



## School of Engineering Technology

The solution to man's present and future problems will require people trained as craftsmen, technicians, technologists, and engineers working together as a team. The mission of the School of Engineering and Technology is to provide women and men with the skills and foundations for life-long learning and growth to prepare them for careers and advancement in engineering, technology, and related fields. The School of Engineering and Technology offers Associate degree in Engineering Technology; Bachelor of Science in Electronics Engineering; Bachelor of Science in Mechanical Engineering, Bachelor of Science in Engineering Management and Master of Science in Engineering Technology Management in partnership with Spectrum International College of Technology, which is accredited by MOHR and MOHE Malaysia. Students will complete the Engineering Practical coursework at Spectrum International College of Technology campus while the remainder of the theoretical coursework will be completed with Charisma University.

The School of Engineering and Technology seeks to educate graduates who demonstrate leadership, innovation, and service to the global community.

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### **Profile of Dr.Liang S Ng, PHD**

Dr.Liang graduated with a Doctor of Philosophy (Ph.D.) (Engineering: Electronic Engineering, Image Processing/Computer Vision) from University of Southampton, United Kingdom in 1999. He started his tertiary education in United Kingdom in 1991 with a scholarship and completed his Bachelor of Engineering (Honours) in Electronic Engineering from University of Southampton, U.K. in 1995.

He is very actively involved in engineering research and has since published the many papers/projects internationally in

- IOP Conference Series: Materials Science and Engineering,
- Journal of Theoretical and Applied Information Technology
- International Conference on Information and Intelligent Computing







- International Journal of Computer Science and Engineering Survey
- Malaysian Journal of Computer Science
- Scientific Research and Essays
- Journal of Integrative Neuroscience
- International Conference on Advances in Pattern Recognition
- Image Analysis and Interpretation, 1998 IEEE Southwest Symposium
- Computational Cybernetics and Simulation. 1997 IEEE International Conference

He also holds patent of the followings:


- 1) “High Performance Computer Architecture”, filed at Intellectual Property Corporation of Malaysia, 14th July 2005; also filed for Patent Cooperation Treaty and Taiwan, Republic of China.
- 2) “Display Systems utilizing Multiple Display Units”, filed at Intellectual Property Corporation of Malaysia, 5th September 2005; also filed for Patent Cooperation Treaty.
- 3) “Convenient Online Payment System”, filed at Intellectual Property Corporation of Malaysia, 11th July 2006 and Patent Cooperation Treaty.
- 4) “Artificial Intelligence System for Information Processing”, filed at Intellectual Property Corporation of Malaysia, 22nd February 2007.

He taught in the subjects of Computer Architecture, Networking & Communications, Internet Technologies, Expert Systems, Computing Mathematics, Data Structure & Algorithm, C Programming, Machine Learning, Applications of Artificial Intelligence in Information Systems, Computer Programming.

### Profile of faculties of School of Technology

	<p>Dr. S R Manickam completed his Doctor of Education, Master in Education (Technical and Vocational) and B.Eng. (Hons.) in Electrical and Electronic Engineering. He has many years of TVET curriculum development and research supervision for engineering students. Currently, his interest is about OUTCOME BASED EDUCATION IN TVET.</p>
	<p>Adrian Tan holds Master of Science in Electrical and Electronic Engineering and Bachelor of Engineering (Hons) in Electrical Engineering. He is currently pursuing his Doctor of Philosophy. His fields of specialization are Control of Power Electronics, Power Electronics and Devices, Electrical Machine and Drives. He has published several research papers and presented in international conferences since 2012.</p>
	<p>Tzeh Tan graduated with Master of Science in Electrical and Electronic Engineering after Bachelor of Engineering (Mechatronic Engineering). He is currently pursuing his Doctor of Philosophy. His fields of specialization are Machine Learning and Embedded System. He has published several research papers and presented in international conferences since 2012.</p>
	<p>Dr. Nick Hong W completed PhD in Electrical &amp; Electronic Engineering after BSc in Industrial Electronic Engineering. His expertise is in Piezoelectric Energy and Transducer design and development. He has published several research papers and presented in international conference since 2012.</p>



	<p>Dr.Rui TANG graduated with Doctor of Philosophy in Electrical &amp; Electronic Engineering after her Bachelor of Engineering (Mechatronic Engineering). Her expertise is image processing, biomedical engineering, software engineering, and reliability engineering. She also won the Best Paper Award in IEEE International Conference on Control Systems, Computing and Engineering.</p>
	<p>A I CheAni graduated with B.Eng. (Hons) in Electrical Engineering from Miyzaki University, JPN and M.Eng. in Biomedical. He has several research publications since 2002 and a regular paper presenter of IEEE International Conference on Control System, Computing and Engineering. His field of interest are Biomedical Engineering and Embedded System</p>
	<p>James Khaun K holds Master in Education (Technical) and Bachelor of Manufacturing (Hons) degree. He has been the Principal of a Community College for several years and his field of interest are manufacturing technology and operational process control.</p>
	<p>Dr. MM Mahmood graduated with Doctor of Philosophy, Master in Mechanical Engineering and Bachelor of Mechanical Engineering. He has more than 20 years of engineering education experience.</p>
	<p>M S Bakar holds MSc Network Centred Computing, The University of Reading, United Kingdom and Bachelor of Computer Science. His expertise is Computer Network and research Interests in Social Media Marketing and Web Development.He has several research publications since 2007.</p>
	<p>Dr.M R Aziz completed his Ph.D in Mechanical Engineering after M.Sc in Mechanical Engineering and B.Eng. (Hons.) in Mechanical Engineering. An experience engineering academician with more than 20 years' experience. He has several research publications since 2002. The research interests are: Impact Mechanics and Robotic Sensing Technology.</p>



## **Associate of Science (AS) in Engineering Technology**

### **Introduction**

The Associate of Science in Engineering Technology program prepares students to pursue opportunities in a wide range of industries including manufacturing, hospitals, laboratories, government, and many other industrial sectors. This program provides the student with broad, basic skills in electronics, computer aided design, computer programming and networks, test and measurement, mathematics, and communication. Focus is on the practical and useful application of fundamental engineering tools and techniques, and will prepare students for careers such as: test engineering technician, field engineering technician, production engineering technician, design engineering technician.

### **Program Learning Outcomes**

Upon graduation, learners are expected to demonstrate the following skill set;

- creative thinking skills and sound knowledge in the field of electronics engineering;
- demonstrate basic understanding of electronic circuits from both the design and troubleshooting aspects;
- able to demonstrate an understanding in DC circuits that includes methods employed to analyse current, voltage and power consumption;
- able to demonstrate a working knowledge on computer and programming skills;
- able to demonstrate an understanding of the theoretical bases of static's and strength of materials and an ability to apply these theories to the analysis of statically determinate and indeterminate structures;
- able to understand the factors involved in a rigid body motion, dynamic forces, energy and power, and its application in electrical machines.

### **Course Requirements**

#### **Core Course (30 credits)**

#### **EGT 200      Engineering Mathematics (3 credits)**

- Course Description
  - An examination of the major mathematical tools for engineers and scientists.
- Learning Outcomes
  - Understand major features of the graphs, expressions, polynomial equations, and partial fractions.
  - Apply trigonometric techniques for solving engineering problems.
  - Demonstrate knowledge of differentiation techniques and its applications for particular engineering applications.
  - Contrast integration and differentiation applications.
  - Understand differential equations and their applications up to the second order.



### **EGT 210 Electrical Circuits & Systems (3 credits)**

- Course Description
  - A study of fundamentals of direct and alternating current, basic circuit theory, three-phase circuits, transformers, electrical generators, and motors.
- Learning Outcomes
  - Demonstrate knowledge of series and parallel circuit analysis techniques.
  - Contrast series and parallel circuits.
  - Understand major features of three-phase circuits and filters.
  - Apply concepts of direct current generators, direct current motors, and three-phase alternators.

### **EGT 220 Computer Network Overview (3 credits)**

- Course Description
  - This course emphasizes the network operational concepts and implementation. It provides students with an understanding of network basics and emerging local area network technologies. Topics include: integration of hardware and software components, network architecture, protocols, and interconnection of networks using bridges and routers, network links using cable modems and DSL and IEEE 802 network access standards. TCP/IP will also be reviewed within the context of networking protocols.
- Learning Outcomes
  - Identify and describe the core principles of network architecture and operations.
  - Identify network devices and explain their functions and the way they operate.
  - Describe LAN interface devices, cabling requirements, and installation procedures.
  - Explain HTTP, TCP/IP and PPP protocols.
  - Apply networking technology concepts within student projects.
  - Understand basic Network Security concepts.

### **EGT 230 Statics & Strength of Material (3 credits)**

- Course Description
  - Introduction to the key topics in strength of materials with focus on applications, problem solving and design of structural members, mechanical devices, and engineering systems.
- Learning Outcomes
  - Explain the major principles of strength of materials.



- Contrast applications of the strength of materials in manufacturing, civil and construction engineering.
- Describe the basic principles of engineering statics.
- Contrast the issues of equilibrium of a particle and equilibrium of a rigid body.
- Apply methods of calculating centroids and moments of inertia for bodies that are combinations of simple geometric shapes.
- Understand major principles of direct shear, bearing stress, bending stress, and torsional shear stress.

### **EGT 240      Electronic Circuits (3 credits)**

- Course Description
  - Analysis and design of analogue electronic circuits which are used in communications, computers and instrumentation. Provide fundamentals and analysis of non-linear, active components such as diodes, transistors (both bipolar and MOSFET), OP-AMP, rectifiers, amplifiers etc. Use modern simulation tools such as PSpice for the design, analyses, and performance evaluations of electronic circuits.
- Learning Outcomes
  - Understand major features of the graphs, expressions, polynomial equations, and partial fractions.
  - Apply trigonometric techniques for solving engineering problems.
  - Demonstrate knowledge of differentiation techniques and its applications for particular engineering applications.
  - Contrast integration and differentiation applications.
  - Understand differential equations and their applications up to the second order.

### **EGT 250      Digital Logic Design (3 credits)**

- Course Description
  - Foundation in design and analysis of the operation of digital gates. Design and implementation of combinational and sequential logic circuits. Concepts of Boolean algebra, Karnaugh maps, flip-flops, register, and counter along with various logic families and comparison of their behavior and characteristics.
- Learning Outcomes
  - Discuss fundamental concepts in the design of digital circuits and systems.
  - Discuss and have a working knowledge of Boolean algebra and its application to combinational logic circuits.
  - Manipulate and design basic combinational operators (and, or, not, etc.) and sequential circuits.
  - Manipulate and design combination of operators to form higher level functions (multiplexer, counter) and memory element (flip-flop).



- Explain the basic components of the Von Neumann computer architecture.
- Prepare and make professional presentations relevant to the course material.

### **EGT 260      Programming in C++ (3 credits)**

- Course Description
  - Fundamentals of Object-Oriented Programming in C++ including class definition and object instantiation, inheritance and polymorphism. Detailed coverage of exception handling, operator overloading, I/O and file streams, templates, and the Standard Template Library (STL). Exposure to Data Structures and basic algorithms for sorting and searching.
- Learning Outcomes
  - Develop and code object-oriented C++ programs.
  - Develop C++ classes that utilize data abstraction, encapsulation and inheritance.
  - Perform simple file I/O streams.
  - Analyse and model classes and their relationship.
  - Apply recursion.
  - Implement basic sort and search algorithms.
  - Describe and apply polymorphism.
  - Design, develop, and use overloaded operators.

### **EGT 270      Intro to Graphics and Auto CAD (3 credits)**

- Course Description
  - Introduction to the latest version of Auto CAD software for two- and three-dimensional modelling, engineering graphics and technical drawings.
- Learning Outcomes
  - Understand ANSI standards.
  - Demonstrate knowledge of the techniques for preparing working drawings.
  - Utilize graphical analysis supported by AutoCAD software.
  - Apply AutoCAD for layouts and viewports.

### **EGT 241      Electronic Circuits Lab (3 credits)**

- Course Description
  - This course offers lab experiments for students to implement, test, analyse, simulate and design electronic circuits such as rectifiers, amplifiers etc. using modern simulation and design tools.
- Learning Outcomes
  - Implement, testing, and troubleshooting electronic circuits.
  - Analyse the behavior of electronic circuits.



- Simulate and design electronic circuits with modern design tools to meet specified requirements.
- Participating as a member of a team-oriented experiments and projects.

### **EGT 251 Digital Logic Design Lab (3 credits)**

- Course Description
  - A study of basic digital logic circuit design and implementation. Circuit schematic development and computer modelling and simulation of digital systems. Experiments explore designs with combinational and sequential logic. Students work through design activities, which include testing, troubleshooting and documentation.
- Learning Outcomes
  - Design and implement digital/computer circuits with modern design tools.
  - Determine the behavior of a digital logic circuit (analysis).
  - Translate descriptions of logical problems to efficient digital logic circuits (synthesis).
  - Integrate previously designed components into a large-scale system to meet specified requirements.
  - Participating as a member of a team-oriented design project.

### **General Education Requirements (33 credits)**

General Education Courses Requirements; each course is valued as 3 Credits. The general education courses at Charisma University hone students to be holistic individuals possessing critical thinking skills applicable to diverse fields of knowledge. Students must complete 33 Credits from General Education Courses distributed as follows:

- English Courses (9 Credits)
- Communications (6 Credits)
- Humanities (3 Credits)
- Natural Science (3 Credits)
- Mathematics (3 Credits)
- History (3 Credits)
- Social and Behavioural Sciences (6 Credits)

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## **Bachelor of Science (BS) in Electro-Mechanical Engineering**

### **Introduction**

The Bachelor of Science in Electro-Mechanical Engineering (BSEME) program is offered in response to a growing demand from industrial and consulting companies for engineering staff members with a wide range of technical knowledge.

The primary aim of the EME program is to provide graduates with the knowledge and skills necessary to apply current methods and technology to the development, design, operation, and management of electro-mechanical systems, particularly in those industries where automated systems are prevalent. Specific educational objectives of the program are to ensure that graduates are:

- Capable of and actively involved in the specification, procurement, or integration of electromechanical systems.
- Capable of and actively involved in the operation, testing, or maintenance of electromechanical systems.
- Capable of and actively involved in project team activities, and
- Capable of and actively involved in the preparation and delivery of technical documentation and communications.

The need for cross-discipline capabilities is particularly true of small and mid-sized manufacturing and production industries where technical staffs are often small and very versatile. As a result, EME graduates are well suited for careers in such industries.

### **Program Learning Outcomes**

Upon graduation, learners are expected to demonstrate the following skill set;

- Ability to gain and apply principles of Mathematics, Science and Engineering.
- Ability to identify engineering problems and apply engineering principles to solve them.
- Ability to recognize and apply suitable tools and techniques for engineering practical applications.
- Ability to investigate complex engineering problems using research techniques.
- Ability to design innovative solutions for complex engineering problems.
- Ability to communicate effectively and professionally.
- Ability to comprehend and demonstrate current good practices of engineering for sustainable development and environmental considerations.
- Ability to practice safety, health, social, cultural and legal responsibilities as an engineer.
- Ability to execute the responsibilities of an Engineer professionally and ethically.
- Ability to function effectively as a team leader or a member in a team.



- Ability to recognize the need for, and be able to engage in independent and life-long learning towards continuous professional development.
- Ability to demonstrate and apply the knowledge and understanding of engineering management and finance.

## **Course Requirements**

### **Core Course (75 credits)**

#### **ETM 270 Computer Aided Design (3 credits)**

- Course Description
  - This unit introduces the student to two and three-dimensional drawing. Typically, the student will be producing drawing and details of medium rise buildings.
- Learning Outcomes
  - Demonstrate basic computer-aided drawing techniques by using AutoCAD software
  - Advantages and limits of using AutoCAD

#### **MET 210 Mechanics of Structure (3 credits)**

- Course Description
  - Generally, this subject is a continuation subject of mechanics of solids. The first chapter is an advanced analysis for the final chapter of the earlier subject. Then a new method to find a deflection and slope is discussed. This followed by the analysis of thick cylinder as a continuation of thin cylinder analysis in mechanics of solids. The different effects to strain energy under different loads are covered in next chapter. Then five different theories of failures are used to identify yield and allowed stresses. Finally, the effect of buckling is studied so that students able to distinguish between the effect of buckling and compression to a certain column.
- Learning Outcomes
  - Gain basic understanding in particular problem of stresses.
  - Know the concepts, calculation, operation and application of various problems for a given loads.
  - Solve and analysis the problems that relate to mechanics of structures.

#### **ETM 270 Statistics and Probability (3 credits)**

- Course Description
  - Probability and Statistics is designed for the college bound student who has demonstrated success in Algebra and wishes to continue to explore a large



range of topics with an emphasis on “real world” applications such as games of chance, random population, and actuarial science. Students will regularly apply the tools of technology including the graphing calculator and computer to solve problems. They will be challenged through critical thinking exercises and participate in various group and individual activities that will enhance their mathematical reasoning ability and communication skills. Students are expected to use the information and technology in various ways in real world applications.

- Learning Outcomes
  - Discuss some of the issues and problems associated with collecting and interpreting data from surveys, polls, and other statistical studies.
  - Develop understanding and facility in the areas of the binomial expansion, progressions, and permutations and combinations.
  - Select and produce appropriate tabular and graphical formats for displaying univariate data sets and know how to summarize information about the centre and spread of a univariate data set.
  - Apply the measures and methods employed in analysing descriptive statistics.
  - Understand the concepts of probability, random variables and their distributions, in particular the binomial distribution and normal distributions.
  - Understand the concepts of estimation (confidence intervals) and hypothesis testing for population averages and percentages.
  - Select and produce the appropriate tabular and graphical formats for displaying bivariate data sets and carry out correlation and regression analyses.
  - Apply key methods of analysis of data in the area of inferential statistics.
  - Use technology to solve problems in probability and statistics.

### **MET220      Thermodynamics 1 (3 credits)**

- Course Description
  - Concepts of the first law of thermodynamics for closed and open systems. Definition of different types of energy and their relation with work and heat. Process analysis for closed and open systems. Steady state equation for open system. Second law of thermodynamics including heat engine and reversed heat engines. Concept of entropy, entropy changes for simple compressible substances, entropy balance and entropy creation.
- Learning Outcomes
  - Analyse and solve thermodynamics related problems qualitatively and quantitatively.
  - Embark on further in detail study independently in thermodynamics.

### **MET230      Fluid Mechanics 1 (3 credits)**



- Course Description
  - The goal of this course is to impart knowledge, understanding and an appreciation of the field of fluid mechanics. This course includes the study of the basic properties of fluids which encompasses both gases and liquids, the basic concepts of system, control volume and flow field, the basic principles of conservation of mass, energy and momentum, the fundamental equations that govern the behavior of fluids, the application of the principles and equations to the understanding of the operations of various types of flow measuring equipment and the study and analysis of the forces that act on bodies moving through a fluid and vice versa.
- Learning Outcomes
  - Understand important analytical principles of fluid mechanics.
  - Apply them to range of common engineering problems.
  - Perform calculations relating to the analysis of the flow through open channels, control and gauging structures Measure the discharge in open channels using approved procedures.

### **BUS 100 Introduction to Business (3 credits)**

- Course Description
  - This course gives the students a comprehensive background to essential concepts of business within an organizational, managerial and financial context. Real world examples will be used to teach business concepts. The course will also be divided into parts like firms, business environment, markets, management, as well as international issues under such divisions relevant issues would be tackled according to the needs of the present and the near future.
- Learning Outcomes
  - Explain the needs of different stakeholders in a business; owners/shareholders, customers, employees, management, suppliers, creditors and government.
  - Understand the inputs required by a business; labor, suppliers, finance, land, management skills.
  - Analyze accountability; owners/shareholders and other Stakeholders.
  - Categorize businesses by sector; primary, secondary, tertiary.
  - Understand the different objectives that exist in a business and appreciate the different stakeholder perspectives.
  - Understand how the external environment creates opportunities and threats for a business.
  - Learn the factors that influence the scale of production, the location of production and the choice between different types of production process.
  - Analyze the need for, and describe the means of, achieving control over quality and stock levels in production.



### **MET 310      Mechanics of Machines (3 credits)**

- Course Description
  - This course is continuation from dynamic subject. The chapter usually covered several analysis of gear systems, belt, balancing and crank effort diagram. Basic of vibration chapter will include free vibration and force vibration analysis. Generally this course is intended to cover that field of engineering theory, analysis and practice that is described as mechanisms of machines and vibration analysis.
- Learning Outcomes
  - Discuss briefly with neat sketches the analysis of gear systems, belt, balancing and flywheel.
  - Solve and analysis the problems that relate to mechanic of machines.

### **MET 320      Circuit Analysis 1 (3 credits)**

- Course Description
  - This is an introductory course in circuit theory for engineering majors. It includes introduction to D.C. and A.C. electrical principles with stress on different circuit analysis methods. Use of Ohm's law, Kirchoff's laws, network theorems for resistive, capacitive and inductive networks - Phasors and Phasor diagrams for AC circuits introduced with real and reactive power and maximum power transfer studies with application to Single and Three Phase circuits and Ideal transformers.
- Learning Outcomes
  - interpret data accurately;
  - apply theoretical strategies to the analysis of data;
  - synthesize research results for the purposes of discussion and written work;
  - conceive reasonable inferences in response to observations;
  - analyze electrical circuit problems systematically and logically;
  - design and construct electrical circuits in the laboratory
  - test circuits for proper function

### **EET 330      Microprocessor (3 credits)**

- Course Description
  - This course introduces microprocessor architecture and microcomputer systems, including memory and input/output interfacing. Topics include assembly language programming, bus architecture, bus cycle types, I/O systems, memory systems, interrupts, and other related topics. Pre-requisite: Digital Electronics



- Learning Outcomes
  - Identify, select, and handle microprocessors and solid state memories.
  - Analyze microprocessor circuits.
  - Analyze computer system building blocks.
  - Analyze microprocessor I/O devices.
  - Analyze microprocessor timing considerations.
  - Interconnect digital circuits to a microprocessor.
  - Select and apply logic analyzers.
  - Generate and interpret machine language programming.
  - Perform decimal, octal, hexadecimal, and binary conversions.
  - Utilize computer programs.

### **MET 340      Engineering Vibration (3 credits)**

- Course Description
  - This course covers basic knowledge of vibration includes free vibration and force vibration analysis. Generally this course is intended to cover that field of engineering theory, analysis and practice that is described as mechanisms of machines and vibration analysis.
- Learning Outcomes
  - Know the concepts, calculation, operation and application of vibration.
  - Discuss briefly with neat sketches the analysis of longitudinal and transverse vibrations.
  - Solve and analysis the problems that relate to vibration.

### **MET350      Control Engineering (3 credits)**

- Course Description
  - This course is the study and application of Control Theory into designing Control Systems with predictable behaviors.
- Learning Outcomes
  - Identify and recognize control systems.
  - Apply the knowledge of Control Theory into predicting and illustrating the design of Control System.
  - Point out the mechanisms of modern control systems.

### **MET 360      Application of Pneumatic & Hydraulics (3 credits)**

- Course Description
  - The course covers topics on basics of applications of fluid power and the application of fluid power in the industries. Various fundamental knowledge of fluid power systems such as properties of fluid, distribution of fluid power



in engineering systems shall be mastered. Students will acquire basic knowledge on the analysis of fluid power designs. Finally the course covers topics on basics of applications of pneumatic and hydraulic and their application in the industries. Pre-requisite: Fluid Mechanics 1

- Learning Outcomes
  - Identify the key processes in the preparation of air/gases for fluid power system
  - Know the actuation principles in fluid power propagation
  - Learn the basic knowledge of hydraulics and pneumatics

### **BUS 316 Business Enterprise Management (3 credits)**

- Course Description
  - This course creates awareness for students on the concepts for planning and deploying critical infrastructure that will help their companies achieve sustained competitive advantage. It includes case studies and research methods that will train them with fundamental business procedures.
- Learning Outcomes
  - Gain a thorough understanding of management, with an emphasis on enterprise, from a tactical, operational and strategic perspective.
  - Learn how ideas and opportunities are created and implemented amidst new concepts and theories.
  - Understand the concepts and processes involved in the production and delivery of enterprise to the marketplace.
  - Develop business and leadership skills, as well as skills in critical thinking and research, which enhances independent learning and reflective capabilities.
  - Use learning tools and studying subjects that are up to date and relevant in all current business environments.

### **ETM 390 Industrial Training (6 credits)**

- Course Description
  - Students will be placed in agencies/companies for industrial training. Criteria for placement at the workplace:-
    - Letters to private or governmental organizations requesting industrial training placement for students would send out a semester earlier.
    - To ensure that students have the opportunity to carry out tasks / responsibilities relevant to their knowledge and skills, their supervisors will communicate with the employers regarding their specific job scope.



- Some formality process for assessment purpose will be installed which include the filling-in of the Employers' General Confidential Report and the Attendance Form.
- Students are briefed before they leave for their training in terms of proper conduct at the workplace, punctuality and commitment. Students are also encouraged to keep an active record of their training activities (experiences, challenges, problems, etc.) which will be submitted in a proper format of a report.
- Learning Outcomes
  - Demonstrate teamwork and effective social & public relations skills (experienced while interacting with personnel at the training workplace).
  - Evaluate workplace practices and apply effective ones to emulate.
  - Relate theories learnt to real-life working environment

### **BUS 251      Operation Management (3 Credits)**

- Course Description
  - This course focuses on the area of business that is concern with the production of goods and services. It also teaches the students of the responsibilities of business operations as well as the management of resources, the distribution of goods and service to customers.
- Learning Outcomes
  - Explain the role of operations management in the overall framework of business administration.
  - Apply the concepts and techniques of operations management to strategic and tactical business decisions.
  - Understand recent and emerging theories of operations management, such as Just-in-Time, Kanban, theory of constraints and supply chain management.
  - Formulate operations strategies in manufacturing and service industries to achieve a competitive edge.

### **EET 450      Computer Network (3 credits)**

- Course Description
  - The course provides students with the opportunity to gain an understanding of the protocols and technologies of modern computer networks, with particular emphasis on the global Internet. The unit has a "top-down" structure, concentrating firstly, and principally, on network applications and application protocols. The various underlying network technologies are then examined in somewhat less detail. Several "specialist" topics, such as Network and Data Security, Network Management and Network Applications in Electronic Commerce are also covered in overview.





- Learning Outcomes
  - Explain Broadly the major computer network technologies.
  - Explain in some detail the Internet family of protocols.
  - Describe, explain and apply knowledge of application protocols such as HTTP and SMTP.
  - Describe, explain and apply computer network security concepts and the issues associated with them.
  - Describe and explain the basic principles of data encryption.
  - Describe and explain the main functions of network management

### **MET 470      Computer Application In Engineering (3 credits)**

- Course Description
  - This is a course introducing various concepts of CAD (Computer Aided Design) and CAE (Computer Aided Engineering) as applied to Mechanical Engineering design problems. Topics include modelling, importing various CAD model formats, assembly and animation of the results of analysis, static modal, nonlinear, contact, impact, failure, thermal, and multi-physics analyses, and computational fluid dynamics for design. The laboratory component involves use of current CAD/CAE software packages. Pre-requisite: Computer Aided Design
- Learning Outcomes
  - Design and modelling using 2D and 3D interface.
  - Analyse the static structure (and thermal).
  - Identify the CAD systems and applications in the industries.

### **MET 440      Robot Technology (3 credits)**

- Course Description
  - The course covers topics on basics of robot technology and automation which includes sensors, work cell design and robot kinematics etc. Various fundamental knowledge of robot design and operation shall be gained. Pre-requisite: Control Engineering
- Learning Outcomes
  - Understand the basics of robot kinematic design.
  - Design robot work cell.
  - Design robot programming with various form.

### **EET 490      Industrial Electronics (3 credits)**



- Course Description
  - A study of electronic/electrical control and instrumentation used in industry. Topics to include electrical and electronic control systems that include closed loop control systems and associated industrial control devices, transducers and sensors, solid state devices, optoelectronics, electromechanical devices, electrical control diagrams, and telemetry.
- Learning Outcomes
  - Understand solid state devices as logic switches, power controller switches.
  - Demonstrate an understanding of photoelectronics, lasers, and fiber optics.
  - Understand the working principles of various input devices (sensors, transducers etc.) and output devices (amplifiers, relays etc.) and signal conditioning circuitry.
  - Understand control logic, data communications for industrial electronics, and telemetry.

### **MET 480 Programmable Logic Control (3 credits)**

- Course Description
  - Fundamental concepts of programmable logic controllers, principles of operation, and numbering systems as applied to electrical controls. Identify and describe digital logic circuits and explain numbering systems; explain the operation of programmable logic controllers; convert ladder diagrams into programs; incorporate timers and counters utilizing programmable logic controllers; and execute and evaluate programs.
- Learning Outcomes
  - Describe a typical PLC processor scan to include how the PLC processes the ladder diagram.
  - Develop and troubleshoot/debug PLC programs using written program requirements, wiring diagrams, and/or hard-wired ladder diagrams.
  - Connect input and output devices to a PLC and develop a program to check, debug, and troubleshoot its operation to include wiring and other hardware problems.

### **MET 490 Manufacturing Engineering (3 credits)**

- Course Description
  - Manufacturing involves the transformation of metals, ceramics and plastics into functional products. Manufacturing engineering focuses on the technologies and integrated production systems required for the manufacture of high-quality, economically competitive consumer products. This course introduces the knowledge and skills of modern manufacturing processes, production systems and quality management practices to turn a conceptual



idea into a globally competitive the finished product. The theoretical knowledge is reinforced with practical work, demonstrations and factory visits.

- Learning Outcomes
  - Demonstrate an understanding of the principles of modern manufacturing processes, production systems and quality management systems
  - Interpret experimental and test results and present these in an appropriate engineering report format
  - Collaborate with others in a team project environment to conduct engineering investigations and produce engineering reports

### **MET 430 Electrical Power & Machines (3 credits)**

- Course Description
  - Introduction to electronic power and machines which students will be introduced to the basic of understanding of electrical power and machines.
- Learning Outcomes
  - Ability to acquire and apply fundamental principles of science and engineering.
  - Ability to identify, formulate and model problems and find engineering solutions based on a system approach.

### **ETM 490 Engineering Project Management (3 credits)**

- Course Description
  - Project management is the discipline of planning, organizing, securing and managing resources to bring about the successful completion of specific project goals and objectives. It is sometimes conflated with program management, however technically a program is actually a higher level construct: a group of related and somehow interdependent projects. A project is a temporary endeavour, having a defined beginning and end (usually constrained by date, but can be by funding or deliverables), [1] undertaken to meet unique goals and objectives, usually to bring about beneficial change or added value. The temporary nature of projects stands in contrast to business as usual (or operations), which are repetitive, permanent or semi-permanent functional work to produce products or services. In practice, the management of these two systems is often found to be quite different, and as such requires the development of distinct technical skills and the adoption of separate management.
- Learning Outcomes
  - Apply the basic concepts and models used which will enhance successful management of projects in engineering and technology.



- Cover topics on: A structured approach to project management, Project life cycle, Project selection and evaluation, Organizational concepts in project management, Project planning, conflict and negotiation, Budgeting and cost estimation, Scheduling, Resource allocation, Monitoring, Information systems and Project control and Project termination.
- Get an insight into human behavior, understand organizational issues and learn quantitative methods that are necessary for successful project management.
- Work on team work and use a significant amount of interaction during lectures, case discussions and student project presentations.

### **URES 499 Capstone Project for Undergraduate Studies (3 credits)**

- Course Description
  - This course is specifically designed to bring out the best work possible for undergraduate students. This would exhibit and culminate the different experiences that the student has acquired for the year. This would encompass all of what they have learned while relating societal, ethic and environmental impacts for their work
- Learning Outcomes
  - Synthesize the knowledge and skills acquired from their courses, leadership experiences and co-curricular involvement into one project.
  - Showcase learning and leadership skills.
  - Extend academic experience of leadership into areas of personal interest.
  - Refine leadership skills and demonstrate proficiency.
  - Work independently to accomplish project.

### **General Education Requirements (45 credits)**

General Education Courses Requirements; each course is valued as 3 Credits. The general education courses at Charisma University hone students to be holistic individuals possessing critical thinking skills applicable to diverse fields of knowledge. Students must complete 45 Credits from General Education Courses distributed as follows:

- English Courses (9 Credits)
- Communications (9 Credits)
- Humanities (6 Credits)
- Natural Science (3 Credits)
- Mathematics (3 Credits)
- Computer Science (3 credits)
- History (6 Credits)
- Social and Behavioural Sciences (6 Credits)



## **Bachelor of Science (BS) in Electrical and Electronics Engineering**

### **Introduction**

The Bachelor of Science in Electrical and Electronics Engineering program provide hybrid learners knowledge in hardware and software aspects of design and development combined with basic electronics engineering principles. The program covers topics on semiconductors, electronic devices, circuit principles, programming and feedback control systems. Learners can choose to specialize in Manufacturing Management, Telecommunication, Computer Technology, Microelectronics, Photovoltaic and Mechatronics.

Graduates of this course will find employment as engineers in various industries including manufacturing, telecommunication, electronics, computer technology and photovoltaics'.

Learners can begin their course of study when they are ready and within defined parameters progress at your own pace. Learners may take more than one course at a time, however it is recommend that you do not, at least until you become entirely comfortable with your study system. The distance learning element of the program guarantees that learning takes place without any sort of disruption to learner careers.

### **Program Learning Outcomes**

Upon graduation, learners are expected to demonstrate the following skill set;

- creative thinking skills and sound knowledge in the field of electronics engineering;
- demonstrate basic understanding of electronic circuits from both the design and troubleshooting aspects;
- able to demonstrate an understanding in DC circuits that includes methods employed to analyse current, voltage and power consumption;
- able to demonstrate an understanding of the theoretical bases of static's and strength of materials and an ability to apply these theories to the analysis of statically determinate and indeterminate structures;
- able to understand the factors involved in a rigid body motion, dynamic forces, energy and power, and its application in electrical machines;
- demonstrate proficiency in management skills, technology management and programming;
- develop design expertise in electronics, computer systems and interfacing;
- ability to solve challenging engineering problems in electronic and digital circuitry;
- able to demonstrate and ability to design a project, analyse and troubleshoot and rectify projects independently;
- ability to design and conduct experiments for digital or electronic circuits using EWB simulation, as well as to analyse and interpret data;
- able to demonstrate the importance of control feedback circuitry and define the various DC and AC motors that is used in electrical machinery;



- able to demonstrate an understanding of the semiconductor material structure, process and design methods used to build semiconductor devices;
- able to demonstrate a strong understanding of DC/AC circuit analysis, analogue and digital electronics and microprocessor fundamentals to the design, testing, production or maintenance of electronic device or equipment and their associated components;
- demonstrate the conceptual foundations in electronic communication and its application.

## **Course Requirements**

### **Core Course (75 credits)**

#### **ETM 270 Computer Aided Design (3 credits)**

- Course Description
  - This unit introduces the student to two and three-dimensional drawing. Typically, the student will be producing drawing and details of medium rise buildings.
- Learning Outcomes
  - Demonstrate basic computer-aided drawing techniques by using AutoCAD software
  - Advantages and limits of using AutoCAD

#### **EET 210 Signal and Systems (3 credits)**

- Course Description
  - This course develops mathematical transform techniques and computational tools to analyse the behavior of analogue and digital systems. While the main part of the course focuses on discrete-time system analysis, we also consider mathematical foundations and tools applied to continuous-time systems. When completing this course, it is expected that a student shall have the ability to apply transform techniques and concepts in formulating and solving engineering problems.
- Learning Outcomes
  - An ability to apply knowledge of mathematics, science, and engineering
  - An ability to design a system, component, or process to meet desired needs
  - An ability to identify, formulate, and solve engineering problems
  - A recognition of the need for and an ability to engage in life-long learning
  - An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice



## **ETM 270     Statistics and Probability (3 credits)**

- Course Description
  - Probability and Statistics is designed for the college bound student who has demonstrated success in Algebra and wishes to continue to explore a large range of topics with an emphasis on “real world” applications such as games of chance, random population, and actuarial science. Students will regularly apply the tools of technology including the graphing calculator and computer to solve problems. They will be challenged through critical thinking exercises and participate in various group and individual activities that will enhance their mathematical reasoning ability and communication skills. Students are expected to use the information and technology in various ways in real world applications.
- Learning Outcomes
  - Discuss some of the issues and problems associated with collecting and interpreting data from surveys, polls, and other statistical studies.
  - Develop understanding and facility in the areas of the binomial expansion, progressions, and permutations and combinations.
  - Select and produce appropriate tabular and graphical formats for displaying univariate data sets and know how to summarize information about the centre and spread of a univariate data set.
  - Apply the measures and methods employed in analysing descriptive statistics.
  - Understand the concepts of probability, random variables and their distributions, in particular the binomial distribution and normal distributions.
  - Understand the concepts of estimation (confidence intervals) and hypothesis testing for population averages and percentages.
  - Select and produce the appropriate tabular and graphical formats for displaying bivariate data sets and carry out correlation and regression analyses.
  - Apply key methods of analysis of data in the area of inferential statistics.
  - Use technology to solve problems in probability and statistics.

## **MET220     Thermodynamics 1 (3 credits)**

- Course Description
  - Concepts of the first law of thermodynamics for closed and open systems. Definition of different types of energy and their relation with work and heat. Process analysis for closed and open systems. Steady state equation for open system. Second law of thermodynamics including heat engine and reversed heat engines. Concept of entropy, entropy changes for simple compressible substances, entropy balance and entropy creation.
- Learning Outcomes
  - Analyse and solve thermodynamics related problems qualitatively and quantitatively.



- Embark on further in detail study independently in thermodynamics.

### **MET230 Fluid Mechanics 1 (3 credits)**

- Course Description
  - The goal of this course is to impart knowledge, understanding and an appreciation of the field of fluid mechanics. This course includes the study of the basic properties of fluids which encompasses both gases and liquids, the basic concepts of system, control volume and flow field, the basic principles of conservation of mass, energy and momentum, the fundamental equations that govern the behavior of fluids, the application of the principles and equations to the understanding of the operations of various types of flow measuring equipment and the study and analysis of the forces that act on bodies moving through a fluid and vice versa.
- Learning Outcomes
  - Understand important analytical principles of fluid mechanics.
  - Apply them to range of common engineering problems.
  - Perform calculations relating to the analysis of the flow through open channels, control and gauging structures Measure the discharge in open channels using approved procedures.

### **BUS 100 Introduction to Business (3 credits)**

- Course Description
  - This course gives the students a comprehensive background to essential concepts of business within an organizational, managerial and financial context. Real world examples will be used to teach business concepts. The course will also be divided into parts like firms, business environment, markets, management, as well as international issues under such divisions relevant issues would be tackled according to the needs of the present and the near future.
- Learning Outcomes
  - Explain the needs of different stakeholders in a business; owners/shareholders, customers, employees, management, suppliers, creditors and government.
  - Understand the inputs required by a business; labor, suppliers, finance, land, management skills.
  - Analyze accountability; owners/shareholders and other Stakeholders.
  - Categorize businesses by sector; primary, secondary, tertiary.
  - Understand the different objectives that exist in a business and appreciate the different stakeholder perspectives.
  - Understand how the external environment creates opportunities and threats for a business.





- Learn the factors that influence the scale of production, the location of production and the choice between different types of production process.
- Analyze the need for, and describe the means of, achieving control over quality and stock levels in production.

### **EET 310 Digital Electronics (3 credits)**

- Course Description
  - This course covers combinational and sequential logic circuits. Topics include number systems, Boolean algebra, logic families, medium scale integration (MSI) and large scale integration (LSI) circuits, analogue to digital (AD) and digital to analogue (DA) conversion, and other related topics. Upon completion, students should be able to construct, analyze, verify, and troubleshoot digital circuits using appropriate techniques and test equipment
- Learning Outcomes
  - perform basic arithmetic calculations in binary, decimal and hexadecimal
  - analyse and synthesise combinatorial logic circuits
  - develop Moore finite state machines
  - analyse the operation of short assembly language programs
  - select and justify appropriate sensors, actuators and controllers for simple digital systems
  - work effectively and ethically in a group to complete an assignment involving problem solving and discovery.

### **MET320 Circuit Analysis (3 credits)**

- Course Description
  - This is an introductory course in circuit theory for engineering majors. It includes introduction to D.C. and A.C. electrical principles with stress on different circuit analysis methods. Use of Ohm's law, Kirchoff's laws, network theorems for resistive, capacitive and inductive networks - Phasors and Phasor diagrams for AC circuits introduced with real and reactive power and maximum power transfer studies with application to Single and Three Phase circuits and Ideal transformers.
- Learning Outcomes
  - interpret data accurately;
  - apply theoretical strategies to the analysis of data;
  - synthesize research results for the purposes of discussion and written work;
  - conceive reasonable inferences in response to observations;
  - analyze electrical circuit problems systematically and logically;
  - design and construct electrical circuits in the laboratory
  - test circuits for proper function



### **EET 330      Microprocessor and Applications (3 credits)**

- Course Description
  - This course introduces microprocessor architecture and microcomputer systems, including memory and input/output interfacing. Topics include assembly language programming, busarchitecture, bus cycle types, I/O systems, memory systems, interrupts, and other related topics. Pre-requisite: Digital Electronics
- Learning Outcomes
  - Identify, select, and handle microprocessors and solid state memories.
  - Analyze microprocessor circuits.
  - Analyze computer system building blocks.
  - Analyze microprocessor I/O devices.
  - Analyze microprocessor timing considerations.
  - Interconnect digital circuits to a microprocessor.
  - Select and apply logic analyzers.
  - Generate and interpret machine language programming.
  - Perform decimal, octal, hexadecimal, and binary conversions.
  - Utilize computer programs.

### **EET 340      Analog Electronics (3 credits)**

- Course Description
  - This course introduces the characteristics and applications of semiconductor devices andcircuits. Emphasis is placed on analysis, selection, biasing, and applications.
- Learning Outcomes
  - Identify and describe operation of semiconductor devices.
  - Analyze where and how analogue components are used.
  - Locate and select analogue devices using component specifications based on circuit requirements.
  - Construct operational circuits using analogue devices.
  - Select and demonstrate the use of appropriate test equipment to analyze circuit operation.
  - Using appropriate troubleshooting techniques evaluate circuit performance applying suitable repairmethods.
  - Identify and demonstrate safe workplace practices

### **MET350      Control Engineering (3 credits)**



- Course Description
  - This course is the study and application of Control Theory into designing Control Systems with predictable behaviors.
- Learning Outcomes
  - Identify and recognize control systems.
  - Apply the knowledge of Control Theory into predicting and illustrating the design of Control System.
  - Point out the mechanisms of modern control systems.

### **EET 360      Communication System (3 credits)**

- Course Description
  - This course introduces the fundamentals of electronic communication systems. Topics include the frequency spectrum, electrical noise, and modulation techniques, characteristics of transmitters and receivers, and digital communications.
- Learning Outcomes
  - Define the main parts of an AM & FM communication systems.
  - Explain the types of modulation used in electronic communication systems.
  - Define and explain the electromagnetic spectrum and its use in radio frequency communication.
  - List the major branches of the field of electronic communication.
  - Calculate voltage, current, gain and attenuation in decibels as applied to communication circuits.
  - Describe and analyze the basic types of filter circuits used in communication circuits.
  - Calculate the modulation index and percent of modulation for FM and AM communication systems.

### **BUS 316      Business Enterprise Management (3 credits)**

- Course Description
  - This course creates awareness for students on the concepts for planning and deploying critical infrastructure that will help their companies achieve sustained competitive advantage. It includes case studies and research methods that will train them with fundamental business procedures.
- Learning Outcomes
  - Gain a thorough understanding of management, with an emphasis on enterprise, from a tactical, operational and strategic perspective.
  - Learn how ideas and opportunities are created and implemented amidst new concepts and theories.



- Understand the concepts and processes involved in the production and delivery of enterprise to the marketplace.
- Develop business and leadership skills, as well as skills in critical thinking and research, which enhances independent learning and reflective capabilities.
- Use learning tools and studying subjects that are up to date and relevant in all current business environments.

### **ETM 390 Industrial Training (6 credits)**

- Course Description
  - Students will be placed in agencies/companies for industrial training. Criteria for placement at the workplace:-
    - Letters to private or governmental organizations requesting industrial training placement for students would send out a semester earlier.
    - To ensure that students have the opportunity to carry out tasks / responsibilities relevant to their knowledge and skills, their supervisors will communicate with the employers regarding their specific job scope.
    - Some formality process for assessment purpose will be installed which include the filling-in of the Employers' General Confidential Report and the Attendance Form.
    - Students are briefed before they leave for their training in terms of proper conduct at the workplace, punctuality and commitment. Students are also encouraged to keep an active record of their training activities (experiences, challenges, problems, etc.) which will be submitted in a proper format of a report.
- Learning Outcomes
  - Demonstrate teamwork and effective social & public relations skills (experienced while interacting with personnel at the training workplace).
  - Evaluate workplace practices and apply effective ones to emulate.
  - Relate theories learnt to real-life working environment

### **BUS 251 Operation Management (3 Credits)**

- Course Description
  - This course focuses on the area of business that is concern with the production of goods and services. It also teaches the students of the responsibilities of business operations as well as the management of resources, the distribution of goods and service to customers.
- Learning Outcomes



- Explain the role of operations management in the overall framework of business administration.
- Apply the concepts and techniques of operations management to strategic and tactical business decisions.
- Understand recent and emerging theories of operations management, such as Just-in-Time, Kanban, theory of constraints and supply chain management.
- Formulate operations strategies in manufacturing and service industries to achieve a competitive edge.

### **EET 420      Advanced Circuit Analysis (3 credits)**

- Course Description
  - This includes an in-depth study of state-equation formulations and methods of obtaining them from a circuit's graph. Extensive use of the Laplace Transform for the analysis of linear time-invariant networks. The study of network functions: poles, zeros, and frequency response; natural frequencies; filtering; and two-port networks. Classical and computer methods for filter design. Transmission lines will be covered and analysed both in the frequency-domain as well as the time-domain. Computer techniques for analysing and designing electrical circuits, using Mat lab and Spice as exemplary tools, will be used throughout the course. Pre-requisite: Circuit Analysis
- Learning Outcomes
  - Analyze linear electrical circuits using the modified nodal analysis, mesh analysis, and state spacemethods, and apply the state space method in conjunction with graph-theoretic approaches.
  - Use the Laplace transforms to analyze linear electrical circuits, to evaluate their stability, and to synthesizetransfer functions/impedances with given amplitude frequency responses.
  - Analyze the input-output properties of interconnected two-port networks.
  - Analyze Butterworth filters and perform frequency transformation as well as low-pass/high-pass/bandpass/band-rejecttransformation.
  - Comprehend the Telegrapher's equations and calculate the propagation constant, reflection coefficient,and input impedance in transmission line circuits.

### **MET 470      Computer Application In Engineering (3 credits)**

- Course Description
  - This is a course introducing various concepts of CAD (Computer Aided Design) and CAE (Computer Aided Engineering) as applied to Mechanical Engineering design problems. Topics include modelling, importing various CAD model formats, assembly and animation of the results of analysis, static



modal, nonlinear, contact, impact, failure, thermal, and multi-physics analyses, and computational fluid dynamics for design. The laboratory component involves use of current CAD/CAE software packages. Pre-requisite: Computer Aided Design

- Learning Outcomes
  - Design and modelling using 2D and 3D interface.
  - Analyse the static structure (and thermal).
  - Identify the CAD systems and applications in the industries.

### **EET 460      Advanced Communication System (3 credits)**

- Course Description
  - The course focus on advanced radio-based communication systems including the study of mobile radio communication systems, the evolution of mobile communications from 1G to 4G networks and some radar system fundamentals. Students will learn important concepts in the design of radio networks including link budgets, propagation path losses, transmitter/receiver parameters, antenna theory and application. Concepts such as tele traffic, traffic distribution and management are also covered. The subject is heavily focused on practical communications engineering and includes a minor project which enables students to design, manufacture and test antenna systems. The unit also examines global challenges around frequency spectrum allocation and sustainable practice for communications systems. Pre-requisite: Communication System
- Learning Outcomes
  - Describe advanced techniques in modern communication systems
  - Model and analyse communication channels in cellular communication systems
  - Use communication systems modelling and analysis tools such as Mat lab to simulate the MIMO and OFDM wireless communication standards.

### **EET 450      Computer Network (3 credits)**

- Course Description
- The course provides students with the opportunity to gain an understanding of the protocols and technologies of modern computer networks, with particular emphasis on the global Internet. The unit has a "top-down" structure, concentrating firstly, and principally, on network applications and application protocols. The various underlying network technologies are then examined in somewhat less detail. Several "specialist" topics, such as Network and Data



Security, Network Management and Network Applications in Electronic Commerce are also covered in overview.

- Learning Outcomes
  - Explain Broadly the major computer network technologies.
  - Explain in some detail the Internet family of protocols.
  - Describe, explain and apply knowledge of application protocols such as HTTP and SMTP.
  - Describe, explain and apply computer network security concepts and the issues associated with them.
  - Describe and explain the basic principles of data encryption.
  - Describe and explain the main functions of network management

### **MET 480 Programmable Logic Control (3 credits)**

- Course Description
  - Fundamental concepts of programmable logic controllers, principles of operation, and numbering systems as applied to electrical controls. Identify and describe digital logic circuits and explain numbering systems; explain the operation of programmable logic controllers; convert ladder diagrams into programs; incorporate timers and counters utilizing programmable logic controllers; and execute and evaluate programs.
- Learning Outcomes
  - Describe a typical PLC processor scan to include how the PLC processes the ladder diagram.
  - Develop and troubleshoot/debug PLC programs using written program requirements, wiring diagrams, and/or hard-wired ladder diagrams.
  - Connect input and output devices to a PLC and develop a program to check, debug, and troubleshoot its operation to include wiring and other hardware problems.

### **EET 490 Industrial Electronics (3 credits)**

- Course Description
  - A study of electronic/electrical control and instrumentation used in industry. Topics to include electrical and electronic control systems that include closed loop control systems and associated industrial control devices, transducers and sensors, solid state devices, optoelectronics, electromechanical devices, electrical control diagrams, and telemetry.
- Learning Outcomes
  - Understand solid state devices as logic switches, power controller switches.
  - Demonstrate an understanding of photoelectronics, lasers, and fiber optics.



- Understand the working principles of various input devices (sensors, transducers etc.) and output devices (amplifiers, relays etc.) and signal conditioning circuitry.
- Understand control logic, data communications for industrial electronics, and telemetry.

### **MET 430 Electrical Power & Machines (3 credits)**

- Course Description
  - Introduction to electronic power and machines which students will be introduced to the basic of understanding of electrical power and machines.
- Learning Outcomes
  - Ability to acquire and apply fundamental principles of science and engineering.
  - Ability to identify, formulate and model problems and find engineering solutions based on a system approach.

### **ETM 490 Engineering Project Management (3 credits)**

- Course Description
  - Project management is the discipline of planning, organizing, securing and managing resources to bring about the successful completion of specific project goals and objectives. It is sometimes conflated with program management, however technically a program is actually a higher level construct: a group of related and somehow interdependent projects. A project is a temporary endeavour, having a defined beginning and end (usually constrained by date, but can be by funding or deliverables), [1] undertaken to meet unique goals and objectives, usually to bring about beneficial change or added value. The temporary nature of projects stands in contrast to business as usual (or operations), which are repetitive, permanent or semi-permanent functional work to produce products or services. In practice, the management of these two systems is often found to be quite different, and as such requires the development of distinct technical skills and the adoption of separate management.
- Learning Outcomes
  - Apply the basic concepts and models used which will enhance successful management of projects in engineering and technology.
  - Cover topics on: A structured approach to project management, Project life cycle, Project selection and evaluation, Organizational concepts in project management, Project planning, conflict and negotiation, Budgeting and cost estimation, Scheduling, Resource allocation, Monitoring, Information systems and Project control and Project termination.





- Get an insight into human behavior, understand organizational issues and learn quantitative methods that are necessary for successful project management.
- Work on team work and use a significant amount of interaction during lectures, case discussions and student project presentations.

### **URES 499 Capstone Project for Undergraduate Studies (3 credits)**

- Course Description
  - This course is specifically designed to bring out the best work possible for undergraduate students. This would exhibit and culminate the different experiences that the student has acquired for the year. This would encompass all of what they have learned while relating societal, ethic and environmental impacts for their work
- Learning Outcomes
  - Synthesize the knowledge and skills acquired from their courses, leadership experiences and co-curricular involvement into one project.
  - Showcase learning and leadership skills.
  - Extend academic experience of leadership into areas of personal interest.
  - Refine leadership skills and demonstrate proficiency.
  - Work independently to accomplish project.

### **General Education Requirements (45 credits)**

General Education Courses Requirements; each course is valued as 3 Credits. The general education courses at Charisma University hone students to be holistic individuals possessing critical thinking skills applicable to diverse fields of knowledge. Students must complete 45 Credits from General Education Courses distributed as follows:

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- Communications (9 Credits)
- Humanities (6 Credits)
- Natural Science (3 Credits)
- Mathematics (3 Credits)
- Computer Science (3 credits)
- History (6 Credits)
- Social and Behavioural Sciences (6 Credits)



## **Bachelor of Science (BS) in Mechanical and Manufacturing Engineering**

### **Introduction**

The goal of the Mechanical and Manufacturing Engineering program is to provide students with the necessary training and education so they can provide high-level technical support to a variety of industrial, commercial, consulting, and governmental organizations. The emphasis of the program is in the application of scientific and engineering principles. Technical communication in oral and written form is also emphasized.

Graduates are expected to appreciate the ethical and societal responsibilities of a technologist, the concepts of Continuous Quality Improvement, and the continuing impact of globalization of design, manufacturing, and marketing of technical goods and services. Graduates are trained to deal with choice of materials and methods that are safe, environmentally and aesthetically acceptable, and economically competitive.

Typical responsibilities that may be assigned to graduates are the development and evaluation of machines and mechanisms; development, organization and supervision of manufacturing processes and procedures; the instrumentation, control and testing of a process; quality control; technical marketing and sales; design of mechanical systems for heating and cooling; and energy management.

Learners can begin their course of study when they are ready and within defined parameters progress at your own pace. Learners may take more than one course at a time, however it is recommend that you do not, at least until you become entirely comfortable with your study system. The distance learning element of the program guarantees that learning takes place without any sort of disruption to learner careers.

### **Program Learning Outcomes**

Upon graduation, learners are expected to demonstrate the following skill set;

- To understand and implement the fundamentals of the Mechanical Design Process
- To have the ability to work effectively on a design team
- To have depth in experience and understanding in the development of detailed engineering drawings through computer Aided Design
- To be able to apply their practical education, analytical reasoning, and creative skills toward the resolution of issues that our scientific, technological, and social
- To be able to incorporate professional standards and ethics into their engineering technology application projects
- To be proficient in both oral and written communication skills as applied to both technical and social endeavors



## Course Requirements

### Core Course (75 credits)

#### **ETM 270 Computer Aided Design (3 credits)**

- Course Description
  - This unit introduces the student to two and three-dimensional drawing. Typically, the student will be producing drawing and details of medium rise buildings.
- Learning Outcomes
  - Demonstrate basic computer-aided drawing techniques by using AutoCAD software
  - Advantages and limits of using AutoCAD

#### **MET 210 Mechanics of Structure (3 credits)**

- Course Description
  - Generally, this subject is a continuation subject of mechanics of solids. The first chapter is an advanced analysis for the final chapter of the earlier subject. Then a new method to find a deflection and slope is discussed. This followed by the analysis of thick cylinder as a continuation of thin cylinder analysis in mechanics of solids. The different effects to strain energy under different loads are covered in next chapter. Then five different theories of failures are used to identify yield and allowed stresses. Finally, the effect of buckling is studied so that students able to distinguish between the effect of buckling and compression to a certain column.
- Learning Outcomes
  - Gain basic understanding in particular problem of stresses.
  - Know the concepts, calculation, operation and application of various problems for a given loads.
  - Solve and analysis the problems that relate to mechanics of structures.

#### **ETM 270 Statistics and Probability (3 credits)**

- Course Description
  - Probability and Statistics is designed for the college bound student who has demonstrated success in Algebra and wishes to continue to explore a large range of topics with an emphasis on “real world” applications such as games of chance, random population, and actuarial science. Students will regularly apply the tools of technology including the graphing calculator and computer to solve problems. They will be challenged through critical thinking exercises and participate in various group and individual activities that will enhance



their mathematical reasoning ability and communication skills. Students are expected to use the information and technology in various ways in real world applications.

- Learning Outcomes
  - Discuss some of the issues and problems associated with collecting and interpreting data from surveys, polls, and other statistical studies.
  - Develop understanding and facility in the areas of the binomial expansion, progressions, and permutations and combinations.
  - Select and produce appropriate tabular and graphical formats for displaying univariate data sets and know how to summarize information about the centre and spread of a univariate data set.
  - Apply the measures and methods employed in analysing descriptive statistics.
  - Understand the concepts of probability, random variables and their distributions, in particular the binomial distribution and normal distributions.
  - Understand the concepts of estimation (confidence intervals) and hypothesis testing for population averages and percentages.
  - Select and produce the appropriate tabular and graphical formats for displaying bivariate data sets and carry out correlation and regression analyses.
  - Apply key methods of analysis of data in the area of inferential statistics.
  - Use technology to solve problems in probability and statistics.

### **MET220      Thermodynamics 1 (3 credits)**

- Course Description
  - Concepts of the first law of thermodynamics for closed and open systems. Definition of different types of energy and their relation with work and heat. Process analysis for closed and open systems. Steady state equation for open system. Second law of thermodynamics including heat engine and reversed heat engines. Concept of entropy, entropy changes for simple compressible substances, entropy balance and entropy creation.
- Learning Outcomes
  - Analyse and solve thermodynamics related problems qualitatively and quantitatively.
  - Embark on further in detail study independently in thermodynamics.

### **MET230      Fluid Mechanics 1 (3 credits)**

- Course Description
  - The goal of this course is to impart knowledge, understanding and an appreciation of the field of fluid mechanics. This course includes the study of the basic properties of fluids which encompasses both gases and liquids, the basic concepts of system, control volume and flow field, the basic principles



of conservation of mass, energy and momentum, the fundamental equations that govern the behavior of fluids, the application of the principles and equations to the understanding of the operations of various types of flow measuring equipment and the study and analysis of the forces that act on bodies moving through a fluid and vice versa.

- Learning Outcomes
  - Understand important analytical principles of fluid mechanics.
  - Apply them to range of common engineering problems.
  - Perform calculations relating to the analysis of the flow through open channels, control and gauging structures Measure the discharge in open channels using approved procedures.

### **BUS 100 Introduction to Business (3 credits)**

- Course Description
  - This course gives the students a comprehensive background to essential concepts of business within an organizational, managerial and financial context. Real world examples will be used to teach business concepts. The course will also be divided into parts like firms, business environment, markets, management, as well as international issues under such divisions relevant issues would be tackled according to the needs of the present and the near future.
- Learning Outcomes
  - Explain the needs of different stakeholders in a business; owners/shareholders, customers, employees, management, suppliers, creditors and government.
  - Understand the inputs required by a business; labor, suppliers, finance, land, management skills.
  - Analyze accountability; owners/shareholders and other Stakeholders.
  - Categorize businesses by sector; primary, secondary, tertiary.
  - Understand the different objectives that exist in a business and appreciate the different stakeholder perspectives.
  - Understand how the external environment creates opportunities and threats for a business.
  - Learn the factors that influence the scale of production, the location of production and the choice between different types of production process.
  - Analyze the need for, and describe the means of, achieving control over quality and stock levels in production.

### **MET 310 Mechanics of Machines (3 credits)**

- Course Description



- This course is continuation from dynamic subject. The chapter usually covered several analysis of gear systems, belt, balancing and crank effort diagram. Basic of vibration chapter will include free vibration and force vibration analysis. Generally this course is intended to cover that field of engineering theory, analysis and practice that is described as mechanisms of machines and vibration analysis.
- Learning Outcomes
  - Discuss briefly with neat sketches the analysis of gear systems, belt, balancing and flywheel.
  - Solve and analysis the problems that relate to mechanic of machines.

### **MET320      Thermodynamics 2 (3 credits)**

- Course Description
  - Thermodynamics 2 is a continuation of Thermodynamics 1. It involves the study of thermodynamic application of mainly all the thermodynamic laws, application in the form of standard air cycles ad regenerative cycles. Basic thermodynamics processes such as combustion and heat transfer are treated here. Also considered here includes basic equipment such as compressors, and other heat exchangers. Pre-requisite: Thermodynamics 1
- Learning Outcomes
  - Understand principles and application of standard Air Power Cycles and the principles of Power and Refrigeration Generation Vapor Cycles
  - Understand the principle of combustion and practical implications.
  - Appreciate the knowledge of compressors and their principle of operations.

### **MET 330      Fluid Mechanics 2 (3 credits)**

- Course Description
  - Fluid Mechanics 2 is a continuation of Fluid Mechanics 1. It involves the study of fluid flow analysis with respect to 2-Dimensional fluid flows. The fluid mechanics involves the effect of shear force and frictional forces on fluid flow and the application of same to turbo machines forte propagation of fluid flow energy. Pre-requisite: Fluid Mechanics 1
- Learning Outcomes
  - Understand the principles of two dimensional flows.
  - Learn boundary layer theory in fluid flow.
  - Understand the principles of Turbomachine.

### **MET 340      Engineering Vibration (3 credits)**



- Course Description
  - This course covers basic knowledge of vibration includes free vibration and force vibration analysis. Generally this course is intended to cover that field of engineering theory, analysis and practice that is described as mechanisms of machines and vibration analysis.
- Learning Outcomes
  - Know the concepts, calculation, operation and application of vibration.
  - Discuss briefly with neat sketches the analysis of longitudinal and transverse vibrations.
  - Solve and analysis the problems that relate to vibration.

### **MET350 Control Engineering (3 credits)**

- Course Description
  - This course is the study and application of Control Theory into designing Control Systems with predictable behaviors.
- Learning Outcomes
  - Identify and recognize control systems.
  - Apply the knowledge of Control Theory into predicting and illustrating the design of Control System.
  - Point out the mechanisms of modern control systems.

### **MET 360 Application of Pneumatic & Hydraulics (3 credits)**

- Course Description
  - The course covers topics on basics of applications of fluid power and the application of fluid power in the industries. Various fundamental knowledge of fluid power systems such as properties of fluid, distribution of fluid power in engineering systems shall be mastered. Students will acquire basic knowledge on the analysis of fluid power designs. Finally the course covers topics on basics of applications of pneumatic and hydraulic and their application in the industries. Pre-requisite: Fluid Mechanics 1
- Learning Outcomes
  - Identify the key processes in the preparation of air/gases for fluid power system
  - Know the actuation principles in fluid power propagation
  - Learn the basic knowledge of hydraulics and pneumatics

### **BUS 316 Business Enterprise Management (3 credits)**

- Course Description



- This course creates awareness for students on the concepts for planning and deploying critical infrastructure that will help their companies achieve sustained competitive advantage. It includes case studies and research methods that will train them with fundamental business procedures.
- Learning Outcomes
  - Gain a thorough understanding of management, with an emphasis on enterprise, from a tactical, operational and strategic perspective.
  - Learn how ideas and opportunities are created and implemented amidst new concepts and theories.
  - Understand the concepts and processes involved in the production and delivery of enterprise to the marketplace.
  - Develop business and leadership skills, as well as skills in critical thinking and research, which enhances independent learning and reflective capabilities.
  - Use learning tools and studying subjects that are up to date and relevant in all current business environments.

### **ETM 390 Industrial Training (6 credits)**

- Course Description
  - Students will be placed in agencies/companies for industrial training. Criteria for placement at the workplace:-
    - Letters to private or governmental organizations requesting industrial training placement for students would send out a semester earlier.
    - To ensure that students have the opportunity to carry out tasks / responsibilities relevant to their knowledge and skills, their supervisors will communicate with the employers regarding their specific job scope.
    - Some formality process for assessment purpose will be installed which include the filling-in of the Employers' General Confidential Report and the Attendance Form.
    - Students are briefed before they leave for their training in terms of proper conduct at the workplace, punctuality and commitment. Students are also encouraged to keep an active record of their training activities (experiences, challenges, problems, etc.) which will be submitted in a proper format of a report.
- Learning Outcomes
  - Demonstrate teamwork and effective social & public relations skills (experienced while interacting with personnel at the training workplace).
  - Evaluate workplace practices and apply effective ones to emulate.
  - Relate theories learnt to real-life working environment





### **BUS 251      Operation Management (3 Credits)**

- Course Description
  - This course focuses on the area of business that is concern with the production of goods and services. It also teaches the students of the responsibilities of business operations as well as the management of resources, the distribution of goods and service to customers.
- Learning Outcomes
  - Explain the role of operations management in the overall framework of business administration.
  - Apply the concepts and techniques of operations management to strategic and tactical business decisions.
  - Understand recent and emerging theories of operations management, such as Just-in-Time, Kanban, theory of constraints and supply chain management.
  - Formulate operations strategies in manufacturing and service industries to achieve a competitive edge.

### **MET 420      Heat Transfer (3 credits)**

- Course Description
  - Heat transfer is the thermal energy in transit due to a spatial temperature difference. The topic of heat transfer has enormous applications in mechanical engineering, ranging from cooling of microelectronics to design of jet engines and operations of nuclear power plants. In this course, you will learn about what heat transfer is what governs the rate of heat transfer, and why heat transfer is so important. You will also learn about the three major modes of heat transfer: conduction, convection, and radiation. Heat conduction is the transport of heat through a solid body, by vibrations of molecules or in the case of electrical conductors, by movement of electrons from one molecule to another. Heat convection is a process by which heat is transferred through a fluid by motion of fluid. Thermal radiation is the transport of energy between two bodies by electromagnetic waves. In addition to the three main modes of heat transfer, you will also learn about heat transfer during phase changes (boiling and condensation heat transfer). Pre-requisite: Thermodynamics 1 and Fluid Mechanics 1
- Learning Outcomes
  - Analyse transient conductive heat transfer problems using different methods and available charts.
  - Analyse the modes of convective heat transfer and determine the convection heat transfer coefficients by means of dimensionless parameters.
  - Apply combined modes of heat transfer in heat exchanger and fins.



### **MET 470 Computer Application In Engineering (3 credits)**

- Course Description
  - This is a course introducing various concepts of CAD (Computer Aided Design) and CAE (Computer Aided Engineering) as applied to Mechanical Engineering design problems. Topics include modelling, importing various CAD model formats, assembly and animation of the results of analysis, static modal, nonlinear, contact, impact, failure, thermal, and multi-physics analyses, and computational fluid dynamics for design. The laboratory component involves use of current CAD/CAE software packages. Pre-requisite: Computer Aided Design
- Learning Outcomes
  - Design and modelling using 2D and 3D interface.
  - Analyse the static structure (and thermal).
  - Identify the CAD systems and applications in the industries.

### **MET 440 Robot Technology (3 credits)**

- Course Description
  - The course covers topics on basics of robot technology and automation which includes sensors, work cell design and robot kinematics etc. Various fundamental knowledge of robot design and operation shall be gained. Pre-requisite: Control Engineering
- Learning Outcomes
  - Understand the basics of robot kinematic design.
  - Design robot work cell.
  - Design robot programming with various form.

### **MET 450 Air Conditioning (3 credits)**

- Course Description
- The course covers air-conditioning, refrigeration, and heating career field. Students will learn installation, troubleshooting, repairing and maintaining air conditioning, refrigeration, and heating equipment for residential, commercial, and industrial applications. Pre-requisite: Heat Transfer, Thermodynamics 2
- Learning Outcomes
  - Discuss in detail with neat sketches the mechanisms of air-conditioning.
  - Solve and analysis the problems that relate to air-conditioning.

### **MET 480 Programmable Logic Control (3 credits)**



- Course Description
  - Fundamental concepts of programmable logic controllers, principles of operation, and numbering systems as applied to electrical controls. Identify and describe digital logic circuits and explain numbering systems; explain the operation of programmable logic controllers; convert ladder diagrams into programs; incorporate timers and counters utilizing programmable logic controllers; and execute and evaluate programs.
- Learning Outcomes
  - Describe a typical PLC processor scan to include how the PLC processes the ladder diagram.
  - Develop and troubleshoot/debug PLC programs using written program requirements, wiring diagrams, and/or hard-wired ladder diagrams.
  - Connect input and output devices to a PLC and develop a program to check, debug, and troubleshoot its operation to include wiring and other hardware problems.

### **MET 490    Manufacturing Engineering (3 credits)**

- Course Description
  - Manufacturing involves the transformation of metals, ceramics and plastics into functional products. Manufacturing engineering focuses on the technologies and integrated production systems required for the manufacture of high-quality, economically competitive consumer products. This course introduces the knowledge and skills of modern manufacturing processes, production systems and quality management practices to turn a conceptual idea into a globally competitive the finished product. The theoretical knowledge is reinforced with practical work, demonstrations and factory visits.
- Learning Outcomes
  - Demonstrate an understanding of the principles of modern manufacturing processes, production systems and quality management systems
  - Interpret experimental and test results and present these in an appropriate engineering report format
  - Collaborate with others in a team project environment to conduct engineering investigations and produce engineering reports

### **MET 430    Electrical Power & Machines (3 credits)**

- Course Description
  - Introduction to electronic power and machines which students will be introduced to the basic of understanding of electrical power and machines.



- .Learning Outcomes
  - Ability to acquire and apply fundamental principles of science and engineering.
  - Ability to identify, formulate and model problems and find engineering solutions based on a system approach.

### **ETM 490    Engineering Project Management (3 credits)**

- Course Description
  - Project management is the discipline of planning, organizing, securing and managing resources to bring about the successful completion of specific project goals and objectives. It is sometimes conflated with program management, however technically a program is actually a higher level construct: a group of related and somehow interdependent projects. A project is a temporary endeavour, having a defined beginning and end (usually constrained by date, but can be by funding or deliverables), [1] undertaken to meet unique goals and objectives, usually to bring about beneficial change or added value. The temporary nature of projects stands in contrast to business as usual (or operations), which are repetitive, permanent or semi-permanent functional work to produce products or services. In practice, the management of these two systems is often found to be quite different, and as such requires the development of distinct technical skills and the adoption of separate management.
- Learning Outcomes
  - Apply the basic concepts and models used which will enhance successful management of projects in engineering and technology.
  - Cover topics on: A structured approach to project management, Project life cycle, Project selection and evaluation, Organizational concepts in project management, Project planning, conflict and negotiation, Budgeting and cost estimation, Scheduling, Resource allocation, Monitoring, Information systems and Project control and Project termination.
  - Get an insight into human behavior, understand organizational issues and learn quantitative methods that are necessary for successful project management.
  - Work on team work and use a significant amount of interaction during lectures, case discussions and student project presentations.

### **URES 499    Capstone Project for Undergraduate Studies (3 credits)**

- Course Description
  - This course is specifically designed to bring out the best work possible for undergraduate students. This would exhibit and culminate the different experiences that the student has acquired for the year. This would encompass



all of what they have learned while relating societal, ethic and environmental impacts for their work

- Learning Outcomes
  - Synthesize the knowledge and skills acquired from their courses, leadership experiences and co-curricular involvement into one project.
  - Showcase learning and leadership skills.
  - Extend academic experience of leadership into areas of personal interest.
  - Refine leadership skills and demonstrate proficiency.
  - Work independently to accomplish project.

### **General Education Requirements (45 credits)**

General Education Courses Requirements; each course is valued as 3 Credits. The general education courses at Charisma University hone students to be holistic individuals possessing critical thinking skills applicable to diverse fields of knowledge. Students must complete 45 Credits from General Education Courses distributed as follows:

- English Courses (9 Credits)
- Communications (9 Credits)
- Humanities (6 Credits)
- Natural Science (3 Credits)
- Mathematics (3 Credits)
- Computer Science (3 credits)
- History (6 Credits)
- Social and Behavioural Sciences (6 Credits)



## Bachelor of Science (BS) in Civil Engineering

**Eligibility :** High School Diploma or equivalent from a recognized board or University

*Total Credits required for Bachelor of Science is 120. This includes 45 credits from general education courses.*

SUBJECT CODE	SUBJECT	CREDIT
<i>Core Subjects for Bachelor of Science</i>		
MAT 210	Mathematics For Engineering	3
PHY 212	Physics For Engineering	3
MAT 211	Calculus And Ordinary Differential Equations	3
BUS 251	Operation Management	3
MAT 215	Linear Algebra, Probability & Statistics	3
CEN 201	Structural Analysis	3
CEN 202	Engineering Geosciences	3
CEN 203	Construction Materials	3
CEN 204	Design Of Steel Structures	3
CEN 205	Design Of Reinforced Concrete Structures	3
CEN 206	Soil Mechanics	3
CEN 207	Geotechnical Engineering	3
CEN 208	Engineering Applications Of Geologic Structures	3
CEN 210	Computer Aided Design In Civil Engineering	3
CEN 211	Environmental Quality And Pollution	3
CEN 212	Water Supply And Waste-Water Engineering	3
CEN 213	Geoinformatics	3
CEN 214	Transportation Engineering	3
CEN 215	Hydraulic Machines	3
CEN 216	Advanced Structural Mechanics	3
CEN 217	Introduction To Earthquake Engineering	3
CEN 218	Concrete Engineering	3
CEN 219	Ground Improvement Techniques	3
CEN 220	Vibration Of Elastic System	3
CEN 221	Environmental Impact And Risk Assessment	3
<b>Course Credits</b>		<b>75</b>
<b>Credits from General Education Requirements</b>		<b>45</b>



<b>Total Credits</b>	<b>120</b>
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## *General Education Requirements*

General Education Courses Requirements; *each course is valued as 3 Credits. The general education courses at Charisma University hone students to be holistic individuals possessing critical thinking skills applicable to diverse fields of knowledge. Students must complete 45 Credits from General Education Courses distributed as follows:*

<b>English Courses</b>		
<i>Undergraduate students must complete three courses from English Courses section</i>		
ENG 210	American Literature	3
ENG 100	English Composition I	3
ENG 101	English Composition II	3
<b>Communication</b>		
<i>Undergraduate students must complete three courses from Communication section</i>		
COM 210	Business Communication	3
COM 211	Business Communication II	3
COM 286	Public Speaking	3
<b>Humanities</b>		
<i>Undergraduate students must complete two courses from Humanities section</i>		
PHIL 264	World Religion	3
PHIL 100	Introduction to Philosophy	3
<b>Natural Science</b>		
<i>Undergraduate students must complete one course from Natural Science section</i>		
BIO 100	Principles of Biology	3
CHEM 100	Introduction to Chemistry	3
<b>Mathematics</b>		
<i>Undergraduate students must complete the following course from Mathematics section</i>		
MTH 257	College Algebra	3
<b>Computer Science</b>		
<i>Undergraduate students must complete the following course from Computer Science section</i>		
CIS 100	Introduction to Computer	3
<b>History</b>		



<i>Undergraduate students must complete two courses from History section</i>		
HIS 217	Western Civilization I	3
HIS 218	Western Civilization II	3
<b>Social and Behavioural Sciences</b>		
<i>Undergraduate students must complete two courses from Social and Behavioral Sciences section</i>		
PSY 100	Introduction to Psychology	3
PSY 218	Introduction to Sociology	3
PSY 122	Introduction to Political Science	3
<b>General Education Credits</b>		<b>45</b>

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## Master of Science (MS) in Engineering Technology Management

### Introduction

Businesses need engineering managers to oversee projects, product design and development, operations, create strategic plans, handle budgets, costs, financing and interface with marketing.

By completing a comprehensive business curriculum, as well as courses in science, engineering, and math, you will easily bridge the gap between engineering and business. With the curriculum tailored to meet industry and professional standards, along with Charisma University's focus on experiential learning, you will be well prepared for your career upon graduation.

Engineering managers can expect to enter a career field that brings together the technological problem-solving and decision-making skills of engineering along the organizational and planning capabilities of business. As an engineering management student, you will prepare for a leadership role in today's complex engineering and technological environments.

### Learning Outcome

A graduate of this course can:

- integrate knowledge from a range of Engineering and Business sub-disciplines to coordinate and manage projects that require engineering control
- acquire and evaluate information to facilitate the coordination and management of engineering works
- communicate effectively to all stakeholders using appropriate (engineering project) management tools and techniques in the control of engineering works
- identify and use suitable and appropriate (engineering project) management tools and techniques in the control of engineering works
- practise engineering management with a global perspective and apply appropriate international standards

### Program Structure

Module	Credit	Module	Credit
Organizational Behavior	3	MGT 658 Managing Innovation	3
Managerial Accounting	3	MENG 543 Manufacturing Process	3
Operation Management	3	MENG 519 Engineering Project Management	3
Human Resource Management	3	MGT 592 Evaluation and Contract	3
Strategic Management	3	Marketing Management	3
Master Thesis	6		
Total Credit	36		

### Managing Innovation

This course recognises today's business needs to gain competitive advantages in order to face the turbulent economic environment where they operate. The ability of managers to turn ideas into actions is critical to



maintain or improve businesses position in the market. This course will provide the know-how and tools to create and manage innovative businesses/organisations.

#### Learning Outcomes:

An action learning approach is adopted whereby students “learn through doing” through analysis of relevant cases and through interactive and traditional exercises that relate to lecture topics. On completion of this course, students should be able to:

- 1 Assess firms’ innovative capabilities
- 2 Develop strategies for managing innovation
- 3 Identify the best alternatives for a successful innovation process
- 4 Acquire the appropriate resources to manage the innovation process effectively
- 5 Describe the impact of innovative networks in the innovation process
- 6 Recognise the importance of innovation management for the firm’s success

### **Manufacturing Process**

Manufacturing involves the transformation of metals, ceramics and plastics into functional products. Manufacturing engineering focuses on the technologies and integrated production systems required for the manufacture of high-quality, economically competitive consumer products. This course introduces the knowledge and skills of modern manufacturing processes, production systems and quality management practices to turn a conceptual idea into a globally competitive the finished product. The theoretical knowledge is reinforced with practical work, demonstrations and factory visits.

#### Learning Outcomes:

On successful completion of this course you should be able to:

1. Demonstrate an understanding of the principles of modern manufacturing processes, production systems and quality management systems
2. Interpret experimental and test results and present these in an appropriate engineering report format
3. Collaborate with others in a team project environment to conduct engineering investigations and produce engineering reports

### **Evaluation and Contract**

Understanding how Engineers obtain work is essential for those in private practice as well as their clients, and enhances the probability of success. The course focuses on best practice in contracts management and administration. You explore the procurement (tendering) process; the structure of contracts and options available; the relationship between the parties; and interpretation of the contract clauses and requirements. You learn how to prepare and evaluate tender responses, and contracts to carry out work.

#### **Learning outcomes:**

1. demonstrate and apply knowledge of requirements and best practice in contract management within the phases of the pavement life cycle in a regional context.
2. Interpret, critically analyse and evaluate a tender response using qualification-based criteria, and justify your recommendations with evidence.
3. synthesise information for clients in the form of engineering tender response, evaluation and contract that:



- a. solve clients' problems
  - b. are justified with research-based Evidence
4. Act professionally during the phases of contract management by:
- a. functioning autonomously
  - b. demonstrating ethical conduct
  - c. being accountable for people and the environment, and sensitive to cultural issues
  - d. adhering to engineering standards
  - e. demonstrating management skills

## **Marketing Management**

Marketing lies at the core of all business; whatever the character or size of your entity, its profit can come from only one place; the marketplace. All businesses are dependent on the income they earn from their customers, clients or buyers. In larger businesses it is marketing managers who are primarily responsible for keeping their company close to its customers. In any case, all those who have a direct responsibility for identifying, reaching and satisfying customers are engaged in marketing and everybody in a business needs to understand its marketplace activities. This course offers a complete introduction to professional marketing thought and action. The course explains the nature and purpose of marketing, followed by the fundamentals of each of the most important marketing tasks. It analyses the business need for customer orientation, the evaluation of markets and the targeting of market opportunities. There is then assessment of buyer behaviour and the role of market information. In addition, the course explains how to integrate product and service decisions with those on pricing, distribution and promotion - and why this is necessary.

### Learning Outcomes:

1. Interpret complex marketing issues and problems using relevant theories, concepts and methods with regard to ethical conduct.
2. Apply contemporary marketing theories to the demands of business and management practice.
3. Find and generate information/data needed to inform problem solving in marketing using appropriate methodology.
4. Analyse information/data critically and synthesise new knowledge and communicate that knowledge via engaging written and oral formats.
5. Organise information and data to reveal patterns and themes, and manage teams and evidence gathering and problem solving processes.
6. Conduct the process of inquiry, and respond to feedback, accounting for ethical, social and cultural (ESC) issues.

## **Strategic Management**

This course addresses the strategic management of organisations, including the formulation of longer term strategic directions, the planning of objectives and supporting strategies, and the control of strategic implementation. It provides students with an understanding of the approaches and tools for planning and controlling strategy at the organisation and sub-unit levels, as well as experience in case analysis and practical application of planning and control skills. Topics include evaluating the strategic environment, industry and competitive analysis, formulating mission and setting objectives, strategy selection and implementation, and strategic control. Also considered are specialist issues in strategic management such as technology and not-for-profit organisation management, corporate social responsibility and environmental strategies.

### Learning Outcomes

On successful completion of this course students will be able to:



1. Critically analyse the internal and external environments in which businesses operate and assess their significance for strategic planning.
2. Apply understanding fo the theories, concepts and tools that support strategic management in organizations.
3. Individually and collaboratively evaluate and synthesise information and existing knowledge from numerous sources and experiences.
4. Apply appropriate tools, theories and concepts to analyse strategic issues in organizationas and to develop strategies for implementation.

Participate constructively in team situations to complete shared tasks and meet agreed.

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