy consumption estimates, including use of energy measurement equipment. Students will also be introduced to the energy efficiency policy and programmes in Malaysia and the prospects of the energy service companies (ESCOs) in the country. The final stage of this couse will include a one-day industrial talk and course synthesis.

**Course Outcome**

CO 1 Understanding the concept of energy audits to determine the efficiency of energy use; and the rationale why energy auditing is essential in commercial and industrial operations;

CO 2 Understand the methods of energy auditing, from Walk-Through Audit to Standard Audit and Simulation Audits; techniques to determine energy flow charts, and making energy consumption estimates. Explain also the work involved in the three phases of auditing process - pre-site, on site and post-site.

CO 3 Explanation, and some demonstration on the various instruments used for energy auditing, including safety considerations. Describe also on national energy efficiency and conservation policy and programmes and the potential of energy auditing as an important energy service industry in the near future;

CO 4 Status of energy audit companies and the energy managers associations in Malaysia, and requirements for registration and accreditation. Final part of the course includes a one-day industrial talk inviting energy service companies (ESCOs) and energy managers to narrate their energy audit experience in buildings and industries.

**BTV3083**
**Energy Management**
**Prerequisites: None**

**Synopsis**

This subject is designed to introduce to the students the importance of energy in peoples' life and in national as well as global economic development. The student will be exposed to the different types of fossil energy supply; supply and consumption trends both at global as well as national level; as well as energy consumption in residential, commercial and industrial sectors. The course also includes discussions on the impacts of energy use on the environment and the growing need for new and renewable energy technologies.

**Course Outcome**

CO 1 Understand the importance of energy to human life and to economic development; energy supply and consumption trends; and how escalating energy costs will disrupt national as well as global economy.

CO 2 Understand the national energy mix; energy use in domestic, commercial and industrial sectors; the importance of energy effciency and conservation programmes; introduction of energy audits;

CO 3 Impact of escalating energy costs to national and global economy; and impact of energy production-to-consumption chain towards local and global environment;

CO 4 Understand the impact of the current unsustainable use of energy to future world energy scenario; and importance of developing alternative energy technologies to supplement fossil-fuel based technologies.

**BTV3923**
**Engineering Technology Senior Design Project I**
**Credit:3**
**Prerequisites: None**

**Synopsis**

This course is designed to expose the students to a senior design project. They have to apply all the knowledge that they have learned in the programme to complete the senior design project. Each student will be supervised by at least one lecturer or two lecturers (main supervisor and co-supervisor). During the senior design project I, the students will be able to do a literature survey and prepare a draft which contains objective of the project, problem statement, literature survey, solving

techniques, methodology, expected result, treatment of results and list of reference publications. At the end of this subject, the students are required to present the draft in a short seminar which will be evaluated by a faculty's panel.

**Course Outcome**

CO 1 Propose background study, problem statement, objective and scopes of the research

CO 2 Practice positive attitude in research activities

CO 3 Present the research proposal and cited latest publications on the subject

**BTM3074**
**Computer Integtrated Manufacturing**
**Credit:4**
**Prerequisites: None**

**Synopsis**

Three basic themes will be stressed throughout the course. First, developing manufacturing strategy involves considering factors beyond the traditional boundaries of the manufacturing function. Such factors include the overall competitive position of the firm, the nature of market demand, competitor's actions, government regulations, and so on. Second, there is a strong linkage between a firm's competitive strategy and its manufacturing strategy. If this linkage is maintained, operations can become a formidable competitive weapon. If this linkage is neglected, even the best-designed strategies can fail. Finally, the course will consider manufacturing strategy issues in an integrative manner by developing the interrelationship between operations, finance, accounting, and marketing.

**Course Outcome**

CO 1 List components of a computerized integrated manufacturing environment.

CO 2 Explain various automation techniques currently used in industry.

CO 3 Develop a systematic plan for manufacturing strategy implementation

CO 4 Develop a systematic plan manufacturing strategy implementation required for a selected product.

CO 5 Model enterprise manufacturing and automation strategies that respond to national and global manufacturing demands.

**BTV4713**
**Occupational Epidemiology & Disease**
**Credit:3**
**Prerequisites: None**

**Synopsis**

This course will expose the students to basic principles of epidemiology necessary to understand scientific literature, monitor data in industry, and/or to conduct scientific investigations or surveillance activities. This course will emphasize on aspects of disease transmission and causation, occurrence of disease,

determining the cause of disease and estimating risk. The major types of epidemiologic study (cohort, case referent and cross-sectional) will be described. Threats to validity and issues in interpreting epidemiologic data such as bias, confounding factors, and random error will be discussed. Communicable and non-communicable diseases plus epidemiologic surveillance will be also discussed for preventing and controlling diseases. Students will also learn how to review a number of published articles related to epidemiologic issues.

**Course Outcome**

CO 1 Understand the basic concepts, nomenclature, and importance of epidemiology in discovering causes, measuring risks and determining priorities for intervention and evaluation.

CO 2 Demonstrate the knowledge of measuring health and disease occurrence

CO 3 Differentiate the main types of study design and calculate basic ratios and rates in epidemiologic studies.

CO 4 Differentiate the communicable and non-communicable diseases

CO 5 Apply the epidemiology concepts and methods to current environmental and occupational health problem

**BTV4723**
**Industrial Toxicology**
**Credit:3**
**Prerequisites: None**

**Synopsis**
This course provides students with a basic understanding and appreciation of the principles of the toxic effects of chemicals on the living organism, regulatory aspect, application of toxicology in industry and the effects of toxic substances on man and the environment. Topics include: disposition and metabolism of toxic substances, types of exposure and response, toxic responses of selected body systems, toxic mechanisms of drugs, industrial chemicals, food additives, pesticides, environmental pollutants, household products, toxicity testing and risk assessment.

**Course Outcome**

CO 1 Explain the dose-response relationship and the concept of threshold dose

CO 2 Explain how toxins enter the body and are transported to different organs and tissues

CO 3 Describe the types of responses or toxic effects that can result from exposure to a substance

CO 4 List dan discuss several types of toxic chemicals available in the occupational environment

CO 5 Apply the principles of chemical safety management in the workplace

**BTV4733**
**Air Pollution Control Technology**
**Credit:3**
**Prerequisites: None**

**Synopsis**

The topics in this course discuss several important aspects of air pollution that include classification and sources of air pollutants, their effects on human, vegetation and material. Sampling methods, pollution control and air quality management system will be discussed.

**Course Outcome**

CO 1 Recognize the terminologies, theories and principle of air pollution control technology.

CO 2 Summarize the impacts and the risks of air pollution towards human health and environment.

CO 3 Identify the specific air pollutants and its control technology.

CO 4 Apply proper air pollutants sampling methods for air quality monitoring.

**BTV4806**
**Engineering Technology Senior Design Project II**
**Credit:6**
**Prerequisites: None**

**Synopsis**

This subject is the continuation of the subject Engineering Technology Senior Design Project I. In this course, the students are required to conduct the research, collect and analyze data, discuss the findings and form the conclusions. At the end of the semester, the students are required to produce a design project report and present it to faculty's evaluation panel.

**Course Outcome**

CO 1 Analyze data, discuss and conclude the findings

CO 2 Manage the research work

CO 3 Practice positive attitude in research activities

CO 4 Present the research report and cited latest publications on the subject

**BTV4909**
**Industrial Training**
**Credit:9**
**Prerequisites: All Subject**

**Synopsis**

In industrial training the students should gain insight into the industrial practice, in order to visualize the tasks and possibilities of their later occupation work. All students are required to undergo six months of industrial training during the last semester of the academic year. The performance of each student during the periods of his/her Industrial Training is evaluated jointly by the faculty staff, and the representatives from employer organizations. The student is required to maintain proper records and submit reports on the training received by him/her. The industrial training report should cover all periods of approved employment. The report document is expected to demonstrate development of practical and professional skills in Engineering

through technical experience and application of theoretical knowledge. Development of skills in dealing with people, and communication skills are part of the subject objectives.

**Course Outcome**

CO 1 Work independently in actual working environment with minimal supervision

CO 2 Develop communication skill with different levels of staff in the organization

CO 3 Construct technical documents and give oral presentations related to the work completed.

CO 4 Develop positive attitude during the training programmed such as team working, lifelong learning and able to use the latest technology in industries

CO 5 Develop an entrepreneurship attitude and management skill during a training

**BTV4913**
**Industrial Training Report**
**Credit:3**
**Prerequisites: Industrial Training**

**Synopsis**

In industrial training the students should gain insight into the industrial practice, in order to visualize the tasks and possibilities of their later occupation work. All students are required to undergo six months of industrial training during the last semester of the academic year. The performance of each student during the periods of his/her Industrial Training is evaluated jointly by the faculty staff, and the representatives from employer organizations. The student is required to maintain proper records and submit reports on the training received by him/her. The industrial training report should cover all periods of approved employment. The report document is expected to demonstrate development of practical and professional skills in Engineering through technical experience and application of theoretical knowledge. Development of skills in dealing with people, and communication skills are part of the subject objectives.

**Course Outcome**

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CO 2 Develop communication skill with different levels of staff in the organization

CO 3 Construct technical documents and give oral presentations related to the work completed.

CO 4 Develop positive attitude during the training programmed such as team working, lifelong learning and able to use the latest technology in industries

CO 5 Develop an entrepreneurship attitude and management skill during a training

## CAREER PROSPECT

### BACHELOR OF PROJECT MANAGEMENT WITH HONORS

Graduates from Bachelor of Project Management have a broad career prospect within the private sectors, industries, local authorities, government agencies as well as other professional bodies. List of potential industries include:

**Types of Industries:**

Consultancy
ICT
Service
Tourism
Event Management
Research and Development
Multimedia
Construction
Education

**Types of Position**

Project Manager
Contract& Procurement Administrator/ Manager
Human Resource & Admin Manager
Document Control Manager
Project Risk Consultant
Project Cost Consultant
Work-package Coordinator
Project Administrator
Project Support Officer
Academician
Entrepreneurs
Technology Manager

### BACHELOR OF OCCUPATIONAL SAFETY AND HEALTH WITH HONORS

Graduates from Bachelor of Science in Occupational Safety and Health have a broad carrier prospect within the private sectors and industries, government agencies and local authorities plus other constitutional bodies. List of sectors involved such as:

Ergonomist
Executive Safety & Health
Fire Engineer
Industrial Hygienist
Lecturer
Permit-to-Work Coordinator
Process Safety Engineer
Researcher
Risk Assessor
Risk Surveyor
Safety and Health Trainer

SHE Advisor
SHE Auditor
SHE Consultant
SHE Coordinator
SHE Engineer

**BACHELOR OF INDUSTRIAL TECHNOLOGY MANAGEMENT WITH HONORS**

Career prospect for those who graduate from Bachelor Degree in Industrial Technology Management is wide, covers in both manufacturing and services oriented company. Industrial operations are at the heart of most organizations. Opportunities are found in the areas of forecasting, inventory management, the design of production facilities, workforce scheduling, and the location and layout of distribution networks. Some of the careers you can pursue with a Bachelor of Industrial Technology Management degree include:

- Production Executie / Superintendent
- Process / Industrial Engineering Executive
- QA / QC Executive
- Information and Document Controller Officer
- Material Controller / Planner
- Production Planning and Control (PPC) Executive
- Procurement / Purchasing Executive
- Logistic Executive / Officer
- Project / Business Development Executive
- Sales & Marketing Executive
- HR / Administrative Executive
- Event Management Executive
- Management Trainee

**BACHELOR OF ENGINEERING TECHNOLOGY (ELECTRICAL) WITH HONORS**

- computer hardware design
- design of alternative enegy systems
- software development
- communications and networking
- energy efficiency engineer
- power sytems design and analysis
- microelectronics
- optoelectronics
- robotics
- electrical design

**BACHELOR OF ENGINEERING TECHNOLOGY (MANUFACTURING) WITH HONORS**

- Engineering Technologist
- Operation/Production Engineer
- Management Trainee
- Quality Engineer
- Applications Engineer
- Senior Technical Associate
- Sales/Procurement Engineer
- Project Engineer
- Business and technology analyst
- Engineering Jobs:
    - Systems engineer
    - Manufacturing engineer
    - Power sytems engineer
    - Industrial engineer
    - Operations research analyst
    - Design/development engineer
    - Process engineer
    - Quality engineer
    - Reliability engineer
    - Applications engineer

**BACHELOR OF ENGINEERING TECHNOLOGY (ENERGY & ENVIRONMENTAL) WITH HONORS**

- Energy Applications Engineer
- Energy system Engineer
- Energy OperationsEngineer

Employment areas include:

- environmental
- energy
- transportation
- construction
- geotechnical
- power systems structural anaylsis
- energy environmental impact

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