Northern technical University
الجامعة التقنية الشمالية

First Cycle – Bachelor's Degree (B.Sc.) – Mechanical Power Techniques Engineering- Power plants Branch

بكالوريوس - هندسة تقنيات ميكانيك القوى -فرع محطات القدرة

Table of Contents

1. Overview

This catalogue is about the courses (modules) given by the program of Mechanical Power Techniques Engineering to gain the Bachelor of Science degree. The program delivers (40) Modules with (6000) total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

نظره عامه

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج هندسة تقنيات ميكانيك القوى للحصول على درجة بكالوريوس العلوم الهندسية في تخصص تقنيات ميكانيك القوى-محطات القدرة. يقدم البرنامج (٤٠) مادة دراسية، على سبيل المثال، مع (٦٠٠٠) إجمالي ساعات حمل الطالب و ٢٤٠ إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

2. Undergraduate Courses 2023-2024

Module 1

Code	Course/Module Title	ECTS	Semester
ntu102	Computer principles	6	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	87
Description			
This course aims to provide the student with the basic concepts and skills of the computer and the importance of using it in various fields of life. It deals with the concept of a computer and its hardware and software components and related concepts, how to represent and process data, computer operating systems with a focus on the skills of dealing with the Windows 10 operating system and a number of utility programs, and the basic skills of dealing with some Microsoft Office package programs (MsWord, PowerPoint Excel and Access). In addition to the concept of the Internet and its most important services, computer networks and their protection, and how to benefit from them, in a way that enables the student to employ the computer and the Internet in his academic and professional life in the future efficiently.			

Module 2

Code	Course/Module Title	ECTS	Semester
teck101	Mathematics	6	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
6	0	93	57
Description			
The mathematics module includes analyzing and solving systems of linear equations and calculate areas and volumes. They are represented by square matrices and provide valuable information about the			

properties of these matrices. trigonometric functions include sine, cosine, tangent, cosecant, secant, and cotangent. These functions have numerous applications, describe physical quantities such as force, velocity, and displacement. Vectors can be added, subtracted, and multiplied by scalars, Limits allow us to analyze the continuity, differentiability, and convergence of functions, which are essential in calculus and mathematical analysis. Derivatives measure the rate of change of a function at a particular point. Derivatives provide information about the slope, concavity, and extrema of functions. Integration It involves finding the antiderivative of a function, which is a function whose derivative is equal to the original function. Integration allows us to calculate areas, volumes, and cumulative quantities.

Module 3

Code	Course/Module Title	ECTS	Semester
teck104	Workshop	6	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
0	6	93	82
Description			
Learn the basic science and practical application of the most commonly utilized and development of basic skills in fields of Turning, Welding, Piping and plumbing, Carpentry, Sand casting, Sheet metal fabrication, Metal forming. Finally, we explore the basics of setting up a cnc machine.			

Module 4

Code	Course/Module Title	ECTS	Semester
mpe103	English	5	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
English Language Learning Module: an English module often refers to a structured unit of study designed to help learners develop their English language skills. These modules typically focus on different aspects of language learning, such as grammar, vocabulary, reading comprehension, writing, speaking, and listening. They may include instructional materials, exercises, assessments, and activities to enhance language proficiency.			

Module 5

Code	Course/Module Title	ECTS	Semester
teck105	Mechanics Engineering /static	6	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	0	48	102
Description			
In a statics module, students typically learn fundamental concepts and principles related to mechanics, such as Newton's laws of motion, vector analysis, and the equilibrium of forces. Throughout the statics module, students typically engage in problem-solving exercises, both theoretical and practical, to apply the learned concepts to real-world engineering scenarios. They may use mathematical techniques, such as vector algebra and trigonometry, to solve problems involving forces, moments, and equilibrium. Overall, a statics module in mechanical engineering provides a foundation for understanding the static behavior of mechanical systems, which is essential for designing and analyzing structures, machines, and mechanisms.			

Module 6

Code	Course/Module Title	ECTS	Semester
teckI102	Human rights and democracy	4	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	33	67
Description			
This module explores the fundamental principles and concepts of human rights and democracy. Students will study topics such as civil liberties, social justice, equality, and the rule of law. The module aims to develop an understanding of the importance of human rights and democratic values in society.			

Module 7

Code	Course/Module Title	ECTS	Semester
mpe106	Electrotechnology	6	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	87
Description			
In this curriculum, the student will learn the basics of connection in series, parallel, and mixed, and when the current is constant and the voltage is constant, and identify measuring devices, as measuring current differs from measuring voltage and resistance. And obtaining the same results, the student learns the amount of current and voltage entering the single loop in the case of two sources, as is the case in Kirchhoff's theory, and then the student experiences the maximum energy conversion, as it shows that there is a load that is drawn according to the source load.			

Module 8

Code	Course/Module Title	ECTS	Semester
mpe102	Mechanics Engineering /dynamics	5	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	0	48	77
Description			
Mechanical engineering encompasses various aspects of motion, and the dynamics module within this field focuses on the study of moving objects and the forces that influence their motion. It involves the analysis of forces, acceleration, velocity, and energy transfer in mechanical systems. Throughout the dynamics module, students typically engage in problem-solving exercises and practical applications to apply the learned concepts to real-world engineering scenarios. They may use mathematical techniques, such as calculus and vector analysis, to solve problems involving forces, motion, and energy. Overall, a dynamics module in mechanical engineering provides a foundation for understanding and predicting the behavior of moving objects and systems. It is crucial for designing and analyzing mechanisms, vehicles, and other dynamic systems in various industries, including automotive, aerospace, and robotics.			

Module 9

Code	Course/Module Title	ECTS	Semester
mpe104	thermodynamics	9	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
6	3	138	87
Description			
The module encompasses a wide range of subjects, including the first and second laws of thermodynamics, thermodynamic properties of substances, ideal gas laws, thermodynamic cycles, and power and refrigeration cycles. Students learn to apply these principles to analyze and design energy systems, such as power plants, engines, refrigeration systems, and HVAC (Heating, Ventilation, and Air Conditioning) systems. Throughout the module, students gain a deep understanding of fundamental thermodynamic principles and their practical applications. They learn how to perform energy and exergy analyses, assess system efficiencies, and optimize engineering processes to enhance performance and sustainability. The course often involves problem-solving exercises, laboratory experiments, and computer simulations to reinforce theoretical concepts and develop practical skills.			

Module 10

Code	Course/Module Title	ECTS	Semester
teck103	Engineering Drawing	6	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	3	64	86
Description			
The aim of this course is to introduce students with key knowledge in the field of Engineering Drawing and CAD as applied to Engineering design practice in first angle and third angle projections. It covers Orthographic and Isometric projection of regular objects. It also introduces CAD modelling to the engineering design.			

Module 11

Code	Course/Module Title	ECTS	Semester
mpe201	Differentiation and integration methods	7.20	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	3	93	87
Description			
Introducing the student to the second part of advanced mathematics, which includes complex numbers, vectors and partial derivatives, double and triple integrations and their applications with polar coordinates and series in order to develop students' intellectual abilities and benefit from their applications in the field of specialization.			

Module 12

Code	Course/Module Title	ECTS	Semester
mpe202	Engineering materials	4.80	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	57
Description			
Materials Science and Engineering (MSE) combines engineering, physics and chemistry principles to solve real-world problems associated with nanotechnology, biotechnology, information technology, energy, manufacturing and other major engineering disciplines.			

Module 13

Code	Course/Module Title	ECTS	Semester
mpe203	Fluid mechanics	6.40	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	2	78	82
Description			
The Fluid Mechanics module explores the principles and applications of fluid behavior. Topics include fluid properties, statics, dynamics, flow in pipes, flow measurement, flow around bodies, compressible flow, fluid machinery, and computational fluid dynamics. Students learn to analyze and solve fluid mechanics problems, design fluid flow systems, and interpret experimental and computational data. The module emphasizes problem-solving skills and provides a foundation for understanding fluid behavior in various engineering contexts. By the end of the module, students will possess the knowledge and skills to tackle real-world fluid mechanics challenges effectively.			

Module 14

Code	Course/Module Title	ECTS	Semester
mpe204	Mechanical drawing	5	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	3	63	62
Description			
The Mechanical Drawings module focuses on developing proficiency in creating and interpreting mechanical drawings used in engineering and manufacturing. Students learn the principles of orthographic projection, dimensioning, and tolerancing to accurately communicate design intent. They gain practical skills in creating detailed drawings, assembly drawings, and exploded views using computer-aided design (CAD) software. The module covers various drafting standards and conventions, geometric dimensioning and tolerancing (GD&T), and the interpretation of engineering drawings. Through hands-on exercises and projects, students acquire the ability to effectively communicate design specifications and create accurate representations of mechanical components and systems.			

Module 15

Code	Course/Module Title	ECTS	Semester
mpe205	Theory of machine	6.60	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	102
Description			
The theory of machine module encompasses the study of various mechanical components and systems that are used to transmit motion and force. It includes the analysis and understanding of machines and			

mechanisms, such as belt drives, brakes, toothed gears, and governors. The theory of belt drives involves the analysis of tension, slip, power transmission, and the selection of appropriate belt types and sizes for specific applications. The theory of brakes involves understanding the principles of friction, heat dissipation, braking torque, and the design and selection of brake systems for specific applications. The theory of toothed gears includes the analysis of gear ratios, torque transmission, speed reduction or increase, backlash, and the design and manufacturing of gears for different applications. The theory of governors involves understanding the principles of centrifugal force, mechanical linkages, control mechanisms, and stability to ensure proper speed regulation in various applications

Module 16

Code	Course/Module Title	ECTS	Semester
mpe206	Strength of materials	6	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	87
Description			
The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and some activities that are interesting to the students.			

Module 17

Code	Course/Module Title	ECTS	Semester
mpe207	Steam power plants	6	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	2	78	72
Description			
The module covers key topics such as the Rankine cycle, steam properties, steam turbines, condensers, pumps, and boilers. Students learn about the thermodynamic processes occurring within each component, the idealized assumptions made, and the practical considerations for efficient and reliable operation. They also delve into advanced concepts like regeneration, reheat, and superheating, which enhance the cycle's performance. Through theoretical analysis, computational simulations, and practical case studies, students develop skills in evaluating the efficiency, power output, and heat transfer characteristics of vapor power cycles. They learn to calculate key performance parameters such as thermal efficiency, specific work output, and heat transfer rates. Additionally, the module explores environmental considerations and the integration of sustainable practices in vapor power systems.			

Module 18

Code	Course/Module Title	ECTS	Semester
mpe208	Hydraulic machinery	6.4	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	2	78	82
Description			
The hydraulic machine module is a versatile mechanical system that utilizes hydraulic power. It consists of key components like the hydraulic pump, which converts mechanical energy into fluid power, creating high-pressure flow. Hydraulic hoses and pipes distribute the pressurized fluid throughout the module, ensuring smooth flow. Control valves regulate fluid flow and direction, allowing precise control over movements. Hydraulic actuators, such as cylinders and motors, convert hydraulic pressure into mechanical force or motion. Cylinders provide linear forces, while motors offer rotational power. Additional components may include filters, accumulators, relief valves, and gauges. The hydraulic machine module finds applications in various industries, offering high forces and precise control. It is used in manufacturing, construction, mining, and agriculture, among others. With its efficient power transmission and ability to handle heavy loads, the hydraulic machine module is a valuable tool in achieving a wide range of tasks.			

Module 19

Code	Course/Module Title	ECTS	Semester
mpe209	Assembly drawing of mechanical parts	5	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	3	63	62
Description			
An assembly drawing of mechanical parts module is a component of mechanical engineering education that focuses on teaching students how to create detailed drawings that represent the assembly of various mechanical parts. It involves the use of standard drawing techniques and symbols to communicate the design and construction of a mechanical system. Throughout the module, students typically work on practical exercises and projects that involve creating assembly drawings of various mechanical systems or components. They may use computer-aided design (CAD) software to create and modify the drawings, incorporating accurate dimensions, annotations, and other necessary details. Assembly drawing skills are crucial for mechanical engineers involved in design, manufacturing, and assembly processes. These drawings serve as a vital communication tool between engineers, manufacturers, and assemblers, ensuring the accurate production and assembly of mechanical systems.			

Module 20

Code	Course/Module Title	ECTS	Semester
mpe210	Physics	6.60	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	102
Description			
This module deals with the fundamental principles of how objects move under the influence of forces. It explores concepts such as Newton's laws of motion, distinction between scalar and vector quantities, calculating forces, understanding inertia, and the relationship between work and energy. It explores various forms of energy, including kinetic energy and potential energy Additionally, topics such as the work-energy theorem, conservation of mechanical energy, power, and different types of energy conversions, study of heat, thermal energy, and its transfer. It includes an exploration of the three modes of heat transfer: conduction, convection, and radiation. Concepts like temperature, specific heat capacity, thermal expansion, Additionally, topics related to the laws of thermodynamics, such as the first law (conservation of energy).			

Module 21

Code	Course/Module Title	ECTS	Semester
mpe301	Computer applications	5.40	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	2	48	87
Description			
This course aims to provide the student with the basic concepts and skills of the computer and the importance of using it in various fields of life. It deals with the concept of a computer and its hardware and software components and related concepts, how to represent and process data, computer operating systems with a focus on the skills of dealing with the Windows 10 operating system and a number of utility programs, and the basic skills of dealing with some Microsoft Office package programs (MsWord, PowerPoint Excel and Access). In addition to the concept of the Internet and its most important services, computer networks and their protection, and how to benefit from them, in a way that enables the student to employ the computer and the Internet in his academic and professional life in the future efficiently.			

Module 22

Code	Course/Module Title	ECTS	Semester
mpe302	Conduction and radiation heat transfer	6	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	2	78	72
Description			
The conduction and radiation heat transfer module is a component of studies in thermal engineering or heat transfer that focuses on understanding and analyzing the transfer of heat through conduction and radiation mechanisms. Throughout the module, students typically engage in theoretical analysis, numerical calculations, and problem-solving exercises to apply the principles of conduction and radiation heat transfer to real-world engineering problems. They may use mathematical methods, computational tools, and software simulations to analyze heat transfer phenomena and design efficient thermal systems. Understanding conduction and radiation heat transfer is crucial in various engineering fields, such as HVAC systems, energy systems, thermal management of electronic devices, and industrial processes where heat transfer plays a significant role.			

Module 23

Code	Course/Module Title	ECTS	Semester
mpe303	mechanical design	6.40	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	82
Description			
The mechanical design module is a component of mechanical engineering education that focuses on teaching students the principles, techniques, and best practices involved in designing mechanical systems, components, and products. It covers a wide range of topics related to the conceptualization, analysis, and implementation of mechanical designs. Throughout the module, students typically engage in design projects and practical exercises that involve designing mechanical systems or components, applying learned concepts and tools. They may also work on team-based design projects, where they collaborate to address real-world design challenges. The mechanical design module plays a vital role in preparing students to be proficient in designing innovative, functional, and efficient mechanical systems and products across various industries, including automotive, aerospace, consumer products, machinery, and more.			

Module 24

Code	Course/Module Title	ECTS	Semester
mpe304	Engineering analytics	5.80	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	1	63	82
Description			
The engineering analytics module is a component of engineering education that focuses on teaching students the principles and techniques of applying analytical methods and tools to solve complex engineering problems. It involves the use of mathematical and statistical analysis, data modeling, and computer simulations to extract insights and make informed decisions in engineering applications. Throughout the module, students typically engage in hands-on projects, case studies, and practical exercises that involve analyzing real engineering data, developing models, conducting simulations, and making data-driven recommendations or predictions. They may use software tools, programming languages, and data analysis platforms to perform the required analyses. The engineering analytics module equips students with the skills and knowledge to leverage data and analytical techniques to address complex engineering challenges. It is increasingly relevant in today's data-driven engineering fields, such as manufacturing, energy systems, transportation, and infrastructure, where informed decision-making and optimization are critical for achieving efficiency, reliability, and sustainability.			

Module 25

Code	Course/Module Title	ECTS	Semester
mpe305	Internal combustion engine	6.40	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	97
Description			
In this module, the students are typically learn about the various subsystems and components of an engine, their functions, and how they interact to produce power. This module covers both theoretical knowledge and practical hands-on experience to provide a well-rounded understanding of internal combustion engines. The internal combustion engine module is designed to be easily mounted and connected to other systems within a larger assembly or application. It simplifies the installation process and allows for easier maintenance and replacement when necessary. The specific design and configuration of an internal combustion engine module can vary depending on the intended application, power requirements, and environmental regulations. It may be optimized for fuel efficiency, power output, emissions control, or specific operating conditions.			

Module 26

Code	Course/Module Title	ECTS	Semester
mpe306	Convection heat transfer and heat exchangers	6.60	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	2	78	87
Description			
The convection heat transfer and heat exchangers module is a component of studies in thermal engineering or heat transfer that focuses on understanding and analyzing the transfer of heat through convection mechanisms and the design and operation of heat exchangers. Throughout the module, students typically engage in theoretical analysis, numerical calculations, and problem-solving exercises to apply the principles of convection heat transfer and heat exchangers to real-world engineering problems. They may use mathematical methods, computational tools, and software simulations to analyze convective heat transfer and design efficient heat exchanger systems. Understanding convection heat transfer and heat exchangers is crucial in various engineering fields, such as HVAC systems, power generation, chemical processes, and refrigeration systems, where efficient heat transfer and heat management are essential for system performance and energy efficiency.			

Module 27

Code	Course/Module Title	ECTS	Semester
mpe307	Numerical analytics	6	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	2	78	72
Description			
The numerical analysis module is a component of mathematics and engineering education that focuses on teaching students the principles, techniques, and algorithms for solving mathematical problems and approximating solutions using numerical methods. It involves the use of mathematical models and computational tools to perform calculations and simulations when analytical solutions are either impractical or unavailable. Throughout the module, students typically engage in theoretical analysis, problem-solving exercises, and computer-based simulations to apply numerical methods to real-world mathematical problems. They may also work on projects that involve modeling, simulation, and data analysis, where they apply numerical techniques to solve engineering or scientific problems. The numerical analysis module equips students with the skills to use numerical methods effectively, allowing them to solve complex mathematical problems, analyze engineering systems, and make informed decisions based on numerical simulations and computations. It is applicable across various disciplines, including engineering, physics, finance, computer science, and any field that requires mathematical modeling and analysis.			

Module 28

Code	Course/Module Title	ECTS	Semester
mpe308	Gas dynamics	5.80	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	82
Description			
Gas Dynamics is a course that explores the behavior of gases in motion. It delves into the principles and theories governing the flow, compression, and expansion of gases. Students will learn about the fundamental concepts of thermodynamics, conservation laws, and the equations of motion in order to analyze and predict the behavior of gases in various scenarios. Topics covered include one-dimensional flow, shock waves, supersonic and hypersonic flows, and nozzle design. Gas Dynamics provides a foundation for understanding and designing propulsion systems, aerodynamics, and other applications related to fluid dynamics.			

Module 29

Code	Course/Module Title	ECTS	Semester
mpe309	Electrical machines	5	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
In this curriculum, the student will learn the basics of connection in series, parallel, and mixed, and when the current is constant and the voltage is constant, and identify measuring devices, as measuring current differs from measuring voltage and resistance. And obtaining the same results, the student learns the amount of current and voltage entering the single loop in the case of two sources, as is the case in Kirchhoff's theory, and then the student experiences the maximum energy conversion, as it shows that there is a load that is drawn according to the source load.			

Module 30

Code	Course/Module Title	ECTS	Semester
mpe310	vibrations	6.60	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	102
Description			
The vibration module is a component of mechanical engineering or structural engineering education that focuses on understanding and analyzing the behavior of vibrating systems. It involves studying the principles of vibration, analyzing vibration phenomena, and designing systems to control or mitigate unwanted vibrations.			

Throughout the module, students typically engage in theoretical analysis, numerical calculations, and laboratory experiments to understand and apply the principles of vibration. They may use software tools for dynamic analysis, perform simulations, and analyze real-world vibration data.
Understanding vibration is crucial in various engineering disciplines, as it affects the performance, safety, and lifespan of structures, machinery, and mechanical systems. By studying vibrations, engineers can design systems to minimize vibrations, identify potential issues, and ensure optimal performance and durability.

Module 31

Code	Course/Module Title	ECTS	Semester
mpe401	Engineering project management	4.60	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	33	82
Description			
Engineering project management is focused on managing engineering projects - for example, designing a new office building. One key difference is that engineering project management requires the management of all aspects of the project, not just of the engineers or engineering work.			

Module 32

Code	Course/Module Title	ECTS	Semester
mpe402	control circuits	6	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	72
Description			
The control circuit module is a component of electrical engineering education that focuses on teaching students the principles and techniques of designing, analyzing, and implementing control systems using electronic circuits. It involves understanding the fundamentals of control theory, learning about various control components and circuits, and gaining practical skills in designing and troubleshooting control systems. Throughout the module, students typically engage in theoretical study, laboratory experiments, and practical projects to apply their knowledge and skills in control circuit design. They may work on hands-on projects to design and implement control systems for various applications, such as robotics, automation, motor control, or process control. The control circuit module is essential for students aspiring to work in fields involving automation, robotics, industrial control systems, and electrical systems with feedback control. It equips students with the knowledge and skills to design, analyze, and troubleshoot control systems, enabling them to create efficient and reliable control solutions.			

Module 33

Code	Course/Module Title	ECTS	Semester
mpe403	Heat system simulation	6.40	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	82
Description			
Design & Simulation of Thermal Systems is intended for mechanical engineering majors taking a thermal design course. It features outstanding practical coverage of thermal/fluid components and systems with thorough, optional review coverage of prerequisite thermodynamics, fluid mechanics and heat transfer. Extensive case studies and practical examples show students how the thermal design is done, and the modern techniques used to simulate and optimize such designs.			

Module 34

Code	Course/Module Title	ECTS	Semester
mpe404	parts of steam power plants	5.80	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	82
Description			
A parts of steam power plants module is an educational or training program that focuses on teaching the components, systems, and operation of steam power plants. Steam power plants are thermal power plants that generate electricity by harnessing the energy from steam produced by boiling water using heat from a fuel source. In a parts of steam power plants module, participants typically learn about the key components and systems that make up a steam power plant and how they work together to generate electricity. The module may cover both theoretical knowledge and practical hands-on experience to provide a comprehensive understanding of steam power plant operations.			

Module 35

Code	Course/Module Title	ECTS	Semester
mpe405	Refrigeration and air conditioning	7.20	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	2	78	102
Description			
The module on Refrigeration and Air Conditioning provides students with a comprehensive understanding of the principles, technologies, and applications of refrigeration and air conditioning systems. It covers both theoretical concepts and practical aspects related to the design, operation, and			

maintenance of these systems. Topics covered include fundamentals of thermodynamics, refrigeration cycles, refrigerants and psychrometrics, refrigeration components, air conditioning systems, system design and installation, system controls and maintenance, and energy efficiency and environmental considerations. Throughout the module, students will engage in practical exercises, laboratory work, and case studies to reinforce their theoretical knowledge and develop hands-on skills. By the end of the module, students will be equipped with the knowledge and skills to analyze, design, and optimize refrigeration and air conditioning systems while considering energy efficiency and environmental sustainability.

Module 36

Code	Course/Module Title	ECTS	Semester
mpe406	quality control	4.92	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	33	90
Description			
Quality control involves testing units and determining if they are within the specifications for the final product. The purpose of the testing is to determine any needs for corrective actions in the manufacturing process. Good quality control helps companies meet consumer demands for better products.			

Module 37

Code	Course/Module Title	ECTS	Semester
mpe407	Turbo machines	6.60	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	102
Description			
Turbomachinery refers to a class of machines that transfer energy between a rotor and a fluid. These machines are widely used in various industries, including power generation, aviation, and oil and gas. Turbomachinery includes turbines, compressors, and pumps, each designed to perform specific functions in different applications. The design and analysis of turbomachinery involve a complex combination of fluid dynamics, thermodynamics, and Mechanical Engineering. Engineers must carefully consider factors such as aerodynamics, structural integrity, and material properties when designing and optimizing these machines. Additionally, the development of modern turbomachinery relies heavily on advanced computational methods and modeling techniques. Turbomachinery continues to evolve as new materials, technologies, and design techniques become available. As a result, engineers in this field are constantly pushing the boundaries of what is possible, creating machines that are more efficient, reliable, and versatile than ever before. With their ability to convert energy from one form to another, turbomachines will continue to be a critical component of many important technologies in the years to come.			

Module 38

Code	Course/Module Title	ECTS	Semester
mpe408	gas and air power plant	6.24	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	93
Description			
A gas and air power plant module is an educational program that focuses on teaching the components, systems, and operation of gas and air power plants. Gas and air power plants utilize the combustion of gaseous fuels, such as natural gas or biogas, combined with air to generate electricity. In a gas and air power plant module class, participants typically learn about the key components and systems that make up a gas and air power plant and how they work together to produce electricity. This module may cover both theoretical knowledge and practical hands-on experience to provide a comprehensive understanding of gas and air power plant operations. Throughout the module class, participants may have opportunities for practical exercises, such as plant visits, equipment simulations, or case studies, to reinforce their understanding of gas and air power plant components and systems.			

Module 39

Code	Course/Module Title	ECTS	Semester
mpe409	Maintenance and operation of stations	6.64	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	103
Description			
The maintenance and operation of stations module is a component of engineering or technical education that focuses on teaching students the principles, practices, and skills involved in the maintenance and operation of industrial or infrastructure stations. It encompasses various aspects related to ensuring the efficient, safe, and reliable operation of stations, such as power plants, manufacturing facilities, transportation hubs, and other critical infrastructure. Throughout the module, students typically engage in theoretical study, case studies, simulations, and hands-on exercises to apply their knowledge and skills in maintenance and operation. They may also have opportunities for internships or practical projects in real-world stations, allowing them to gain practical experience and understand the challenges and complexities involved in station operations. The maintenance and operation of stations module prepares students for careers in various industries, including power generation, manufacturing, transportation, and infrastructure management. Graduates gain the necessary knowledge and skills to contribute to the efficient, safe, and reliable operation of stations, ensuring the smooth functioning of critical infrastructure and industrial processes.			

Module 40

Code	Course/Module Title	ECTS	Semester
mpe410	Graduation Project	5.60	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
3	6	45	95
Description			
The Graduation Project module is an essential component of many academic programs, particularly in engineering and other technical disciplines. It is typically undertaken by students in their final year of study and serves as a culmination of their educational journey. The module provides students with an opportunity to apply the knowledge, skills, and concepts they have acquired throughout their program to address a real-world problem or complete a substantial research project. The Graduation Project module aims to develop students' problem-solving, research, project management, and presentation skills. It encourages independent thinking, self-directed learning, and the integration of theoretical knowledge with practical application. The project provides students with an opportunity to demonstrate their readiness to enter the professional world by applying their skills and knowledge to solve real-world problems or contribute to the existing body of knowledge in their field. The specific requirements and expectations of the Graduation Project module may vary depending on the educational institution, program, and discipline. Students are typically guided and supported by a project advisor or a supervisory committee throughout the duration of the project.			

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